

relating to this project are addressed, comments and suggestions are invited from all parties interested in participating in the process.

Comments or questions concerning this proposed action and the EIS should be directed to the FHWA or the Vermont Agency of Transportation at the addresses provided above.

Issued on: March 29, 1982.

George A. Jensen,

Assistant Division Administrator, Montpelier, Vermont.

[FR Doc. 82-8166 Filed 4-7-82; 8:45 am]

BILLING CODE 4910-22-M

Maritime Administration

[Docket No. S-670, Sub. 1]

Equity Carriers, Inc., Asco-Falcon II Shipping Co.; Application

Notice is hereby given that Equity Carriers, Inc. (Equity Carriers) holder of a long-term operating-differential subsidy (ODS) contract in the worldwide bulk trades, has filed an application dated December 4, 1981, to amend its contract with respect to the vessel STAR OF TEXAS only to permit the carriage of dry bulk cargoes subject to the cargo preference laws of the United States including, but not limited to 10 U.S.C. 2631, 46 U.S.C. 1241 and 15 U.S.C. 616(a), at fair and reasonable rates. Concomitantly, Asco-Falcon II Shipping Company, the vessel owner, has applied for the total repayment of the construction-differential subsidy (CDS) paid on the vessel. Equity Carriers proposes that Article I-2(a) of its ODS contract be amended in its entirety, with respect to the vessel STAR OF TEXAS only, to read as follows:

(a) During the period of this Agreement, the Operator shall operate the STAR OF TEXAS for a minimum of 335 days per calendar year (pro rata for the first and last year of operation) in the worldwide carriage of dry bulk cargoes in the foreign oceanborne commerce of the United States, the carriage of such cargoes between foreign ports, and the carriage of cargoes subject to the cargo preference statutes of the United States including but not limited to 10 U.S.C. 2631, 46 U.S.C. 1241, and 15 U.S.C. 616a at fair and reasonable rates under the cargo preference laws of the United States. *Provided however*, That such carriage of cargoes subject to cargo preference statutes of the United States shall be subject to the following conditions and limitations:

(i) The STAR OF TEXAS shall not carry such preference cargoes in loads of less than 10,000 tons or more than 39,000 tons;

(ii) The Operator shall not receive operating-differential subsidy for any voyage in which the STAR OF TEXAS carries such preference cargo; and

(iii) Asco-Falcon II Shipping Company, the owner of the STAR OF TEXAS, shall undertake on terms and conditions satisfactory to the Board to repay the entire amount of construction differential subsidy paid by the Board with respect to the STAR OF TEXAS, such repayment to be made in level annual installments in arrears over a period of 25 years from delivery of the STAR OF TEXAS.

The applicants emphasize that they are not seeking coastwise employment for the vessel and that the release of domestic trading restrictions under section 506 of the Merchant Marine Act, 1936, as amended, is not being requested. The applicants expect that the domestic trading restrictions in the CDS contract relating to the vessel will remain in force.

This application supersedes the application dated August 3, 1979, by Equity Carriers to carry dry bulk preference cargo at fair and reasonable rates with or without ODS. That application was published in the *Federal Register* on June 20, 1980 under Docket No. S-670.

Interested parties may inspect this application in the Office of the Secretary, Maritime Subsidy Board, Room 7300, Department of Transportation Building, 400 Seventh Street, SW., Washington, D.C. 20590.

Any person, firm, or corporation having any interest in such application who desires to offer views and comments thereon for consideration by the Maritime Subsidy Board should submit such views and comments in writing, in triplicate, to the Secretary, Maritime Subsidy Board, at the address given above, by April 23, 1982. The Maritime Subsidy Board will consider such views and comments and take such action with respect thereto as may be deemed appropriate.

(Catalog of Federal Domestic Assistance Program No. 11.504 Operating-Differential Subsidy (ODS))

By order of the Maritime Subsidy Board.
Dated: March 31, 1982.

Robert J. Patton, Jr.,
Secretary.

[FR Doc. 82-0436 Filed 4-7-82; 8:45 am]
BILLING CODE 4910-81-M

Office of the Secretary

Minority Business Resource Center Advisory Committee; Meeting

Pursuant to section 10(a)(2) of the Federal Advisory Committee Act (Pub. L. 92-463; 5 U.S.C. App. 1), notice is hereby given of a meeting of the Minority Business Resource Center Advisory Committee to be held May 10, 1982, at 10:00 a.m. until 1:00 p.m. in

Room 10234-38 at the Department of Transportation, 400 7th Street SW, Washington, D.C. 20590. The agenda for the meeting is as follows:

—Report on surety bonding and financial assistance programs

—Report on survey on financial assistance needs of MBEs

Attendance is open to the interested public but limited to the space available. With the approval of the Chairman, members of the public may present oral statements at the meeting. Persons wishing to attend and persons wishing to present oral statements should notify the Minority Business Resource Center not later than the day before the meeting. Information pertaining to the meeting may be obtained from Ms. Betty Chandler, Minority Business Resource Center, 400 7th Street SW., Washington, D.C. 20590, telephone (202) 426-2852. Any member of the public may present a written statement to the Committee at any time.

Issued in Washington, D.C. on March 31, 1982.

Melvin Humphrey,

Director, Office of Small and Disadvantaged Business Utilization.

[FR Doc. 82-9208 Filed 4-7-82; 8:45 am]
BILLING CODE 4910-62-M

DEPARTMENT OF THE TREASURY

Internal Revenue Service

Tax Forms Coordinating Committee; Public Hearings and Request for Forms Suggestions

As part of its annual forms review process, the Internal Revenue Service will hold public hearings to receive comments and suggestions concerning its tax return forms, instructions, and related schedules. It should be emphasized that the comments may apply to any tax form issued by IRS. The hearings will be held in 3 separate cities on Tuesday, May 11, 1982. The hearings will be held in Jacksonville, Florida, St. Paul, Minnesota, and Honolulu, Hawaii, beginning at 10 a.m. local time.

A person wishing to speak at one of these hearings should write or call the Internal Revenue Service at the address or phone number given below for the city of the particular hearings he or she plans to attend. If IRS is contacted by letter, the letter should be marked "Public Hearings on Forms" and should give both the return address and telephone number of the person desiring to speak.

The addresses and phone numbers to contact IRS regarding the hearings, as

well as the hearing locations, are listed below:

Jacksonville

Internal Revenue Service, Attn: Public Affairs, P.O. Box 35045, Stop 620, Jacksonville, Florida 32202; Phone: (904) 791-2989.

Hearing Location: Internal Revenue Service, Federal Building, 400 W. Bay Street, Room 531, Jacksonville, Florida 32202.

St. Paul

Internal Revenue Service, Attn: Public Affairs, P.O. Box 43450, St. Paul, Minnesota 55101; Phone: (612) 725-7435.

Hearing Location: Internal Revenue Service, Federal Building & Court House, 316 N. Robert Street, Room 424F, St. Paul, Minnesota 55101.

Honolulu

Internal Revenue Service, Attn: Public Affairs, P.O. Box 50089, Honolulu, Hawaii 96850; Phone: (808) 546-2803.

Hearing Location: Internal Revenue Service, PJKK Federal Building, 300 Ala Moana Boulevard, Room C462, Honolulu, Hawaii 96850.

Although not required, it would be helpful to receive a copy of any written comments and suggestions a speaker may prepare. These should be sent to the appropriate mailing address listed above or may be left with the hearing panel on the day of the hearing.

In order to afford as many speakers as possible a chance to participate, each

speaker's remarks will be limited to 10 minutes. Persons who have advised IRS that they wish to speak at the hearings will be notified in advance concerning the approximate time for their scheduled appearance. The last date for submitting requests to speak is May 3, 1982.

However, if there is time remaining after scheduled speakers have been heard, the remaining time will be offered to persons in attendance not previously scheduled who wish to speak.

The panel for each hearing will be made up of representatives from the District Director's Office concerned and the National Office in Washington, D.C.

Request for Written Forms Suggestions

In addition to receiving comments at the public hearings, the Service also desires to receive written comments and suggestions for improving its tax return forms, instructions, and related schedules from those persons unable to attend the hearings. Again, it should be emphasized that the comments may apply to any tax form issued by IRS. The written submissions should be self-explanatory and in sufficient detail to communicate clearly what is being suggested.

Careful consideration will be given to all comments and suggestions received. However, individual responses to the submissions will not be made because of the volume of correspondence involved.

In order to meet our work schedule and early printing deadlines, it is requested that written submissions be made on or before June 1, 1982.

Comments and suggestions should be sent to the Chairman, Tax Forms Coordinating Committee, Room 5577, Internal Revenue Service, 1111 Constitution Avenue, NW., Washington, D.C. 20224. Further information concerning this notice may be obtained by calling (202)566-6254.

Dated: March 16, 1982.

Approved:

Joseph T. Davis,

Associate Commissioner (Policy and Management).

[FR Doc. 82-9506 Filed 4-7-82; 8:45 am]

BILLING CODE 4830-01-M

Office of the Secretary

[Supplement to Dept. Circular Public Debt Series—No. 9-82]

Treasury Notes, Series D-1989; Interest Rate

April 1, 1982.

The Secretary announced on March 31, 1982, that the interest rate on the notes designated Series D-1989, described in Department Circular—Public Debt Series—No. 9-82 dated March 24, 1982, will be 14% percent. Interest on the notes will be payable at the rate of 14% percent per annum.

Gerald Murphy,

Acting Fiscal Assistant Secretary.

[FR Doc. 82-9507 Filed 4-7-82; 8:45 am]

BILLING CODE 4810-40-M

Sunshine Act Meetings

Federal Register

Vol. 47, No. 68

Thursday, April 8, 1982

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

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1

FEDERAL DEPOSIT INSURANCE CORPORATION

Change in Subject Matter of Agency Meeting

Pursuant to the provisions of subsection (e)(2) of the "Government in the Sunshine Act" (5 U.S.C. 552b(e)(2)), notice is hereby given that at its open meeting held at 9:00 a.m. on Monday, April 5, 1982, the Corporation's Board of Directors determined, on motion of Chairman William M. Isaac, seconded by Director Irvine H. Sprague (Appointive), concurred in by Mr. H. Joe Selby, acting in the place and stead of Director C. T. Conover (Comptroller of the Currency), that Corporation business required the addition to the agenda for consideration at the meeting, on less than seven days' notice to the public, of the following matter:

Recommendation regarding the liquidation of a bank's assets acquired by the Corporation in its capacity as receiver, liquidator, or liquidating agent of those assets:

Case No. 45,142-L—Banco Credito y Ahorro Ponceno, Ponce, Puerto Rico

By the same majority vote, the Board further determined that no earlier notice of this change in the subject matter of the meeting was practicable.

Dated: April 5, 1982.

Federal Deposit Insurance Corporation.

Margaret M. Olsen,

Assistant Executive Secretary.

[S-503-82 Filed 4-6-82; 11:16 am]

BILLING CODE 6714-01-M

2

FEDERAL DEPOSIT INSURANCE CORPORATION

Changes in Subject Matter of Agency Meeting

Pursuant to the provisions of subsection (e)(2) of the "Government in the Sunshine Act" (5 U.S.C. 552b(e)(2)), notice is hereby given that at its closed meeting held at 9:30 a.m. on Monday, April 5, 1982, the Corporation's Board of Directors determined, on motion of Chairman William M. Isaac, seconded by Director Irvine H. Sprague (Appointive), concurred in by Mr. H. Joe Selby, acting in the place and stead of Director C. T. Conover (Comptroller of the Currency), that Corporation business required the addition to the agenda for consideration at the meeting, on less than seven days' notice to the public, of the following matters:

Application of Androscoggin Savings Bank, Lewiston, Maine, for consent to merge, under its charter and title, with Atlantic Federal Savings and Loan Association, Portland, Maine, upon its conversion to a state charter, and to establish the three offices of Atlantic Federal Savings and Loan Association as branches of the resultant bank.

Recommendation that the Corporation pursuant to Section 10(b) of the Federal Deposit Insurance Act conduct an examination of a national bank.

The Board further determined, by the same majority vote, that no earlier notice of the changes in the subject matter of the meeting was practicable; that the public interest did not require consideration of the matters in a meeting open to public observation; and that the matters could be considered in a closed meeting by authority of subsections (c)(6), (c)(8), and (c)(9)(A)(ii) of the "Government in the Sunshine Act" (5 U.S.C. 552b(c)(6), (c)(8), and (c)(9)(A)(ii)).

Dated: April 5, 1982.

Federal Deposit Insurance Corporation.

Margaret M. Olsen,

Assistant Executive Secretary.

[S-504-82 Filed 4-6-82; 11:16 am]

BILLING CODE 6714-01-M

3

FEDERAL ELECTION COMMISSION

DATE AND TIME: Wednesday, April 14, 1982 at 10 a.m.

PLACE: 1325 K Street, NW., Washington, D.C.

STATUS: This meeting will be closed to the public.

MATTERS TO BE CONSIDERED: Personnel Litigation. Compliance.

PERSON TO CONTACT FOR INFORMATION:

Mr. Fred Eiland, Public Information Officer; Telephone: 202-523-4065.

Morjorie W. Emmons,

Secretary of the Commission.

[S-510-82 Filed 4-6-82; 3:23 pm]

BILLING CODE 6715-01-M

4

FEDERAL MARITIME COMMISSION

TIME AND DATE: 9 a.m., April 14, 1982.

PLACE: Hearing Room One, 1100 L Street, NW., Washington, D.C. 20573.

STATUS: Parts of the meeting will be open to the public. The rest of the meeting will be closed to the public.

MATTERS TO BE CONSIDERED: Portions open to the public:

1. Agreement No. 8238-13: Modification of the Greece/United States Atlantic Rate Agreement to change the procedure for exercising independent action.

2. Agreement No. 10427: APL/Aleut Transshipment, Rate-Making and Agency Agreement.

3. Request for exemption from the filing requirements of section 18(b) of the Shipping Act, 1916, filed by Remolcadores y Chalanés, S.A. (USAMEX Hydro-Train).

4. Petition of Florida Customs Brokers and Forwarders Association for the removal of portwide exemptions at Pensacola, Port Everglades and Tampa, Florida.

Portion closed to the public:

1. Docket No. 79-83: Investigation of Unfiled Agreements in the North Atlantic Trades—Consideration of further proceedings.

CONTACT PERSON FOR MORE

INFORMATION: Francis C. Hurney, Secretary (202) 523-5725.

[S-508-82 Filed 4-6-82; 2:33 pm]

BILLING CODE 6730-01-M

5

FEDERAL MINE SAFETY AND HEALTH REVIEW COMMISSION

March 31, 1982.

TIME AND DATE: 10 a.m., Wednesday, April 7, 1982.

PLACE: Room 600, 1730 K Street, NW., Washington, D.C.

STATUS: Open.

MATTERS TO BE CONSIDERED: The Commission will consider and act upon the following:

1. Itmann Coal Company, Docket No. HOPE 76-197-P, IBMA 77-58. (Issues include whether judge properly found that the operator failed to make a timely notification of an accident in violation of section 103(e) of the 1969 Act.)

CONTACT PERSON FOR MORE

INFORMATION: Jean Ellen, (202) 653-5632.

[S-505-82 Filed 4-6-82; 2:32 pm]

BILLING CODE 6735-01-M

6

FEDERAL RESERVE SYSTEM

TIME AND DATE: 10 a.m., Wednesday, April 14, 1982.

PLACE: 20th Street and Constitution Avenue, NW., Washington, D.C. 20551.

STATUS: Closed.

MATTERS TO BE CONSIDERED:

1. Proposed revision to the Federal Reserve Bank employee salary structure adjustment policies.
2. Personnel actions (appointments, promotions, assignments, reassignments, and salary actions) involving individual Federal Reserve System employees.
3. Any items carried forward from a previously announced meeting.

CONTACT PERSON FOR MORE

INFORMATION: Mr. Joseph R. Coyne, Assistant to the Board; (202) 452-3204.

Dated: April 6, 1982.

James McAfee,

Associate Secretary of the Board.

[S-509-82 Filed 4-6-82; 3:16 pm]

BILLING CODE 6210-01-M

7

PAROLE COMMISSION

[2 P0401]

TIME AND DATE: 9 a.m. to 5:30 p.m., Wednesday, April 14, 1982.

PLACE: Room 420-F, One North Park Building, 5550 Friendship Boulevard, Chevy Chase, Maryland 20815.

STATUS: Closed pursuant to a vote to be taken at the beginning of the meeting.

MATTERS TO BE CONSIDERED: Appeals to the Commission of approximately 10 cases decided by the National Commissioners pursuant to a reference under 28 CFR 2.17 and appealed pursuant to 28 CFR 2.27. These are all cases originally heard by examiner panels wherein inmates of Federal prisons have applied for parole or are contesting revocation of parole or mandatory release.

CONTACT PERSON FOR MORE

INFORMATION: Linda Wines Marble, Chief Case Analyst, National Appeals Board, United States Parole Commission, (301) 492-5987.

[S-506-82 Filed 4-6-82; 2:33 pm]

BILLING CODE 4410-01-M

8

PAROLE COMMISSION

[2P0401]

TIME AND DATE:

9 a.m.-5:30 p.m., Thursday, April 15, 1982.

9 a.m.-5:30 p.m., Friday, April 16, 1982.

PLACE: Room 420-F, One North Park Building, 5550 Friendship Boulevard, Chevy Chase, Maryland 20815.

STATUS: Open.

MATTERS TO BE CONSIDERED:

1. Approval of Minutes of Meetings of October 7 and December 8, 1981.
2. Reports from the Chairman, Vice Chairman, Commissioners, General Counsel, Director of Research, and Case Operations.
3. Disclosure of Presentence Investigation Reports.
4. (a) What constitutes the appropriate district of supervision under certain circumstances. (b) Compliance with registration laws as to certain offenders.
5. Representation of Original Jurisdiction Appeal hearings.
6. Waiver of parole.
7. Multiple offenses.
8. Proposed amendments to instructions for scoring Item A of the Salient Factor Score.
9. (a) Revised scale of offense severity. (b) Creation of a new category Eight for certain offenses.
10. Proposed changes in offense severity or salient factor score treatment.
11. Ten-year reconsideration hearings.
12. Prohibition against using Unit Disciplinary Committee findings for rescission.
13. Credit for time in custody.

CONSENT AGENDA: The following consent agenda items, only if previously requested to be opened for discussion at the meeting on or before April 12, 1982:

14. Prisoners out of the institution.
15. Youth Corrections Act cases on bail.
16. Modifications to Procedures Manual, at paragraphs 2.39-01 and 2.49-02.
17. Rulemaking petition from Institute for Public Representation, Georgetown Law School.

CONTACT PERSON FOR MORE

INFORMATION: Mr. Peter B. Hoffman, Director of Research, U.S. Parole Commission (301) 492-5980.

[S-507-82 Filed 4-6-82; 2:33 pm]

BILLING CODE 4410-01-M

THE HISTORY OF THE
CITY OF BOSTON
FROM THE FIRST SETTLEMENT
TO THE PRESENT TIME
BY
JOHN H. COLEMAN
OF THE CITY OF BOSTON
IN TWO VOLUMES
VOL. I.
BOSTON: PUBLISHED BY
J. B. LEECH, 15 N. MARKET ST.
1845.

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Electrical Engineering Regulations

Thursday
April 8, 1982

Part II

Department of Transportation

Coast Guard

Electrical Engineering Regulations

DEPARTMENT OF TRANSPORTATION**Coast Guard**

46 CFR Parts 31, 32, 33, 35, 37, 38, 63, 71, 75, 76, 77, 78, 79, 92, 94, 96, 97, 99, 110, 111, 112, 113, 114-139, 161, 190, 192, and 196

[CGD 74-125A]

Electrical Engineering Regulations

AGENCY: Coast Guard, DOT.

ACTION: Final rules.

SUMMARY: These regulations contain the primary standards for the review of electrical installations on all new U.S. Coast Guard certificated vessels except small passenger vessels. These final rules replace in its entirety the existing Subchapter J (Electrical Engineering Regulations—46 CFR Parts 110-113). These amendments to the regulations clarify the regulations, bring them up to date, and delete unnecessary requirements. Further, the revisions incorporate recommendations for electrical installations as made by the Inter-Governmental Maritime Consultative Organization (IMCO) and the National Transportation Safety Board (NTSB).

EFFECTIVE DATE: These amendments are effective on June 1, 1982.

FOR FURTHER INFORMATION CONTACT:

Lieutenant Commander Roger D. Mowery, Project Manager, Office of Merchant Marine Safety (G-MMT-2/12), Room 1214, Department of Transportation, U.S. Coast Guard Headquarters Building, 2100 Second Street, SW., Washington, D.C. 20593, PH: 202-426-2206.

SUPPLEMENTARY INFORMATION:

Information collection requirements contained in this regulation (§ 110.25) have been approved by the Office of Management and Budget under the provisions of 44 U.S.C. Chapter 35 and have been assigned RCS/OMB Number 2115-0115. In the June 27, 1977 issue of the *Federal Register* (42 FR 32700), the Coast Guard published a notice of proposed rulemaking (CDG 74-125) in which it proposed to amend the Electrical Engineering Regulations. Interested persons were given until August 11, 1977 to submit comments. Fifty letters of comment were received. The total number of individual comments exceeded one thousand. As a result of comments, changes were made to the proposed regulations, which were significant and deserved further comment before final rulemaking. Several other changes were made that were new and considered necessary to

update the regulations. In order to make these changes public, a supplemental notice of proposed rulemaking (CGD 74-125A) was published in the March 3, 1980 issue of the *Federal Register* (45 FR 13982). The comment period on the supplemental notice of proposed rulemaking closed on April 17, 1980. Eighty-five comments were received in twenty-five letters of comment.

Discussion of Comments

Many revisions have been made to the proposed regulations and supplemental proposed regulations to improve clarity without changing the substance of the proposed regulations or which revert the regulations to the form of the existing regulations. These revisions, as well as the substantive revisions, result from comments received and Coast Guard review of the proposal and supplemental proposal.

Those changes that significantly altered the proposed regulations were published in the supplemental proposed regulations along with a discussion of the applicable comments. Comments received as a result of the supplemental proposed regulations are discussed in this document. Also discussed are those comments received on the original proposed regulations which were not discussed in the supplemental notice of proposed rulemaking.

Comments which address the Notice of Proposed Rulemaking (NPRM) are identified by the article or section number only. Comments which address the Supplemental Notice of Proposed Rulemaking (SNPRM) have the acronym SNPRM appearing after the article number. In some instances, where changed, the location of the material in these final rules is indicated.

In the discussion of some comments, it has been indicated that certain requirements have not been changed from the former requirements. This has been done merely for the convenience of the reader, not as justification for retaining the requirements.

General Comments

Some comments considered the statement in the preamble of the NPRM, that the proposed rules would result in a 50 percent decrease in the volume of the Electrical Engineering Regulations, misleading. They pointed out that the number of codes, standards, and specifications which are incorporated into the regulations by reference has increased by over 100 percent. However, the physical volume of the regulations was reduced. This was accomplished mainly by deletion of superfluous or duplicate requirements, substitution of Underwriters Laboratories Inc. (UL) and

Factory Mutual Research Corporation (FM) hazardous locations requirements by reference, and referencing the National Electrical Code when the wording was similar to the regulations. The number of references has increased, but it should be noted that many of the references are added for clarification purposes or to allow the use of additional or alternative equipment or devices aboard ship. The regulations have been extended to new pieces of equipment in only a few cases and then only to codify in regulations the present Coast Guard practice. For example, the former regulations reference one UL standard for fuses and one for equipment in hazardous locations; whereas, proposed regulations referenced 8 UL fuse standards and 11 hazardous location standards. This would not increase the scope of Coast Guard regulations; moreover, all UL standards for fuses and hazardous locations have been deleted in the final version due to reasons discussed later in this document.

Several comments expressed concern that the proposed regulations referencing the National Electrical Code (NEC) would cause greater variations in electrical installations aboard ships and that this would create problems for the Coast Guard inspectors. The Coast Guard considers the advantages of referencing the NEC to outweigh any possible disadvantages. In many instances of electrical installations there is not much difference between marine applications and shoreside applications. These are the areas that the Coast Guard has chosen to reference. In these cases, the wording of the NEC is very similar to what would be placed in regulations. In many of these areas, there have been, and will continue to be, advances in technology. The establishment supporting the NEC is in a better position to keep itself abreast of technology than the Coast Guard. While the regulations will require occasional reference to the NEC, this is not considered to be an undue burden. From the Coast Guard's viewpoint it is unlikely that may field inspectors would have occasion to refer to the NEC since most drawings are reviewed by Merchant Marine Technical Offices. Merchant Marine technical personnel will have the expertise and appropriate references to follow the NEC. From the viewpoint of the vendor and designer, reference to the NEC should be an advantage in many cases since frequently marine work is only a small part of their business and the NEC is commonly used in their shoreside work.

One comment suggested that the former regulations be retained for existing vessels because it would be impossible to amend or to upgrade the requirements for existing vessels. Also, there was concern that the industry in general and Coast Guard inspectors in particular would be required to maintain and to use the old regulations for inspection of existing vessels. It is true that these new regulations will supersede the old regulations only for electrical equipment and systems installed after the effective date of these regulations. Electrical equipment and systems installed before that date (existing installations) are required to meet the specifications in effect at the time of installation. Repairs to existing installations will have to meet the specifications in effect on the date of the original installation or the specifications in effect on the date of the repair (§ 110.01-3). Coast Guard inspectors and other interested persons will need copies of the old regulations for existing vessels. The Coast Guard considers this more efficient than republishing and intermingling old specifications with new specifications in the new Subchapter J. Old regulations applicable to existing vessels will gradually be replaced by new regulations. During the transitional period, it will be necessary to check both new and old regulations, but the only disadvantage of that will be the need to use two sets instead of one. On the other hand, there will be the convenience of a simpler structure that will take less time to peruse.

Miscellaneous Parts 31-99 and 190-196

It was proposed to amend Parts 32, 33, 35, 37, 72, 75, 77, 78, 79, 92, 94, 96, 97, 99, 190, 192, 195, and 196 by deleting the specific references to Subchapter J. The Coast Guard has decided in most of these sections to delete specific section references, but to retain the general reference to Subchapter J.

§ 35.30-30. One comment suggested that a size limitation should be placed on self-contained, battery-fed lamps on hazardous locations because rechargeable lamps may cause ignition in a fault situation. The intent was to require the lamps to be explosionproof. Section 35.30-30 has been rewritten to clarify this.

§ 76.25-25. A change to paragraph (i) corrects a clerical error; the reference to Subchapter J is changed to Subchapter F.

§ 78.16-1. One comment suggested allowing the emergency loudspeaker system to be used as a general loudspeaker system. The Coast Guard disagrees because it is important on an ocean or coastwise passenger vessel

which can carry 500 or more persons to have a communication system which has thorough and reliable coverage that cannot be adjusted or turned off locally such as would be typical and desirable for a general or entertainment loudspeaker system. However, further consideration will be given to this subject in the next revision of § 161.004, the Subchapter Q specification for emergency loudspeaker systems.

§§ 192.50-10 and 192.50-15. These sections have been revised to eliminate reference to a specific section in Subchapter J. Also, the requirements for illumination of lifeboat and liferaft launching operations have been made applicable to all vessels subject to Subchapter U since the problems of embarkation and loading of lifeboats/liferafts in the dark are similar, regardless of route. This revision is consistent with revisions previously made to §§ 33.20-1, 75.50-10, 75.50-15, 94.50-10, and 94.50-15.

SUBCHAPTER J—ELECTRICAL ENGINEERING

PART 110—GENERAL PROVISIONS

§ 110.01. Four comments suggested that the effective date of these revised regulations be based on contract date rather than installation date. The Coast Guard agrees.

Four comments suggested that it was necessary to clarify Subpart 110.01 with regard to existing vessels. One comment suggested keeping the former regulations for existing vessels and using the revised regulations for new vessels so that certain systems on existing vessels could be required by regulation to be upgraded by amendments to the existing regulations. The intent is to require vessels undergoing initial inspection and new construction to meet this revision as provided in the other subchapters. The regulations in this revision would not be retroactive except as specifically provided for. Thus by imposing retroactive regulations when needed, it will be possible to amend or upgrade requirements for existing vessels.

One comment stressed that this revision will require a listing of effective regulations by chronological date in proposed § 110.01-5. The previous edition of Subchapter J contains many dates in the text as well as notes of Federal Register changes since the last edition. The Merchant Marine Technical Offices as well as the many marine inspection offices will keep that edition on file and available for reference. Furthermore, in practice, the need to determine what regulations were in effect on a certain date does not occur frequently.

§ 110.10-1. Two comments favored the increased reference to specifications, standards, and codes used in other industries, specifically the National Electrical Code. Three comments expressed the view that the increased use of references increased the scope of the regulations without proper justification. The actual number of references listed in this subpart increased because of the following:

(1) The increased number of standards involved with explosionproof, intrinsically safe equipment, and fuses.

(2) Some of the references were mentioned in the text of the existing regulations but were not contained in the list of references.

(3) Some old standards were divided into two or more standards.

(4) Some new standards were added, but these basically formalized existing approval procedures for such things as battery chargers and appliances. The scope of the regulations has not increased.

One comment suggested that all the referenced documents in § 110.10-1 be written into regulation form. The Coast Guard disagrees. This would make the regulations unwieldy and unuseable. Furthermore, the reference procedure allows builders to purchase equipment to a UL, NEC, etc. specification knowing that it will meet the regulations.

Several comments suggested that the specific edition and/or revision of each reference in § 110.10-1 be spelled out in the regulations so that the various code committees would not possess de facto authority to promulgate standards having the effect of regulations without public comment. The incorporation by reference language in the final rule is that approved by the Director, Office of the Federal Register. The procedure ensures that current material is listed and that proper notice of any changes is provided. Use of a table, in lieu of inserting dates, addresses etc. directly in the regulations facilitates the annual updating required by the Office of the Federal Register.

The IEEE Standard Dictionary of Electrical and Electronics Terms (IEEE Standard 100) has been deleted from the incorporation by reference section. The Office of the Federal Register does not consider it necessary to approve, for incorporation, documents which are used for definition and do not contain specifications. However, this dictionary is still referred to in § 110.15-1.

One comment pointed out that the referenced standards frequently use discretionary words such as should, shall or may and requested that the extent to which they become mandatory

be defined. The word "may" is self-explanatory. It means that a course of action could be undertaken, but is not required. The words "should" and "shall" have been defined in § 110.10-1(c).

One comment recommended that the NFPA-493 be used as the reference document in § 110.10-1 on intrinsic safety in lieu of the UL standards. All documents regarding criteria for approval of explosionproof or intrinsically safe equipment have been deleted since the regulations do not reference them. The criteria is that the equipment be approved by an independent laboratory recognized by the Coast Guard. Additionally, all of the UL fuse standards have been deleted for the same reason. Evaluation of the laboratory equipment approval criteria (standards used) is one of the factors in recognition of a laboratory by the Coast Guard for the approval of explosionproof or intrinsically safe equipment and fuses.

§ 110.15-1. The maximum copper content requirement of corrosion resistant aluminum has been transferred from § 110.01-11 to § 110.15-1(b)(5)(viii). Three comments consider the 0.4 percent maximum copper content too restrictive and the up to 0.6 percent copper content suitable. One comment suggested reducing the maximum copper percentage to 0.25. The Coast Guard has consulted aluminum corrosion experts as well as many reference books obtaining a range of opinions. It concluded that the 0.4 percent maximum copper content is proper. Other alloys may be individually accepted if they pass the test outlined in § 110.15-1(b)(5)(x).

One comment suggested deleting the words "fiberglass reinforced" in reference to plastics from § 110.15-1(b)(5)(ix) since some plastics, such as polycarbonate, which is used in receptacles, etc. actually lose strength when used with fiberglass fill. The Coast Guard agrees. The words have been deleted.

Three comments recommended the requirement of some accelerated-life corrosion-resistance performance tests in § 110.15-1(b)(5). One comment suggested the NEMA ICS 1-110.58 test. Various types of accelerated-life corrosion-resistance tests have been considered. It appears that the most suitable and most commonly used is the ASTM B 117 test procedure using a salt water fog chamber in conjunction with the criteria contained in NEMA Publication No. IS 1.1. This test has been added to the regulations.

One comment questioned why a public washroom was considered a

"damp or wet location" whereas a private washroom was not in § 110.15-1(b)(7). The public washroom that contains showers has been called a damp location because experience has shown that it is normally damp, while a private washroom is not, due to the differences in the frequency of use. It should be pointed out that in practice, when public accommodations are provided, the showers are usually in a room separated from the washroom, making the washroom a dry location.

On comment suggested that if a galley, laundry, or other "damp or wet location" has a false ceiling, that the space above the false ceiling not be considered as a "damp or wet location." Also, several comments expressed the view that in § 110.15-1(b)(7), not all locations within a galley, a laundry, or a public washroom or toilet room that has a bath or shower should be considered as "damp or wet locations." It was pointed out, that some electrical equipment, receptacles, outlets, and switches in these spaces may be located out of the way of any ordinary exposure to excessive moisture or splashing water. The Coast Guard agrees. The definitions of "damp or wet location" and "dry location" have been changed.

On comment suggested including NEMA Type 12 enclosures in the note of § 110.15-1(b)(9) as meeting the dripproof definition. The Coast Guard agrees.

A definition of "dead ship condition" has been added at the request of one comment.

One comment requested that the specific NEMA type enclosure which would meet the proposed "waterproof machine" of § 110.15-1(b)(18) be specified. The definition indicated is basically the same as the NEMA definition, however, NEMA does not identify machine enclosures by type number. The definition is now located in § 110.15-1(b)(19).

§ 110.20-1. One comment suggested enlarging § 110.20-1 to include ground rules by which foreign shipyards can easily obtain Coast Guard review and approval of "equivalent" foreign standards. The same regulations must apply to U.S. flag vessels regardless of where constructed unless otherwise directed by law. If compliance with a standard or code is required by the regulations, both U.S. and foreign manufacturers have the same options open to them. No change to the regulations is warranted.

§ 110.25-1. In § 110.25-1(b), three comments recommended that a load analysis be required for only the worst operating condition. The number of operating conditions to be submitted is left to the discretion of the person

reviewing the plans because on some vessels the worst case may be obvious and on others it may not.

In § 110.25-1, three comments suggested that deck wiring plans of the power and lighting system with complete equipment identification should remain a plan approval requirement. After an evaluation of the comments received, the Coast Guard agrees. The proposed rules would have required the inspector to determine the acceptability of various equipment and evaluating it against UL specifications in many cases. This function has been returned to the technical plan reviewer who would have the UL listings and standards or other information more readily available. § 110.25-1(d) has been added.

Two comments suggested that approval procedures for engine order telegraphs (EOT's) be included in § 110.25-1. The Coast Guard agrees that plan submittal requirements should be included in § 110.25-1 for EOT's and other equipment as well. It has been Coast Guard practice to require sufficient plans and information to evaluate this equipment, so this will not be a new requirement. Two new paragraphs had been added in the SNPRM as § 110.25-1 (l) and (m) to clarify the plan submittal requirements for electrical equipment. Paragraphs (l) and (m) of the SNPRM have been rewritten and expanded so that in these final regulations, paragraphs (n), (o), and (p) clarify and consolidate the plan submittal requirements for electrical equipment.

One comment suggested that the wording "isometric or deck wiring" in § 110.25-1(c) be changed to "isometric or deck wiring or arrangement plans" to permit drawings that show both equipment arrangement and wiring on the same drawing. The present meaning of this phrase is sufficient to cover all methods of presenting wiring layouts.

Three comments suggested that it should be mentioned in § 110.25-1(c), that watertight doors, firescreen doors, and the emergency loudspeaker system drawings apply only to specific vessel types. Many of the systems indicated by this paragraph are not installed on all vessels. Therefore, the requirement for drawings would be applicable only to those vessels that have the systems. A sentence has been added at the beginning of § 110.25-1 to indicate that only plans for systems applicable to, i.e., installed on a specific vessel, need be submitted.

Three comments expressed the opinion that carbon dioxide alarm systems are prohibited from being

electrical and therefore should be eliminated from § 110.25-1(c). The Coast Guard agrees.

Three comments questioned the requirement for electrical plans of a supervised patrol system, since the system is not defined. The detailed requirements for the supervised patrol system are in 46 CFR 78.30-10.

Three comments questioned the intent and necessity of submitting the operating, maintenance and instruction manuals for automated propulsion and auxiliary machinery systems. This requirement is an existing requirement to support the safe operation, maintenance, and testing of systems that are intended to be automated. Special emphasis and attention must be given to the maintenance and testing programs for equipment which will not be attended by watchstanders.

Two comments suggested that the requirement for submittal of motor control circuit schematics be retained in § 110.25-1 since they would show compliance with disconnect requirements, overload protection, fusing, and control in the case of automation. The Coast Guard agrees that the submittal of motor control schematics is necessary and these regulations have been retained.

Three comments suggested defining the various stamps used by the technical and inspection offices. These stamps are self-explanatory and need no further definition.

Three comments suggested a section be added to describe the function of the field technical offices and the appeal procedure for plan disapprovals. The function of the field technical offices is to review plans for compliance with the regulations as indicated by the regulations. The appeal procedure is clearly spelled out in § 2.01-70 of this chapter and there is no need to repeat it in this subchapter.

§ 110.25-1SNPRM. One comment expressed the opinion that the requirements of this section will result in higher costs due to design complications and increased outfitting work. The plans required for submittal are necessary to check compliance with regulations. It will be advantageous to the builder and others if the Coast Guard discovers noncompliance at the plan review stage rather than later at the inspection stage. Moreover, there are no new plan submittal requirements. The Coast Guard has simply consolidated and clarified required submissions in § 110.25-1.

One comment stated that the requirement of proposed § 110.25-1(j), now § 110.25-1(k), to submit the hazardous location drawing for mobile

offshore drilling units (MODU's), was new. This is not true. Existing § 110.05-5(d)(22), may have been misinterpreted to required submission of the plan only for those MODU's which "carry hazardous materials in bulk". MODU's have hazardous (referred to as classified) locations as defined by regulations and therefore the required drawing must be submitted.

One comment considered the requirement of proposed § 110.25-1(j) to submit name, model identification, and equipment location for electrical equipment in hazardous locations to be unnecessary and burdensome. It suggested that the paragraph should set minimum acceptable criteria or standards and require the owner (operator) to meet these requirements. The Coast Guard has already established the acceptable criteria in regulations and the requirement for equipment identification is not new to the regulations as discussed in the preceding paragraph. The submission of the equipment information is necessary for the plan reviewer to check compliance with the regulations at the earliest possible time during the vessel certification procedure. The requirement for identifying the testing laboratory has been removed since that information may not be available when the plan is drafted. However, the submittal of this information at the earliest possible date is recommended. Laboratory approval of intrinsically safe and explosion-proof equipment will ultimately be checked during inspection, but early inventory and screening during plan review is advantageous to the builder. The Coast Guard publication, NVC No. 6-79, "Coast Guard Review of Merchant Vessel Plans and Specifications," contains further explanation of the plan review process and recommendations for plan submittals.

One comment requested that the Coast Guard define the differences between intrinsically safe components and intrinsically safe systems requiring UL or FM approval. It also questioned the requirement of drawings of intrinsically safe equipment. There is no UL or FM component approval. Intrinsically safe equipment receives approval by UL or FM only as a system. The Coast Guard requires submittal of plans and installation instructions for each intrinsically safe system after it has been approved by UL or FM so the system may be checked for safe installation in accordance with UL or FM approved plans and installation procedures. Submittal of information on intrinsically safe systems was required in former regulations under § 111.80-8.

One comment contended that since the fault current calculations and coordination analysis for generator distribution systems will come under NVC 6-79, the requirement for single point plan submission will be burdensome. The reasons for the single point plan submission are addressed by the NVC; the main reason being to reduce the administrative time taken by the plan reviewer. It is therefore important that information originating from many different vendors be coordinated before it is submitted to the Coast Guard. Moreover, fault calculations and coordination analysis were required in former regulations under §§ 111.50-20 and 111.50-25 and NVC 6-79 has been applicable to these items since its inception.

One comment argued that the requirement to prepare and submit fault current calculations and protective device coordination analysis serves no useful purpose on offshore supply vessels and that the average builder of these vessels does not have the expertise to perform the required calculations. The cut-off for requiring detailed fault current calculations and coordination analysis has been raised to electrical distribution systems of 1500 kilowatts or above; therefore, offshore supply vessels will require only the simplified assumptions of § 111.52-3. The simplified assumption calculation is not a new requirement and should be well within the expertise of the shipbuilders. Interrupting capacities of circuit protection devices will be checked by the Coast Guard using the simplified assumption calculation. Coordination is considered by the Coast Guard to be a necessary safety requirement; it is in the former regulations under § 111.50-25 and is now required in Subpart 111.51. However, the coordination analysis itself will not be a required submission if the electrical distribution system is less than 1500 kilowatts.

One comment requested clarification of the words "other independent laboratory approved by the Commandant" in proposed § 110.25-1(k), now § 110.25-1(l). This wording has been changed to "other independent laboratory recognized by the Commandant." Independent testing laboratories which are presently recognized by the Coast Guard for approval of explosionproof equipment and intrinsically safe systems are Underwriters Laboratories and Factory Mutual Research Corporation. In order for another independent testing laboratory to be recognized by the Commandant, it must in general have:

An adequate testing capability, standards that are recognized and generally accepted in the trade, and a listing and follow-up service. To be considered for recognition, and independent testing laboratory must present evidence that the above criteria are met.

§ 110.25-3. Three comments pointed out that the procedures for submittal of plans differ from the other subchapters and recommended keeping these regulations under the same procedures. The Coast Guard agrees and has amended the final rules accordingly.

§ 110.25-5. The proposed section has been revised and combined with § 110.25-3 due to new optional procedures which can be used by applicants for plan review of a vessel that is classed by the American Bureau of Shipping (ABS). These new procedures are explained in a Navigation Vessel Inspection Circular published by the Coast Guard.

§ 110.30-3. Fourteen comments addressed the inspection procedures in the proposed section. However, inspection procedures have been removed from the regulations since those were inspections which are necessary to check for compliance with regulation. The inspection procedures are not regulatory in nature. Inspection procedures are more appropriately discussed in the U.S. Coast Guard Marine Safety Manual. The comments have been considered in revisions to that manual.

§ 110.30-7. One commenter suggested that the words "important repairs or alterations" as used in this section be defined. This section has been revised for clarification. The Officer in Charge, Marine Inspection must be notified of any extensive repairs or alterations affecting the safety of the vessel. He will then determine the extent of inspection which will be required.

PART 111—ELECTRIC SYSTEM—GENERAL REQUIREMENTS

§ 111.01-1. The words "normal and" have been added before "emergency" to correct a clerical error.

§ 111.01-9. One comment suggested that the NEMA type or some standard be referenced to define "watertight" and "waterproof". The definitions are contained in § 110.15-1(b).

One comment indicated that a watertight enclosure could cause equipment exposure to high temperature. A second comment suggested the wording should be clarified. The Coast Guard agrees. The wording has been changed to clarify the intent that a piece of equipment may be

made watertight if it is placed in a watertight enclosure that is designed so that the temperature rise of the equipment when it is operating will not exceed the total rated temperature of the piece of equipment.

One comment suggested that motors that have commutators or slip rings should be watertight while other motors whose windings and rotors are totally encapsulated could be waterproof. The Coast Guard considers the definitions contained in § 110.15-1(b) to be sufficient.

§ 111.01-15. Five comments considered an assumed ambient temperature of 40 degrees C to be too low for spaces such as boilerrooms, engine rooms, and auxiliary machinery spaces. The Coast Guard agrees. These spaces will have an assumed ambient of 50 degrees C as per the former regulations.

One comment suggested the wording be clarified regarding use of equipment whose rated ambient temperature is less than the required assumed ambient. The wording has been modified.

§ 111.01-17. Three comments suggested the inclusion of 600 volts as a standard voltage while one comment suggested the inclusion of 480 volt systems. The table has been modified to include these standard voltages.

Three comments suggested that a listing of standard voltages be dropped. The Coast Guard disagrees. Such a listing is a benefit to designers and engineers indicating which supply systems the Coast Guard has accepted. It does not preclude acceptance of alternative systems.

One comment suggested that the propulsion standards should be dropped since each system is specifically designed. This part of the table has been deleted.

One comment suggested that the table be made clearer. This has been done.

One comment suggested that 440 volt high intensity lighting be added as a standard for hold and deck applications. The Coast Guard agrees.

§ 111.05-3. One comment asked if this section required a lug inside or outside the equipment or in both locations. The intent of this section is not to design or require a specific grounding method. A metallic box is usually grounded by the attachment whereas a fiberglass box would require an external grounding lug if it was to be used with a cable that did not have an equipment ground.

Two comments indicated that paragraph (b) was too general. The Coast Guard agrees and has changed the wording. The revised language "to prevent any person from accidentally contacting energized parts" clarifies and

limits this provision. This paragraph is now paragraph (a).

§ 111.05-5. This section has been combined with § 111.05-3.

§ 111.05-7. Three comments questioned the requirement that the armor of a single conductor alternating current cable should be grounded only at the midpoint. In practice, single conductors are used mainly in high current circuits such as propulsion and generator cables. If these cables are grounded in more than one point it would be possible to set up an induced current circuit. The Coast Guard considers this requirement to be necessary.

§ 111.05-11. Two comments recommended that hull return systems be permitted for cathodic protection systems, welding systems, and insulation level monitoring devices. The Coast Guard agrees. The regulations have been modified to permit cathodic protection, engine starting, insulation level monitoring, and in some cases, welding systems.

§ 111.05-15. Three comments indicated that this section was not clear and that it would prohibit an internally Y-connected generator to be utilized in an ungrounded system. It was not intended to prohibit this type of system. The section has been modified for clarification.

§ 111.05-17. One comment suggested clarification of the wording of the first sentence, that all generation systems would not be required to be grounded. The Coast Guard agrees and the wording has been changed to make the requirement applicable only to grounded systems.

Two comments suggested deleting paragraph (c) since it allows only a high impedance ground. It was pointed out that low impedance and solidly grounded neutrals have been safely used for many years and that the solidly grounded neutral is probably preferred. The Coast Guard agrees. Paragraph (c) has been deleted. The requirement for the neutral of a dual voltage system has been added as a paragraph (b) to § 111.05-15.

§ 111.05-21. One comment suggested that the requirement for ground detection was meaningless for grounded systems and should be limited to ungrounded systems. The Coast Guard disagrees. The requirements for a ground detection system for a grounded neutral alternating-current system are contained in § 111.05-27.

The words "ship's service" have been added before "power system" in § 111.05-21(b) to clarify that ground detection is not required for the

emergency power system. Similar revisions have been made to §§ 111.30-29(e)(3) and 111.30-29(f)(2).

One comment asked for clarification of "distribution system" as used in § 111.05-21(d). The wording has been changed to "power or lighting distribution system" to limit the applicability of this paragraph to power and lighting systems and to exclude instrumentation systems.

§ 111.05-23. Two comments questioned the clarity of paragraph (a). The confusion was apparently the result of an error which had placed the word "and" between the words "generator" and "distribution." The paragraph has been rewritten to clarify the intent that all ground indicators including the emergency lighting system ground indicator be at the main switchboard.

One comment suggested changing the word "main" to "normal" as a more precise statement. The Coast Guard agrees.

§ 111.05-25. One commenter suggested that lamp wattages in subparagraph (a)(2) should be left to the designer and are not a safety function. The Coast Guard disagrees. For instance, if a 150 watt bulb was used, the necessary sensitivity would not be obtained in a standard system. Another factor that affects the sensitivity is the cabling capacitance. It has been determined by experimentation that wattages within the specified range are most sensitive for most normal ships. If a designer feels that this is not adequate for an installation, an equivalence approval under Subpart 110.20 should be requested.

One comment suggested that a provision be added in paragraph (b) for a switch arrangement when more than one ground detector system is in parallel. The comment gave as an example the situation where the main bus and the emergency bus were being fed from one generator. Ground detectors should not be in parallel. The main power ground detection lamps would indicate a ground on the emergency bus when the bus-tie is closed. Section 111.05-21 has been revised to not require ground detection on the emergency bus. Ground detection is still required for the emergency lighting system. A parallel circuit will not be set up if the indicator lamps are on the secondary side of any transformer (i.e. main or emergency lighting system).

§ 111.05-27. One comment considered requiring an ammeter with a full scale range of 10 amperes to be too restrictive in that it prohibited a log type ammeter where 0 to 10 amperes is a large percentage of the scale. The Coast

Guard agrees. The wording has been changed to require clear definition of the reading in the 0 to 10 ampere range.

Another comment stated that a 10 ampere range is specified for the ground ammeter whereas § 111.05-17(c) permitted a 20-ampere ground current. The requirement for a high reactance ground was eliminated by deletion of § 111.05-17(c).

Another comment stated that if a high reactance ground as described in § 111.05-17(c) was used, a ground fault on the neutral conductor would make the detection system described in § 111.05-27 inoperative. The Coast Guard agrees. Section 111.05-17(c) has been deleted.

§ 111.05-31. One comment suggested including in the table the metric equivalents of the specified cable sizes. The metric equivalents have been included. Additionally the format has been changed to accommodate the metric system.

§ 111.05-33. One comment considered requiring the grounding conductor to be at least as large as the power conductor that supplies the equipment to be excessive. The Coast Guard agrees and has modified the requirement to agree with the National Electrical Code.

§ 111.05-35. Two comments requested that the difference between "grounded conductor" and "grounding conductor" be clarified. These terms are adequately defined in both the IEEE Standard Dictionary of Electrical and Electronic Terms and in the National Electrical Code.

In paragraph (a), one comment recommended that all neutral conductors, grounded or ungrounded, be covered with white or gray insulation. On grounded and ungrounded systems, it is recommended that conductor identification be consistent throughout the vessel. However, this color coding requirement has been deleted since it is in conflict with standard marine color coding and would have required changing the color at each connection on three wire ungrounded systems.

One comment proposed the addition of a paragraph (d) requiring ungrounded conductors of different voltages to be marked with different colors and the phases be clearly indicated. The cables are required to have each conductor color coded by IEEE No. 45 as required by § 111.60-1 of this subchapter. The Coast Guard does not consider it important that the phase be indicated on each current carrying conductor.

One comment considered the requirements of paragraphs (a) and (b) to be too restrictive in that duplicate stocks of cable would be required for color code purposes. The Coast Guard

agrees and the requirements have been deleted as discussed above.

§§ 111.05-37 and 39. One comment recommended prohibiting a switch in any grounded conductor except in a circuit serving equipment located in a hazardous area. The Coast Guard disagrees. A switch or circuit breaker that simultaneously disconnects grounded and ungrounded conductors is a safe installation and should be allowed.

§ 111.10-1. Three comments pointed out that Part 112 did not require an emergency generator as indicated by this section. The wording has been changed and the section has been renumbered as § 111.10-3.

One comment suggested that the heading should be changed to indicate a normal or ship's service system to distinguish it from the emergency system. The heading has not been changed; however, definitions have been added in a new § 111.10-1.

§ 111.10-3. Two comments suggested that a definition of the phrase "except full power to electric propulsion motors" be provided. The regulations have been modified to remove this phrase. This section is now numbered § 111.10-4.

One comment suggested that this section should be clarified especially in how it relates to electrical propulsion. The subpart has been clarified by the inclusion of the two definitions in § 111.10-1. Also, paragraph (d) has been added to make the requirements more applicable to drilling units and to clarify that the intent of these regulations was not to require so called "take home power" for the electrical propulsion system.

Paragraphs (b) and (c) have been added to clarify the intent of these regulations if shaft driven or waste heat generators are used. The intent of the Coast Guard's power supply requirements is that the supply to the ship's service loads must not be interrupted during normal operations of the vessel. This intent is also reflected by IMCO. IMCO Resolution A 325(IX) is the basis for the required number of generators and generator capacities. In that resolution, IMCO recommends that the arrangements of the ship's main source of power shall be such that the ship's service loads be maintained regardless of the speed and direction of the main propelling engines or shafting. A shaft driven generator that is attached to a shaft with either a fixed pitch propeller or a controllable pitch propeller operating along an rpm/pitch curve will not meet the IMCO recommendation because it will not be available under all operating conditions.

Such a generator may, however, be provided as a supplemental generator. If it is provided as an additional or supplemental generator and is used to supply power for ship's service loads, it is essential that it provide a continuous and uninterrupted source of power under normal operational conditions. Any speed change or throttle movement is considered a normal operational condition and must not cause a power interruption. On the other hand, a shaft driven generator that is attached to a shaft capable of being operated at constant speed under all operational conditions (i.e. pitch control only) may be capable of providing electric power under both maneuvering and steady state conditions and may be counted towards the required ship's service generating capacity. However, the other required generators must be independent of the main propelling engines and shafting and capable of supplying the ship's service load. The above rationale also applies to a generator dependent upon waste heat.

§ 111.10-5. One comment requested clarification of the term "energy source." The term "energy source" was intended to mean a boiler, diesel, or gas turbine. A definition of energy source has been provided.

§ 111.10-7. One comment indicated agreement with the regulation that new vessels be required to have dead ship start up capability but suggested that the requirement be extended to existing vessels which undergo alteration to lengthen their useful life. This will be considered at a later date.

One comment requested a definition of dead ship. A definition has been included as § 110.15-1(b)(8).

§§ 111.10-9 and 111.10-11. Fifteen comments addressed the requirements for two transformers if transformers are an essential part of the power and lighting supply system. The comments indicate that there was considerable confusion over the intent of these requirements. These requirements are contained in IMCO Resolution A.325(IX). The intent is that if transformers are used to feed the main ship's service bus in lieu of low voltage ship's service generators, they should be duplicated in the same manner as the ship's service generators. This situation would occur when two or more medium or high voltage generators are used for electric propulsion or to power some industrial function. This medium or high voltage power would then be transformed to 450-480 volts for utilization in the ship's service distribution system. These transformers are the ones required to be duplicated. Sections 111.10-9 and 111.10-11 have

been rewritten to more clearly reflect this intent.

Four comments suggested that three transformers connected in a delta-delta configuration but sized in a way that an open-delta configuration of two could handle the load be considered acceptable in lieu of two separate transformer banks. This configuration is not considered as being equivalent to the two or more ship's service generators normally found on conventional ships.

One comment asked for clarification as to whether the transformers are required to be provided with automatic transfer switches. Automatic transfer switches are not required but may be used.

Two comments suggested that the requirements be generalized since motor-generator sets and DC-AC inverters could perform the same function. Such systems will be extremely rare and are capable of being handled under § 110.20.

§ 111.12-1. One comment suggested that as some generators use grease lubricated bearings, sensing of low oil pressure at the prime mover bearings should be permitted. Also it was indicated that Subpart 112.50 should be noted. This comment is not understood. Low lubricating oil pressure may be alarmed. Section 111.12-1(c) requires automatic shutdown upon loss of lubricating oil pressure. It should be pointed out that section 111.12-1(a) already has a reference to Subpart 112.50 for emergency generator prime mover requirements.

One comment suggested that in certain installations the operators would rather lose a generator than have a power outage. Unless the prime mover was designed and approved to operate with no lubricating oil pressure, it should shut down upon loss of lubricating oil pressure. The regulations have been changed to allow acceptance of prime movers that do not require oil pressure for lubrication purposes.

§ 111.12-3. Six comments were in opposition to the proposed regulation prohibiting static exciters. Some comments indicated that if automatic field flashing was installed it should be permitted while other comments stated that it should be permitted if permanent magnet field flashing was used. The intent of the proposed rule was to prohibit battery type field flashing and residual-type that lose the residual magnetism over a short period of time. The regulations have been modified to indicate this intent.

§ 111.12-5. Two comments suggested that paragraphs (b), (c), and (d) be eliminated because the requirements

were contained in ABS rules. The Coast Guard disagrees. The ABS rules require moisture condensation protection only for generators weighing over 1,000 pounds. Since condensation and moisture collection can be a problem in any generator regardless of size and function, the Coast Guard concluded that in order to protect the integrity of generator insulation, all generators should have this protection regardless of size and that all generators should have dampers in each non-recirculating system air duct, not just propulsion generators as indicated by the ABS rules.

Three comments asked clarification of the term "protected machine." Section 110.15-1(a) indicates that electrical terms are used as defined in "IEEE Standard Dictionary of Electrical and Electronics Terms" (IEEE Standard No. 100). This publication defines "protected machine" as being "an open machine in which all openings giving direct access to live or rotating parts are limited in size by design or by screens, grilles, expanded metal, etc. to prevent accidental contact with such parts." The definition continues to give specific requirements. The Coast Guard concluded that this definition needs no further clarification.

One comment suggested that the requirement for dampers in each non-recirculating systems air duct is not a generator construction feature and should not be located in this section. The Coast Guard concluded that although this is a generator installation requirement, its most appropriate location is in this section.

One comment asked for clarification as to whether ABS shop inspectors would be required for generators being installed on non-self-propelled drilling units. The generator requirements for ships and drilling units are identical; however, it was not the intent of section 111.12-5(a) to require ABS shop inspection of the generator. The regulations have been modified to clarify this intent.

§ 111.12-7. Two comments suggested that short circuit protection be allowed on the voltage regulation circuit. The Coast Guard agrees.

§ 111.12-9. One comment suggested that the terminology "trip setting" be clarified. Paragraph (a) has been revised as the result of other comments on § 111.60-1 and these words have been eliminated.

Four comments suggested clarification of paragraph (b). The intent of paragraph (b) was to require cables from two or more generators to be separated. This requirement was

determined to be unnecessary and has been deleted.

§ 111.12-11. Three comments recommended modifying paragraph (b) to include medium voltage vacuum circuit breakers. The Coast Guard is not prepared to accept vacuum circuit breakers at this time except on a trial basis.

Two comments suggested reference to short time delay trips in paragraph (d) to avoid interpretations that such trips are not permissible. The wording was changed in the SNPRM. This paragraph is now paragraph (c).

In paragraph (f)(1), three comments questioned the setting of the instantaneous trips above the maximum asymmetrical short circuit current available from the generator. An instantaneous trip is not allowed on alternating current generators if only two ship's service generators are installed. An instantaneous trip is required only if three or more alternating-current generators can be paralleled. This arrangement is necessary to obtain the selectivity required by § 111.51-3 to protect two or more generators from feeding a fault in another generator. Section 111.12-11(f) was revised in the SNPRM and is now § 111.12-11(e).

§ 111.12-11, SNPRM. One comment interpreted § 111.12-11(b), which allows air circuit breakers only, as not allowing molded case breakers. A molded case breaker is considered an air circuit breaker since its contacts open and close in free air. Therefore, molded case breakers are allowed.

One comment expressed confusion with § 111.12-11(d)(2), and stated that the ABS does not recognize an overload rating. The ABS does recognize setting long time overcurrent protection at 115% of the overload rating of special-rated machines in § 35.119.1 of their "Rules for Building and Classing Steel Vessels."

Eight comments expressed concern with § 111.12-11(g). Some of them pointed out that it is not always practical to layout the engineroom so that the generator is visible from the control room. The Coast Guard agrees. Also, the comments expressed concern that requiring a remote sensing mechanism that will open the generator breaker and also secure excitation will instill needless complexities into the circuit protection. The Coast Guard agrees. The regulations still require that a generator and a main switchboard be located in the same space (§ 111.30-1) and that the circuit breaker be on the switchboard. However, for the purpose of this section and § 111.30-1 of the regulations, the following are not considered as separate spaces:

(1) A control room that is inside of the machinery casing and;

(2) A dedicated switchgear and semiconductor rectifier (SCR) compartment on a mobile offshore drilling unit which is separate but directly adjacent to and on the same level as the generator room.

§ 111.12-13. One comment recommended that more complete requirements be developed concerning protection of the propulsion generator. The number of vessels utilizing electric propulsion systems are limited and are usually of a specialized nature. The requirements necessary for some systems would be unsatisfactory for other systems. The intent of § 111.12-11 and the concept of continuity of service requires special consideration in each case.

Subpart 111.15. Throughout the Subpart, the wording has been changed to clarify that battery categories are based upon the size of the "battery installation". A "battery installation" includes all battery cells or units of the same size and type connected in series. IEEE Standard No. 45 has been referenced for battery specific gravity in § 111.15-2.

§ 111.15-3. One comment suggested that a provision should be added to allow Nickel-Cadmium (Ni-Cd) batteries to be classified as moderate when connected to a battery charger whose output is greater than 2 KW because these batteries evolve hydrogen at a slower rate than lead-acid batteries. The Coast Guard agrees that Ni-Cd batteries usually evolve hydrogen at a slower rate than lead-acid batteries, however the requirements of § 111.15-3 will remain in effect except on a case-by-case basis. The Coast Guard will determine equivalency under § 110.20 upon submission of data showing equivalency.

§ 111.15-10. Three comments indicated a manufacturer could not be found of a Class 1, Division 1, Group B approved motor and suggested stating that the motor be located in a non-hazardous area in lieu of citing the 10 foot rule. It is understood that there are at present no Class 1, Division 1, Group B explosion proof motors because there is not sufficient demand to warrant the cost of testing. The option to use such a motor should remain as an alternative to locating the motor in a non-hazardous area. Section 111.15-10(b)(2) has been modified for clarity.

Paragraph (d) has been rearranged for clarity.

§ 111.15-20(d). Three comments suggested that the cable and overcurrent protective devices be based on connected load. The Coast Guard

considers the maximum charging or maximum discharge current, whichever is greater to be a more valid criterion since, if the batteries are completely discharged, it is probable that the recharging current will be higher than the current drawn by the loads. It is undesirable to have an overcurrent device operate during this recharging period.

§ 111.20-15. One comment stressed that this section allowed a substantial increase in transformer overcurrent protection and asked if this relaxation was warranted. It also indicated that there were no short circuit requirements in Article 450 of the NEC as implied by the regulation. The difference between the old and new regulations is that the primary side overcurrent device setting or rating has been increased from 115 to 125 percent. This was done to bring the Coast Guard's requirements into line with the national standards. The comment is correct in that the NEC does not use the words "overcurrent and short circuit" protection. The definition of "overcurrent" protection, in IEEE Standard 100 and the NEC, includes short circuit protection. This problem has been corrected by deleting the redundant words "and short circuit."

Table 111.25-15. One comment suggested that the words "Lifeboat winches" be changed to "Boat winches" in keeping with revised Subpart 111.95. It suggested correcting a typographical error where the short time rating of the boat winch was indicated as one-thirteenth in lieu of the correct one-twelfth. The Coast Guard agrees with the above editorial changes. Section 111.25-15 has also been revised editorially.

§ 111.30-1. One comment indicated that paragraph (a) appears to contradict § 110.15-1(b) which defines a machinery space as a damp or wet location. The wording has been changed to require an installation in a location that is as dry as possible.

One comment considered paragraph (d) to be in conflict with § 56.50-1(d) of this chapter. It should be pointed out that this regulation supplements § 56.50-1(d). It has been revised to more closely parallel § 56.50-1(d) and is now § 111.30-1(b).

Several comments were received concerning whether in paragraph (e) a switchboard located in a control room was considered to be in the same space as the generator. Section 111.12-11(g) has been revised to indicate that a control room that is located in a machinery room is considered to be part of the machinery space. Three comments indicated that many drill

units presently do not have this arrangement and in some designs with a large electrical plant, a generator could not fit in the room containing the electrical distribution and control equipment. Also an air conditioned space is often necessary for the semiconductor rectifier (SCR) and control equipment. The regulations have been modified to permit other arrangements when necessary. This requirement is contained in IMCO Resolution A.325(IX) and the latest proposed draft of IMCO requirements for Machinery and Electrical Installations, Mobile Off-shore Drilling Units.

§ 111.30-4. *SNPRM*. Two comments considered this relaxation of current regulations not to be safe. After further study, the Coast Guard agrees and the existing requirements has been restored to require circuit breakers which can be removed from the front without unbolting bus connections or cable connections or deenergizing the supply.

§ 111.30-5. Three comments indicated that there were no structural standards cited for switchboards. The structural requirements in the existing regulations have been added.

One comment suggested that door positioners be required on hinged switchboard panels greater than 45 inches high or 24 inches wide as per requirements for motor controller enclosures. This change has been made.

§ 111.30-9. One comment asked for a definition of an "environmentally controlled" space and suggested that it would be applicable to other parts of the vessel. The proposal to drop the requirement for a dripshield in an environmentally controlled space has been deleted. A dripshield will be required on all switchboards.

One comment suggested that horizontal or vertical front non-conducting handrails be permitted. The regulations do not, at the present, specify orientation. Any handrail orientation that satisfies the intent of this paragraph is satisfactory.

§ 111.30-11. One comment suggested that Electric Grade Sheet Deck Covering also be accepted in addition to non-conducting mats and gratings. This Electric Grade Sheet Deck Covering will be acceptable provided it meets and is installed in accordance with Mil-M-15562.

§ 111.30-13. One comment suggested adding control transformers to the list of devices whose metal case must be grounded. The definition of "instrument transformer" contained in IEEE Standard 100, IEEE Standard Dictionary of Electrical and Electronic Terms, includes transformers for instrument,

controls and protective devices. This standard is referenced by § 110.15-1(a).

Two comments indicated that there were designs in which grounding the secondary windings of instrument transformers as required in paragraph (b) could not be accomplished in some SCR systems. The information available to the Coast Guard indicates that problems developed in the early SCR systems when the secondary windings of some of the instrument transformers were grounded. The modern SCR systems have eliminated this problem. Article 250-121 of the NEC requires the secondary windings of all switchboard instrument transformers to be grounded.

§ 111.30-17. Two comments suggested that overcurrent protection should be permitted for the devices listed in paragraph (b). One of these comments suggested that short circuit protection be provided while the other comments suggested that the entire paragraph be deleted. The Coast Guard agrees that short circuit protection can be provided for these circuits; however, overload protection must not be provided. The short circuit protection is allowed with a minimum setting of 500 percent of the expected current in a new paragraph (c). Paragraph (d) has been added to retain the requirements of § 111.30-1(i)(2) of the former regulations regarding current transformers.

§ 111.30-19. One comment considered the bus sizing required in paragraph (a)(1) not to allow for diversity and that it was not normally used. This sizing requirement has been used in the marine field for a number of years as a minimum requirement and has proved satisfactory.

In paragraph (f)(1), one comment questioned why only TA, TBS and SIS wire were allowed in switchboards and types FEP, RHW and XHHW were not allowed. The Coast Guard requires that all switchboard wires be capable of passing the flammability test contained in UL Standard 83. TA and TBS wire meet this test as do some SIS wires (thus the requirement in § 111.30-19(f)(4)). Most FEP, RHW and XHHW do not meet this flammability test. Other wire types may be used only after equivalency is established.

One comment questioned the relaxation of the switchboard wire size from a minimum of 14 AWG to 18 AWG in subparagraph (f)(3). The minimum switchboard wire requirement has been returned to 14 AWG as per existing regulation. Many reasons entered into this decision, the primary one being that the three acceptable wire types TA, TBS, and SIS are approved for a minimum size of 14 AWG. See Article 310-13 of the National Electrical Code.

The 14 AWG minimum size is also a requirement of IEEE Standard No. 45-1977.

Six comments pointed out that the reference to Table A34 in paragraph (b) should be Table A27. This has been corrected. Also, two comments suggested that since the NPRM allowed a 43 degrees C ambient in machinery spaces, a factor should be used to allow a higher ampacity for 40 degrees C ambients since the table is based on a 50 degrees C ambient. The 40 degrees C engineroom ambient has been returned to 50 degrees C so no factor is needed.

§ 111.30-23. Two comments pointed out that the referenced document was ANSI C37.20 as indicated in this section and not C37.25 as indicated in the preamble. This was a typographical error in the preamble.

§ 111.30-24 *SNPRM*. One comment considered this requirement to be unnecessary on a mobile offshore drilling unit. The Coast Guard agrees since the requirement originated with IMCO Resolution A.325(IX), which does not apply to MODU's.

§ 111.30-25. One comment suggested that the word "main" as used in paragraph (e) be defined or changed. The term has been changed to "ship's service" for the power system and "normal" for the "lighting system." Also, in paragraph (e), and exciter field rheostat has been added as required switchboard equipment. This item was in the former regulations and was inadvertently left out of the NPRM.

In paragraph (f), one comment suggested that a reverse phase relay be required to prevent connecting shore power in an out-of-phase sequence. The Coast Guard concludes that such a device should not be included in a set of minimum requirements, but recommends that the device be installed if a vessel uses a shore tie extensively.

Paragraph (g)(1) has been revised to clarify the intention that the generator circuit breakers must be capable of being controlled from the area of the control console and to allow remote operation of the circuit breakers if the switchboard is not within the control room.

The requirement to sectionalize the main switchboard has been moved from § 111.30-25(h) in the proposed rules to § 111.30-24 since the IMCO A.325(IX) requirement is applicable to both AC and DC switchboards and not just AC systems as written in the proposed rules.

One comment suggested that the requirement to sectionalize be deleted because of arrangement problems in some designs, increased cost, and

damaged buswork can be removed with a wrench in present designs. The Coast Guard considers this IMCO A.325(IX) recommendation to increase the ability to provide ship's service power in the event of a casualty to part of the switchboard.

One comment suggested that the sectionalizing device be remotely operable while another comment suggested automatic circuit breakers with overcurrent trip elements coordinated with the generators' circuit breakers should be permitted. It is the Coast Guard's opinion that the disconnect device should be manually operable as per IMCO recommendations.

One comment requested clarification of sectionalizing requirements from the standpoint of how many buses in a dual level system (5 KV and 480 V) are required to be sectionalized. In the system described, the 5 KV switchboard would be required to be divided into two sections. Two transformers or transformer banks would be required by § 111.10-9. If the total capacity of these transformers is greater than 3000 KW, the 480 V ship's service switchboard must also be sectionalized.

§ 111.30-29. One comment suggested that where an automatic emergency generator is provided, the voltage regulator cutout switch was not desirable since it could be left in the off position. A voltage regulator cutout switch is necessary to allow manual control of the voltage utilizing the exciter field rheostat in case of a voltage regulator failure. An error was made in the rewrite in that the exciter field rheostat was required under paragraph (d) in lieu of (e). This has been corrected.

§ 111.30-31. One comment requested that the tests desired be clarified. The tests the American Bureau of Shipping require for switchboard equipment are in various paragraphs of section 35. For instance, paragraph 35.91 contains dielectric strength tests and paragraph 35.161 contains operational tests.

Subpart 111.33. SNPRM. One comment suggested adding the word "system" after the words "semiconductor rectifier" to clarify that the requirements apply to the complete unit and not directly to each semiconductor rectifier component. The Coast Guard agrees. Two comments stressed that in § 111.33-5(e), shutdown of power should not be required if the rectifier temperature is regulated automatically or would not exceed maximum temperature due to operation at current levels below their full capacity. The requirement has been amended to allow a maximum-

operating-temperature-activated shutdown. Paragraph (c) has been revised to allow use of semiconductor rectifier systems rated at 40 degrees C if installed in an area which will not normally experience temperatures higher than 40 degrees C.

§ 111.35-1. This section has been revised to more specifically identify the sections of the ABS Rules which must be met by electrical propulsion installations.

§ 111.40-1. Three comments suggested revising the section pointing out that much of the NEC requirements are contained in the UL standard referenced in § 111.40-13 and it was confusing to utilize the NEC with exceptions. Reference to the NEC has been eliminated. The NEC requirements not covered have been added in §§ 111.40-13 and 111.40-15.

§ 111.40-3. This section has been deleted since it was repetitive to § 111.05-3.

§ 111.40-5. One comment asked if the emergency lighting panelboard in the main machinery space that supplies the power to the flashing red light (§ 113.25-10) would be required to be watertight. The lighting panel serving as a power source would not be considered part of the general alarm system if it did not contain the actuating relay and would not in any way affect the operation of the general alarm system.

One comment suggested that a statement be added to the effect that if liquid could not drip on a panelboard which is flush mounted it would not have to be manufactured drip proof. It is concluded that the present regulation covers this situation.

§ 111.40-7. Three comments considered it unnecessarily restrictive to prohibit installing panelboards in the weather or in storerooms. The locations in the weather are often not accessible due to ice and storms and often storerooms are locked, making them inaccessible. Therefore, the Coast Guard concludes that these spaces should not contain panelboards.

One comment suggested that panelboards be permitted in cargo holds on roll on/roll off vessels since there is ready access and sufficient lighting as a result of the type of cargo operations. The Coast Guard agrees.

§ 111.40-11. One comment suggested the setting of the overcurrent device should be included in the directory. The rating has been retained for fuses and setting added for circuit breakers.

§ 111.50-3. In paragraph (c), one comment suggested the effect of heat on the operation of fuses should be considered if they are subject to

extremes of temperature. The Coast Guard agrees.

In paragraph (g), the permissive statement for single pole circuit breakers with handles yoked together has been deleted. Permissive statements are not regulatory and should not be in the regulations and in this case the permissive statement is repetitive to the basic requirement that a switch must open all ungrounded conductors.

In paragraph (h), one comment recommended that no overcurrent device be allowed in a grounded conductor. The Coast Guard considers an overcurrent device that simultaneously opens all conductors to be a safe installation and therefore it should be allowed.

§ 111.50-5. Five comments pointed out that the requirements in § 111.50-5(a) (1) and (2) were identical to those in §§ 111.12-11(h) and 111.30-25(f) respectively. The duplication has been eliminated.

One comment pointed out that the overcurrent arrangement permitted by § 111.50-5(a)(4) does not agree with the requirements of Article 450 of the NEC. Another comment pointed out that this overcurrent protection arrangement would not be permitted by the NEC Section 240-3 for other than single phase transformers. Section 111.50-5(a)(4) has been revised to agree with the NEC.

§ 111.51-1. Two comments requested a definition of vital equipment. The section has been changed to clarify the intent.

One comment expressed concern that instantaneous trips could not be coordinated except by setting one to operate at a lower current, so that, when the current setting of both elements is exceeded, both breakers will trip. The intent of this section is that the circuit breakers' instantaneous trips should be coordinated in such a way that the upstream breaker's instantaneous trip would be set higher than the current flow through it due to a fault on the load side of the downstream breaker. The cable impedances between breakers can be utilized to do this.

§ 111.52-1(b). One comment suggested that the term "probable motor loads" be defined or the requirement be modified to include all motor loads. The latter suggestion would be excessively restrictive. Probable motor loads is self-explanatory.

One comment suggested that for a feeder breaker coordinating with a generator breaker, the worst case would be with only one generator feeding on a three-phase fault on the load terminals of the protective device. The coordination requirements are contained

in § 111.51. The coordination is normally accomplished using current-time characteristic curves.

One comment questioned the origin of the 750 KW maximum aggregate generating capacity limitation for the rule-of-thumb calculation and suggested a table that would account for differences in combined direct axis subtransient reactance for various combinations of parallel generators. The rule-of-thumb for systems below 750 KW was developed from actual test results with 750 KW being the largest system tested. This method is very conservative but the submitter has the option of calculating the actual short circuit current as detailed in § 111.52-1. The Coast Guard has decided to change the limitation to 1500 KW and has clarified the calculation methods.

§ 111.53-1. One comment indicated that some solid state devices should be protected by special fuses which do not comply with UL requirements. These situations will be looked at on an individual basis and, if equivalent safety and protection is provided, will be accepted under § 110.20.

§ 111.53-3. This section has been rewritten to apply to current-limiting devices in general and has been moved to Subpart 111.57.

One comment suggested that the current-limiting fuses of a fused circuit breaker not be required to meet the calculation methods of this section if they meet the applicable UL or NEMA standards. The Coast Guard agrees and a note to this effect has been added to § 111.57-1.

§ 111.54-1. One comment suggested that NEMA and ANSI standard frame sizes be required to preclude use of "specially designated" frames and use of trip elements above established frame ratings. Designation of standard size breakers is not considered necessary.

Two comments suggested that § 111.54-1(a)(3) be clarified regarding what value of interrupting rating is required of a circuit breaker. The section has been clarified.

The proposed regulations would allow oil type circuit breakers. Oil type circuit breakers are not suitable for shipboard use due to the fire hazard. Section 111.54-1(a)(4) has been added to prohibit oil type breakers.

Two comments questioned the applicable regulations for molded case circuit breakers that are rated in excess of 600 amperes or 600 volts or both. UL 489 is applicable to all molded case circuit breakers of 600 volts or less regardless of current rating. Molded case circuit breakers are presently not acceptable for use at voltages greater than 600 volts as § 111.54-1(b) and UL

489 indicate. Requirements for circuit breakers other than molded case have been specified dependent upon voltage rating in paragraphs (c)(1), (c)(2), and (c)(3).

One comment considered the requirement in § 111.54-1(d)(2) prohibiting the longtime delay element to be set above the current rating of the trip element or of the circuit breaker frame to be unduly restrictive and in conflict with § 111.12-11. Section 35 of UL 489 specifically prohibits a circuit breaker with an adjustable pickup point to be capable of being adjusted to more than 100 percent of the marked ampere rating with an exception that requires special testing which would be handled under § 110.20-1. There is not a conflict between § 111.54-1(d)(2) and § 111.12-11 because the pickup setting of these adjustable breakers has a considerable range, making it possible to obtain a frame and trip element that is rated higher than or equal to the desired pickup setting.

Paragraph (e) has been added to require 50 degree C ambient temperature calibration for circuit breakers located in the engine room, boiler room, or machinery space. This was required in the former regulations under § 111.50-15(e)(6).

§ 111.55-3. One comment suggested that § 111.55-3 be clarified as to which side of the fuse the switch should be on. This has been done.

§ 111.59-5. Nine comments considered the requirements that all current-carrying parts of a busway must be copper to be too restrictive in that steel bolts, silver or tin plating, etc. would not be acceptable. The Coast Guard agrees and has deleted § 111.59-5.

§ 111.60-1. Four comments questioned the deletion of MIL-C-915 cable. The MIL-C-915 cable was deleted because some of the cables could not pass the IEEE No. 45 flammability test. The cable may be substituted for the equivalent IEEE type cable provided it can pass the flammability test contained in IEEE Standard No. 45. The conditions under which MIL-C-915 cable and other cable including type N may be substituted for IEEE-45 cable have been added to this section.

Four comments questioned the deletion of the conductor sizing table in § 111.60-10 of the existing regulations. Two comments suggested that the table be included in the regulations because cable sizes should be determined by the current they carry and should not be dependent on overcurrent devices. The Coast Guard agrees. A demand load table similar to the one in the former regulations has been added under § 111.60-7.

One comment suggested that a provision be made to accept newer cable insulation and types. A provision has been added to allow acceptance of cable constructed in accordance with other standards.

Four comments requested clarification of the Coast Guard's position regarding the use of armored cable. Section 111.60-3 requires the cable application to meet Section 19 of IEEE Standard No. 45 which states the use of armor is recommended but unarmored cables may be used provided special precautions are used to avoid damage to the jacket during or after installation. This is the Coast Guard's position and a further clarification is unnecessary. However, armored or MI type cable is required in certain hazardous locations. See Subpart 111.105.

Two comments questioned how enforcement of the cable construction requirements was to be accomplished. The required cable markings will be used in conjunction with the insulation resistance tests by the construction inspector. The Coast Guard would have the option of testing or witnessing testing of cable it suspected of not being constructed to the accepted standard.

One comment suggested that an exception be made to Section 18 of IEEE Standard No. 45 to permit the use of aluminum conductors. The Coast Guard disagrees because the problems associated with aluminum cable in a shipboard atmosphere have not been adequately solved at this time.

Three comments requested a definition of type N cable. A definition has been added.

Section 111.60-1(b) has been revised to give cable identification requirements for type N cable.

One comment asked if type THWN wire could be used as control conductors and cable. THWN is wire and must meet § 111.60-11 and be used in an enclosure.

§ 111.60-3. Two comments suggested that Table A6 of IEEE Standard No. 45 be excluded from the regulations because the ampacities are for single banked runs with a penalty for double banked runs, that some cable sizes are omitted and the ampacities are not consistent with Table 35.2 of the ABS Rules. The IEEE ampacities are based upon national standards while the ampacities of ABS Rules are based on international standards. At the present time the Coast Guard concludes the only option is to use the national standards, however a research program has been instituted in conjunction with MARAD to develop cable performance standards with the intent of adopting performance

standards in lieu of the present construction standards.

Paragraphs 19.6.1 and 19.6.4 of IEEE Standard No. 45 have been excepted from the cable application requirements since the subjects of those paragraphs are regulated by §§ 111.60-11 and 111.60-13 of this chapter.

§ 111.60-4. This section has been added to consolidate and clarify the minimum allowed cable conductor sizes.

§ 111.60-5. One comment suggested changing the 24-inch cable support spacing of IEEE Standard No. 45 to that of the Navy which is 32 inches for thermoplastic and thermosetting jacketed cables and not more than 18 inches on vertical runs for lead sheath cable. Present requirements are considered to be adequate.

Paragraph 20.11 has been excepted from the cable installation requirements of IEEE Standard No. 45 since cable splicing is covered by § 111.60-19 of this chapter.

Paragraph (b) has been added to stress the Coast Guard's requirements for cable installation in tanks.

§ 111.60-9. Three comments requested that the term "vital equipment" be defined. The wording has been clarified.

Three comments suggested that the term "as far apart as possible" be clarified. The wording has been modified.

§ 111.60-11. Two comments pointed out that the referenced table should have been 310-16 in lieu of 310-13.

One comment indicated that the standards cited were for both stranded and solid conductors. This was an inadvertent omission. A requirement to use only stranded conductors has been added. Also, minimum wire size requirements have been added.

One comment suggested that UL 44, UL 83, and reference to NEC tables be deleted and that the only requirement be that wire be an UL recognized wire. The Coast Guard considers such a requirement to be too broad and that it would not necessarily provide a safe installation in a marine environment.

§ 111.60-13. One comment indicated that the Design Data sheet, DDS 304-2, should be referenced in lieu of the Cable Comparison Guide. The Coast Guard has decided to delete the Department of the Navy reference.

"Portable" cord and cable has been changed to "flexible" cord and cable throughout this section and subchapter to agree with the referenced NEC.

Paragraph (e) contradicts NEC 400-9 regarding the minimum size of flexible electric cord that may be spliced for repairs. Section 111.60-13(e) has been changed to agree with NEC 400-9 by limiting the minimum cable size that

may receive a repair splice to No. 12 AWG.

§ 111.60-17. This section has been clarified and expanded. It was intended to include connections of conductors made within connection or junction boxes and connections made to equipment flexible leads, in addition to connections made at terminal blocks.

One comment indicated that there are other means to capture the terminal in addition to the one required by subparagraph(b)(2). The wording has been modified to allow other suitable means.

§ 111.60-19. One comment recommended acceptance of a splicing method and insulation that is recommended by the cable manufacturers without review action. This recommendation is rejected because the safety and reliability of a spliced marine cable is dependent upon the selection of proper connectors, installation tools and methods, insulation and jacket replacement material. This is best determined by a review of the complete splicing method in accordance with the requirements of this section since splicing methods are usually developed by the shipyard and are intended for use on a wide variety of cable types, sizes, and manufacturers.

One comment disagreed with the requirement that the insulation thickness had to be of the same or a greater thickness than the original insulation. Another comment suggested deleting the requirement that the replacement insulation be of "the same or greater thickness than that of the cable insulation" and require instead that the "mechanical properties of the replacement insulation be equal to or better than that of the cable insulation." The Coast Guard concludes that the latter would be difficult to determine and no change has been made.

One comment expressed concern that this regulation would not allow the use of a properly installed explosion-proof junction box to make a cable connection within a hazardous location. This was not the intent. The paragraph has been reworded to clarify that cables must not be spliced within a hazardous location using the method of § 111.60-19.

§ 111.60-19(d) SNPRM. One comment expressed concern that splicing intrinsically safe cables could conflict with §§ 111.105-11 and 111.105-15 of the proposed regulations and ISA recommended practice RP 12.6. A review of these items did not reveal any conflicts. One comment interpreted this regulation to prohibit splices made in approved junction boxes. This is not true. Splices made out in the open will

be prohibited in hazardous locations by this regulation.

The cable insulation resistance requirement has been moved from § 110.30-3(q) to § 111.60-21.

§ 111.70-1. Three comments requested clarification of the fire pump exception. Additional wording has been added for clarity.

One comment suggested that it was not necessary to require three running overload units on 3 phase supply circuits. The Coast Guard agrees except when there is a wye-delta or delta-wye connected transformer. Paragraph (b) has been added.

Paragraph (c) has been added to retain the existing requirement of § 111.70-30(b) that requires an externally operable means of disconnecting motors from the circuit.

One comment stated that substantial change in the regulations occurred in the deletion of the requirement that no damage could occur upon interruption of a fault or on operation of a device. The regulations in Subpart 111.54 require compliance with UL 489 and other standards which have adequate design and test requirements.

One comment considered motor running protection set at 140 percent of motor full load current in accordance with the NEC to be too little protection and that the criticality of protection is much more severe in marine applications. The Coast Guard has decided to conform with the National Standard since the maximum setting has only been increased from 130 percent to 140 percent of full load current. This increase should not create a safety problem.

One comment pointed out that Article 430 of the NEC does not permit the use of panelboard or switchboard circuit breakers capable of being locked in the open position and located out of sight as a disconnect means and asked whether this prohibition was intended. The Coast Guard did intend that these requirements of the NEC be applicable to a shipboard installation.

§ 111.70-3. One comment suggested adding location requirements for metal enclosed switch gear. Paragraph (a) has been revised. The marine supplement has been added to UL 508 in paragraph (d). Paragraph (k) on identification of controllers has been reworded for clarification at the suggestion of one comment and is now paragraph (h).

As suggested by two comments, paragraph (f) has been revised to allow low voltage protection for vital propulsion auxiliaries which can be restarted from a central control station. Also, paragraph (f) has been revised to

allow sequential starting of low voltage release controllers so that the power source will not be overloaded when power is restored. Paragraph (g) is no longer applicable and has been deleted.

§ 111.70-3(l) SNPRM. One comment recommended that the angle of inclination be reduced to 15 degrees. Another comment suggested that it be changed to 22.5 degrees to be consistent with ABS Rules section 35.29 and IMCO Resolution A.325(IX) Regulation 2(f). The 20 degrees has been changed to 22.5 degrees.

§ 111.70-5. Two comments suggested that the heater circuit disconnect requirements should be described in this section. The section has been revised.

§ 111.70-7. In paragraph (a), two comments suggested that the overcurrent device should be set at 200 percent in lieu of 300 percent of the current-carrying capacity of the control, interlock or indicator circuit conductors in accordance with 430-72 of the NEC. The Coast Guard disagrees since the NEC now specifies 300 percent.

In paragraph (b), two comments suggested that a ground should not void the operation of the stop switches, not just the start circuit. The Coast Guard agrees.

§ 111.75-1. One comment suggested changing paragraph (b) to require an emergency feeder. The emergency lighting must meet the requirements of Part 112. Some vessels are permitted battery operated lanterns, thus requiring one of the feeders in § 111.75-1(b) to be an emergency lighting feeder would not be consistent with Part 112.

§ 111.75-5. One comment suggested that a 20-ampere lighting circuit be permitted for general lighting. The Coast Guard agrees.

One comment suggested that lighting distribution panels be permitted to feed loads other than lighting and appliance circuits. The Coast Guard agrees.

One comment suggested that mercury-vapor or sodium-vapor electric discharge lights be allowed. The Coast Guard agrees that such lights are acceptable.

§ 111.75-15. One comment suggested that paragraph (a) be expanded to require the two circuits to be arranged so that adjacent fixtures would be supplied from different, separately protected circuits. The Coast Guard disagrees, the minimum emergency lighting conditions are indicated in Part 112.

Four comments suggested changes to the illumination requirements of paragraph (c). Three of these comments suggested referencing the Illuminating Engineering Society's recommended practice for marine lighting. The Coast

Guard concluded that the proposed regulation provides adequate safety but is a minimum requirement. The actual level of lighting in the various spaces should be a designer-owner-union decision and should not be regulated by the Coast Guard. The phrase "throughout the normally occupied areas" has been added for clarification.

§ 111.75-16. One comment suggested that the requirement for a floodlight at a forward liferaft launching area on a tanker should be deleted with the signal searchlights on the bridge wing being used instead. The Coast Guard disagrees since there would be the additional problem of having to man the bridge searchlights while lowering the forward lifeboat. This is not an acceptable solution.

§ 111.75-17. Five comments considered the overcurrent protection requirements of paragraph (a) to be unduly restrictive. The Coast Guard agrees and the requirements have been revised. The requirement for a feeder from the emergency switchboard has been added to paragraph (a) to reflect the requirement of proposed § 112.15-1.

At the suggestion of two comments, paragraphs (a) and (b) have been revised so that the feeder and panel overcurrent protection will be based on the circuit loads and would be applicable to a system of any voltage.

Three comments requested clarification of circuit requirements for navigation light indicator panels. The NPRM and existing § 111.75-15(g)(3)(ii) gave recommended circuit diagrams for the panels, but no specific requirements. The Coast Guard has deleted these diagrams and revised § 111.75-17 (b) and (c) to prescribe general requirements for the panels.

Three comments suggested that a Subchapter Q specification be published for navigation light approval. The Coast Guard is adopting an Underwriters Laboratories Inc. standard for navigation lights. This standard, UL 1104, consolidates the technical requirements of the navigation rules with the marine lighting fixture standard, UL 595. The Coast Guard will consider development of a Subchapter Q specification based on this UL standard.

Paragraph (d)(4) has been added to prescribe a method for determining the intensity of a flashing light.

The table giving standard incandescent lamp wattages has been deleted since it only gave recommendations. Actual intensities will be determined by testing.

Three comments expressed concern about the requirements for light screens of paragraph (f). The paragraph has been revised to require that light screens

be used as needed for the lights to meet the sector cutoff parameters of the applicable navigation rules.

One comment supported the proposal to extend the requirement for navigation light indicator panels to all self-propelled vessels. However, that comment suggested that further extension of the requirement should be made to include push-towed vessels. These vessels are typically equipped with battery powered portable lights. It would not be practical to run cable to each light to provide for a monitoring system.

Throughout this section, the phrase "applicable Rules of the Road" has been changed to "applicable navigation rules". This was done because the "U.S. Coast Guard Navigation Rules, International-Inland" (CG-169) has superseded the Coast Guard pamphlet "Rules of the Road, International-Inland" (CG-169). Also the "Rules of the Road, Great Lakes" (CG-172) and "Rules of the Road, Western Rivers" (CG-184) have been superseded by the Inland Navigation Rules. Since the new CG-169 and Inland Navigation Rules have intensity standards, Table 111.75-17 has been deleted.

§ 111.75-18. Three comments stated that if approval is necessary for signaling lights it should be the subject of a Subchapter Q specification and this section eliminated. The Coast Guard does not agree that formal design approval and/or test requirements are necessary. International agreements merely require an "efficient daylight signaling lamp that does not solely depend upon the ship's main source of electrical power". The regulations in this subchapter set minimum requirements to ensure that the lights meet the intent of the international agreements.

The wording of this section has been changed to clarify the intention that the requirements apply to self-propelled vessels on an international voyage.

For vessels of over 150 gross tons and less than 300 gross tons, the specifications for the signaling lights have been relaxed so that a portable light with less stringent specifications can be used to meet the requirement on these smaller vessels.

§ 111.75-20. One comment questioned the need for any open-arc lamps on new vessels. Paragraph (b) has been deleted.

One comment suggested the requirement in paragraph (c) that lighting fixture globes be guarded or be of high strength material in some locations be made applicable only to incandescent fixtures. The requirement is applicable to all fixtures. The wording has been modified to indicate this fact.

One comment indicated that some of the plastic guards used to meet the requirement of paragraph (c) were being broken in service. The wording has been changed to require a "high strength" guard. The suitability of a guard meeting the high strength requirement will be determined by its durability in service.

One comment questioned the use of a fixture in an hazardous area—should it have a UL marine label or should it be UL approved for a hazardous location? The hazardous area requirements as well as these requirements are applicable. The fixture must be approved for the hazardous area by UL or Factory Mutual (must be labeled) but it must also meet the requirements of UL 595 (need not be labeled). The hazardous area requirements and the marine fixtures requirements are not conflicting.

§ 111.77-3. This section has been modified to remove specifications which were repetitive to the referenced UL standard.

§ 111.77-5. One comment stated that the motors and controllers normally provided with commissary equipment do not have watertight enclosures nor are they totally enclosed. It suggested a change to clarify the intent and permit the use of UL equipment normally provided for this application. The intent is to require the motor and controller to be in a watertight enclosure or be totally enclosed to protect the equipment in a damp or wet location. The regulation has been changed to only require watertight enclosures or totally enclosed motors in these locations.

§ 111.79-3. The reference to the NEC has been deleted since the exceptions allowed by the NEC 250-74 are not applicable to shipboard installations.

§ 111.79-7. Three comments considered the requirements of § 111.79-7 to be contained in UL 498 and that the repetition is not necessary. Only the interior unit of a receptacle must meet UL 498.

§ 111.79-15. SNPRM. Two comments suggested that a warning sign advising that the breaker in the power panel is to be tripped before disconnecting the container be required in lieu of a switch interlocked receptacle due to the excessive cost of changing to the interlock type receptacle. Another comment suggested that receptacles that are UL listed for circuit breaking service and have no energized bare metal parts readily accessible, even with the plug removed, be acceptable as equivalent under this regulation. This section has been revised to allow the alternatives suggested by these comments.

Subpart 111.81. One comment suggested that an outlet box in a

machinery space should be dripproof in lieu of watertight as required by the definition in §§ 110.15-1(b)(7) (ii) and 111.81-7. The Coast Guard disagrees. Switchboards and panelboards installed in machinery spaces are installed in relatively dry locations which is not the case with outlet boxes, receptacles, etc.

§ 111.83-5. One comment indicated that the wording of this section was not clear. The section has been reworded.

§ 111.85-1. In paragraph (d), one comment suggested combining the function of the low level/no flow device with that of the high temperature device. The Coast Guard considers it unduly restrictive to require both devices to be combined. As presently written the sensing units could operate the same conductor interrupting device if so desired.

§ 111.87-3. One comment suggested that the term "regulatory switch" in paragraph (c) be further defined. The intent of the requirement was to require a temperature regulator such as a thermostat. The regulation has been modified to indicate this intent.

Two comments suggested the requirement in paragraph (c) for both a temperature regulator and a manually reset type thermal cutoff was unduly restrictive. The Coast Guard disagrees. The thermal cutoff should not be used to regulate the temperature but should be utilized only upon the failure of the temperature regulating switch. Also, due to the fact that the thermal cutoff must be the manually reset type, it would be impractical to control the temperature with this device.

Paragraph (e) has been added. This requirement was in the former regulations and was inadvertently omitted from the proposed regulations.

Subpart 111.91. One comment recommended that a section be included for rack and pinion driven elevators. Since the NPRM was published, industry awareness of elevator safety has increased. There is now a draft ASTM standard for shipboard elevators. Furthermore, ANSI is considering adding requirements to ANSI A17.1, the primary referenced document in the NPRM, for rack and pinion driven elevators. Due to the increased industry awareness of elevator safety and the improvements in the applicable industry standards, the Coast Guard is of the opinion that increased regulations in this area are not necessary.

Subpart 111.93. SNPRM. Many comments were received from representatives of the offshore supply vessel industry concerning applicability of this subpart to the offshore supply vessels. The internationally recognized design philosophy reflected in these

regulations employs redundancy and independence as the means of achieving steering system reliability. The international requirements were written for vessels over 500 gross tons. For cargo vessels of 500 gross tons or less the Coast Guard will consider steering systems which will achieve equivalent reliability to a system required by these regulations. A system which is considered equivalent will be acceptable to the Coast Guard. Provision for acceptance of equivalent equipment is in § 110.20-1 and § 111.93-5.

Three comments considered the requirement that the two steering systems must be separate on a port and starboard basis to be unnecessarily restrictive. The Coast Guard has decided that a simplified system with no electrical cross-connections will decrease the chances of operator error when shifting steering systems and will increase reliability since there will be no common parts to the two systems.

§ 111.93-5. SNPRM. Three comments indicated concern that requiring the two steering systems to be separate on a port and starboard basis would not allow for a valved cross-over line between the two systems. It is intended that the two systems be electrically independent so that a shift from one system to the other can be effected by one movement of the control switch handle in the pilothouse. Steering gear piping is not addressed here, but is covered by § 58.25-70 of this chapter. Valved cross-overs will continue to be allowed so long as the requirements of § 58.25-70 are met.

The words "a main steering gear and" have been deleted from § 111.93-1(b) for clarification. Also, the definition of "main steering gear" in § 111.93-3(a) has been made applicable to "steering gear." The difference between a main steering gear and auxiliary steering gear is defined in Part 58 of this chapter.

§ 111.93-7. SNPRM. One comment asked why the alternate emergency power supply, if provided, could not be used for other purposes. IMCO recommendations state that this source of power should be used only for this purpose. The international philosophy is that the power source will be more reliable if it is used for no other purpose. The Coast Guard agrees with the IMCO recommendations and this regulation will not be changed. Another comment suggested that the alternate emergency power supply be allowed to be located outside the steering gear compartment. IMCO recommendations specifically provide that this power source be located inside the steering gear

compartment for purposes of accessibility, simplicity, and reliability. The Coast Guard will adopt this IMCO recommendation.

Paragraph (a) has been revised to only require an emergency source of power for the steering gear on vessels based on the size of the rudder stock as recommended by IMCO. Also, vessels that are not required to have an emergency source of power by § 112.05-5(a), will not be required to provide emergency power to the steering gear.

§ 111.93-9. *SNPRM*. Paragraph (b) has been revised to exclude an alternative steering station from the requirement that the control system be capable of being operated from the wheelhouse.

Paragraph (c) has been revised to except vessels of less than 500 gross tons from the requirement that each steering gear power unit be controllable from the steering gear room. The arrangement required by this paragraph is an IMCO recommendation which is not intended to apply to these smaller vessels.

§ 111.93-11. *SNPRM*. One comment suggested that "short circuit protection only" should not be required for indicating and alarm systems and that normal overcurrent protection should be provided. The Coast Guard disagrees. When an alarm circuit is energized, it is possible that transient overloads caused by system components may trip the circuit protection device before the alarm is heard or seen.

§ 111.93-13. *SNPRM*. One comment recommended that a control power failure alarm be added as recommended by IMCO and that the alarm for opening of a steering gear feeder circuit breaker be eliminated since it is redundant to the alarm for failure of the steering gear power supply. The Coast Guard agrees. Another comment recommended reducing the number of alarms. The required locations of alarms have been changed to agree with IMCO recommendations and this has reduced the number of alarms.

A note has been added at the end of this section to accommodate vessels which will not have steering gear rooms large enough to contain all the steering system equipment required to be in the steering gear room.

§ 111.95-1. Paragraph (b) has been added to cross-reference other applicable requirements.

§ 111.95-5(c). One comment suggested that only waterproof motors be required. The Coast Guard disagrees—watertight motors could be used for this application.

§ 111.95-7. Four comments requested clarification of paragraph (b). This has been done.

Subpart 111.99. One comment pointed out that the last two sentences of § 111.99-5(d) are contradictory. The last sentence was intended to be an exception to the next-to-last sentence. This has been clarified.

Three comments suggested that a Subchapter Q specification be written for firescreen door holding systems. The Coast Guard disagrees since the requirements are primarily related to the installation on a particular vessel.

§ 111.103-3. Two comments suggested clarification in paragraph (a) that the supply circuit breaker may be one of the required stop controls. The Coast Guard agrees.

Three comments questioned whether the grouping requirement of § 111.103-3(b), conflicted with proposed § 111.30-25(h) (now § 111.30-24(b)). Paragraph 111.30-24(b) requires separation of duplicated equipment; however, the ventilation fans are not duplicated so they may be grouped on the switchboard.

§ 111.103-5. This section has been deleted. Cargo hold ventilation has been included in § 111.103-1 since it was intended that cargo hold ventilation systems have remote stopping systems that meet the same requirements as those for other power ventilation systems. This is consistent with former regulations and IEEE-45.

§ 111.103-7. One comment pointed out that undervoltage requirements are not a function of a stop station. The Coast Guard agrees. The undervoltage type requirement has been deleted.

§ 111.105-11. A grounded metal barrier has been added as an acceptable means for separating electric cable for an intrinsically safe system from non-intrinsically safe electric cables. The requirement that the cable have only intrinsically safe circuits has been deleted since that requirement is contained in ISA RP 12.6 which is now referenced in § 111.105-15(b).

Sections 111.105-11(c), (d) and (e) have been added to stipulate what information is required to be submitted under § 110.25-1(1).

§ 111.105-15. *SNPRM*. Four comments recommended that cable which is neither armored or MI type be permitted on mobile offshore drilling units. They were particularly concerned about the flexible cable which supplies skid mounted machinery components. Armor used on such cable would remain intact for only a short time and would add to the cost of such cable. The IMCO code for the Construction and Equipment of Mobile Offshore Drilling Units recognizes the use of unarmored flexible cable in hazardous locations and the National Electric Code allows tray cable

without armor in a Class I, Division 2 location. After a review of this requirement, the Coast Guard has determined that the intent was to require armor only in Class I, Division 1 locations and areas which are considered equivalent to or greater in hazard.

One comment suggested that there were conflicts between § 111.105-11(b) of the original proposed regulations and § 111.105-15 of the supplemental notice which references ISA RP 12.6. Section 111.105-15 has been clarified to eliminate any conflict. The same comment interpreted ISA RP 12.6 to not require identification of cable containing intrinsically safe conductors external to panels in hazardous locations. This interpretation is not correct. Intrinsically safe wiring must be identified in hazardous locations. It also stated that there is no practical way to identify cable exposed to the elements which is in danger of being painted. Cable should not be painted. In addition, there are many acceptable commercial methods of identifying cable such as stamped metal tags and heat shrink labels.

§ 111.105-19. This section has been revised to reflect the same requirement as for ordinary location circuit breakers; that there be a pole for each ungrounded circuit conductor.

§ 111.105-29. Four comments suggested that impressed current cathodic protection systems not be permitted in combustible liquid cargo tanks. The Coast Guard agrees.

§ 111.105-31. One comment suggested that installation requirements for lighting fixtures in hazardous areas be provided. These requirements are in the referenced NEC, Article 501-9.

Six comments questioned the exclusion described in paragraph (a)(1) and three comments stated that paragraph (k) was incomplete for liquified gas carriers. Requirements for ammonia and liquified gas carriers have been moved to a new section, § 111.105-32. These requirements are complete and the exclusion has been clarified.

One comment discussed inconsistencies between requirements for inorganic acids contained in this section, §§ 153.555 and 151.05-1 of this chapter. A NPRM modifying Part 153, published July 17, 1980 (45 FR 48058), includes a change to § 153.555, making this section a reference for inorganic acid carrier requirements. Additionally hazard class and group designations were proposed for the inorganic acids in that NPRM. The proposed designation for the inorganic acids is "I-B." Due to comments received on that NPRM, a footnote will be added to the table

which will exclude the weatherdeck of a tankship carrying inorganic acid from the "I-B" classification. Section 111.105-31(1) has been revised accordingly. Part 151 of this chapter contains no hazard group designation for inorganic acids; this deficiency will be corrected in a future rulemaking. The language of § 111.105-31 has been revised to include only inorganic acid tankships until the rulemaking for barges in Part 151 has been finalized.

In paragraph (h)(2), three comments requested clarification of the term "gastight enclosure." The wording has been changed to clarify this requirement which is now in § 111.105-31(i)(2).

Two comments suggested that purged and pressurized lighting be permitted in the cargo handling room. The Coast Guard considers the explosionproof lighting fixtures to be more reliable and that they are easier to maintain than purged and pressurized systems. The explosionproof lighting fixtures are being allowed where through-the-bulkhead-type fixtures can not provide adequate lighting. In both cases, the safety of the installation is dependent upon the physical integrity of the fixtures. In the case of purged and pressurized systems, the safe operation is further dependent upon operation of the air source, alarms, and shutdowns, making the installation more complex. The Coast Guard is not ready to allow that type of installation in a cargo handling room which is considered to be more hazardous than a Class I, Division 1, hazardous location.

One comment stated that requiring the installation of an explosionproof alarm bell in a cargo handling room may be in conflict with the ABS. The requirement for an alarm bell in a cargo handling room has been deleted from § 113.25-9.

§ 111.105-35. One comment stated that you cannot have a Division 2 area with coal as per Section 500-5(a) of the NEC. Bituminous coal is not electrically conductive; therefore, a space that has a coal conveyor can be considered a Class II, Division 2 space since combustible dust will not normally be in suspension in the air in quantities sufficient to produce an explosive atmosphere.

PART 112—EMERGENCY LIGHTING AND POWER SYSTEMS

Part 112. Two comments suggested that this part be reorganized because it was confusing to read about details required for lighting before the power supplies were defined. The Subpart 112.07 Emergency Lighting Systems has been moved and is now Subpart 112.43.

§ 112.05-1. One comment suggested that a statement be included that the

emergency generator should have sufficient capacity to simultaneously supply all connected loads (load factor of unity). Section 112.05-5(a) contains a similar statement and is considered to be adequate.

Nine comments suggested that limiting the loads on the emergency bus to those listed in § 112.05-1(b) was unduly restrictive. Some comments suggested that if some vital propulsion related auxiliaries were fed from the emergency bus it would allow the vessel to maintain or quickly recover its propulsion plant. Other comments suggested that any load be permitted provided the emergency generator has sufficient capacity. IMCO Resolution A.325(IX) basically requires that only emergency loads be routinely supplied from the emergency switchboard. The Coast Guard agrees that only emergency loads are allowed to be fed from the emergency bus and that non-emergency loads may be supplied by the bus-tie. The regulations have been modified to permit other loads which may be considered emergency loads, depending upon the route and vessel type, to be supplied from the emergency source. Non-emergency loads, such as refrigerated cargoes, bow thrusters, etc., will not be permitted on the emergency bus. Dead-ship start-up can be accomplished through the bus-tie.

§ 112.05-5. Some of the oral and written comments received indicated there were some questions as to where a temporary power source is required. Table 112.05-5(a) has been revised to facilitate understanding.

The emergency power source requirements for nuclear vessels have been deleted from § 112.05-5(a) and § 112.15 because they were inadequate and did not address the entire problem. Requirements for nuclear vessels are only being worked on at IMCO and regulations will not be written until this work is finalized.

Three comments stated that the required capacity of the emergency power source was far in excess of the existing regulations and of that recommended by IMCO Resolution A.325(IX). Specifically they indicated that IMCO recommended that power to the life boat floodlights be provided for three hours and only intermittent power was required for ships whistle and alarms. The comments indicated concern with the size of the temporary emergency batteries. First, it should be pointed out that the loads required to be powered by the temporary emergency source by the proposed rules and IMCO A.325(IX) are basically the same. Secondly, they both require a minimum of one-half hour of operation for the

required loads, not the three hours indicated by the comments.

Table 112.05-5(a) has been modified by footnote 2 to require emergency power source capacity for 30 minutes operation of the auxiliary steering gear.

In § 112.05-5(b), three comments stressed that it was overly restrictive to prohibit remote stopping of the emergency generator, while another comment indicated that the present wording would preclude the use of a fuel oil shut-off valve at the fuel tank. A remote electrical engine stop control is prohibited so that a casualty in a space containing a remote stop could not cause the emergency generator to become inoperative. The intent of this section was not to preclude a remote mechanical fuel oil shut-off valve to an independent fuel oil tank. The paragraph has been revised to indicate this intent.

The requirement that the prime mover of an emergency generator be either a diesel engine or a gas turbine has been moved from Table 112.05-5(a) to paragraph (i).

In § 112.05-5(c), one comment indicated that since it was impractical to test the emergency installation at 22½ degrees heel and 10 degrees trim that, as a minimum, the manufacturers must certify that the emergency equipment will function at these angles. The Coast Guard disagrees. While the equipment must be designed to function under the specified conditions, actual performance can be affected by the installation; therefore manufacturer's certification is not appropriate. Although performance testing of the installed equipment under these conditions is not practical, the effects of these conditions can be taken into account in the design, arrangement and installation of the equipment. The wording of this section has been modified to clearly indicate the intent of requiring the emergency generator of all vessels to operate at its maximum angle of heel given the required assumed damage.

In § 112.05-5(d), one comment suggested adding the words "on or" between "and" and "above". The phrase "above the main decks" has been changed to "above the uppermost continuous deck" and includes a piece of equipment on the main deck if the main deck is the uppermost continuous deck.

In § 112.05-5(e), five comments suggested that the compartment containing the emergency source should be allowed to adjoin a Category A machinery space if the bulkhead between the two has an A-60 fire classification. IMCO Resolution A.325(IX) requires the compartment not

to have boundaries contiguous with a Category A machinery space as far as practicable. The regulation has been modified to include the phrase "as far as practicable" and the requirement for a class A-60 bulkhead when it does adjoin.

In § 112.05-5(f), two comments suggested that it was not practical to eliminate through runs of cable for emergency circuits on drill units. The Coast Guard disagrees. One of the most important situations in which emergency circuits are needed is when there has been a casualty in a machinery space, thus it is necessary that through runs of cable for emergency circuits be excluded from category A machinery spaces.

One comment suggested that through runs of fire resistant cables be permitted. A "fire resistant" cable is usually considered a cable that has passed the flammability test contained in IEEE Std. No. 45. This is not adequate to insure continuity of service in a machinery space fire.

In § 112.05-5(h), one comment questioned the requirement of having the emergency generator and the emergency switchboard in the same space because of the desirability of keeping the switchboard in a clean environment. The Coast Guard concludes that it is more important to reduce the change of fire or other hazard induced damage to the emergency power source equipment by keeping it all in one space.

Subpart 112.07. This subpart has been renumbered as Subpart 112.43. Discussions relative to proposed Subpart 112.07 will be found under the renumbered Subpart discussion.

§ 112.15-1. One comment suggested breaking up the first sentence in § 112.15-1(d) to make it more understandable. The Coast Guard agrees.

One comment indicated that 46 CFR 161.002-9 permitted the fire detection system to use the emergency switchboard as one of its power sources. A paragraph has been added to allow the fire detection system load.

§ 112.15-5. One comment suggested allowing a crews' elevator to be considered as an emergency load. The Coast Guard does not consider that the crews elevator is an emergency load.

Three comments considered the equipment required to receive power from the final emergency power supply to be far in excess of the existing regulations. They also stated that many of the loads listed in the proposed regulations were recommendations in the existing regulations. The comments appear to be due to an error made in

reading the rules. First, there are no loads that are only recommended in the existing regulations. Four new loads were added to the list of final emergency loads for ships. Two of these, the elevator on passenger ships and the steering gear on ocean, Great Lakes and coastwise vessels were required by IMCO Resolution A.325(IX). The third load, the rudder angle indicator requires very little power and is an insignificant load. The fourth load is the lube oil pumps for propulsion turbines and ship's service generator turbines that need external lubrication. This need not be an electrical pump since a gravity tank would suffice. The wording of § 112.15-5(g) has been changed to indicate this load is optional.

One comment suggested the addition of a paragraph to require the general alarm flashing lights as outlined by § 113.25-10. Paragraph (p) has been added to correct this oversight.

Paragraph (r) has been added to require emergency power for any permanently installed diving system which is dependent on ship's service power.

One comment pointed out that § 112.50 permitted a starting air compressor to be powered from the emergency bus but this load was not included in the list. This oversight has been corrected.

§ 112.20-15. In paragraph (a), a forty-five second time limit for automatic transfer of the emergency load has been added to reflect an IMCO recommendation. This also clarifies the Coast Guard's intent since many persons have misinterpreted the 20 second cranking limit of § 112.50-1(e) to be the total limit for assumption of the emergency load by the emergency generator. Section 112.25-10 has been similarly revised.

§ 112.30. Three comments indicated that it appeared as though these provisions would apply only to barges due to the number of loads required by § 112.15. The Coast Guard considers a battery system to be viable on certain small vessels and concludes that the alternative should remain in the regulations.

Subparts 112.37 and 112.39. These subparts have been added to reflect requirements that were previously in Table 112.01-5(a).

§ 112.43-1. Two comments suggested permitting the use of switches in explosion-proof emergency lighting circuits as an added precaution against relamping such fixtures while energized and to avoid the additional hazard of keeping a circuit in such areas continuously energized. The Coast

Guard agrees, provided the switches are located outside of the pumproom.

§ 112.43-7. In paragraph (a)(1), one comment suggested that ships that normally do not tow but have towing lights aboard which are arranged for portable mounting be permitted to supply these lights from a general lighting circuit since it would be impossible to tow if the normal source is inoperative. The Coast Guard has decided that a specific exemption is not necessary in the regulations and that such situations can be handled by Subpart 110.20 of this subchapter.

One comment pointed out that a discrepancy existed between § 112.43-5 and § 112.43-7(a)(2). This has been resolved by adding the words "except as allowed in § 112.43-5 of this part" to § 112.43-7(a)(2).

§ 112.43-13. A new paragraph has been added as § 112.43-13(b) to retain from the former regulations the option of providing a through feed from the feeder to the wheelhouse emergency lighting panel.

§ 112.45-5. Two comments suggested deleting the requirement for a test switch, indicating that opening the bus-tie circuit breaker would accomplish the same purpose. The Coast Guard disagrees in that this operation would not test the main-emergency bus-tie disconnect.

§ 112.50-1. One comment suggested referencing § 111.12-1(b) in paragraph (h) for detailed overspeed trip requirements. The Coast Guard agrees.

Paragraph (k) has been added to clarify that an independent fuel supply must be provided for the emergency generator prime mover.

§§ 112.50-3, 112.50-5, 112.50-7. One comment suggested deleting § 112.50-3(g) and § 112.50-7(d), stating that there was no need to hold 3 cranking cycles in reserve. The Coast Guard disagrees. There is a need to have a person check out the prime mover before the final three cranking cycles are depleted. This is also a recommendation of IMCO Resolution A.325(IX). The electric starting has been revised to reflect this three cranking cycle requirement.

Two comments suggested deletion of § 112.50-7(e), indicating that there was no need for the visual alarm when compressed air starting was used if there was no requirement for such an alarm on a hydraulic or electric installation. The Coast Guard agrees and the paragraph has been deleted.

§ 112.55-15. Three comments suggested deleting paragraph (c) since there are many types of batteries with different voltages. The Coast Guard agrees.

PART 113—COMMUNICATIONS AND ALARM SYSTEMS AND EQUIPMENT

Two comments suggested reorganizing this part to include smoke detectors and manual alarms as well as information on a supervised patrol system under a fire detection and alarm system section. The Coast Guard disagrees. The appropriate location for the patrol system requirements would be the operations sections of the respective general vessel subchapters—the present location. The present organization is considered satisfactory.

Throughout this Part, the words "must be approved" have been deleted except where actual Coast Guard approval by the Commandant is required. Equipment or systems which have specific requirements in this subchapter can be reviewed by the District Merchant Marine Technical offices. Items which require approval by the Commandant must be reviewed at U.S. Coast Guard Headquarters. Commandant is defined in § 110.15-1(a)(3).

§ 113.10-1. Four comments indicated that the Subchapter Q specifications for fire detection and alarm systems are outdated. The Coast Guard agrees. A regulation project will be initiated to update these regulations, hopefully utilizing U.L. and Factory Mutual Standards.

§§ 113.10-3, 113.10-5, and 113.10-7. These sections have been rewritten for clarification and the power supply requirements have been added in a new section, § 113.10-9. The power supply requirements have been deleted from § 161.002-9 since installation requirements are more appropriately located in Subchapter J.

Subpart 113.15. The requirements in this subpart repeated those of Subpart 113.10. These two subparts have been combined in a single Subpart 113.10.

§ 113.25-3. Three comments suggested that the general alarm system equipment should have Subchapter Q specifications since it requires the Commandant's approval. The Coast Guard disagrees. First, there is now no requirement for the Commandant's approval, but only that the equipment installation be approved. Second, the technical requirements for the equipment are contained in this subpart. Approval is obtained by submittal of plans that show the information required for approval to a District Merchant Marine Technical Office as required by 46 CFR 110.25-1. The existing procedure is considered satisfactory and as stated above, the words "must be approved" have been deleted for clarification.

§ 113.25-6. One comment suggested deleting paragraphs (e)(2) through (e)(4) because of the possibility of human error with the switching schemes and because of the possibility that the other loads will discharge the batteries making it unavailable for the alarm. The Coast Guard disagrees. The system outlined in paragraph (e)(3) is continuously charged as required by § 112.55-10. The systems referred to in paragraphs (e)(2) and (e)(4) have other loads which are normally in use, thus the operating personnel would need to keep a charged battery connected to the load to keep the other equipment operating.

§ 113.25-8. In paragraph (c), one comment suggested requiring the space containing the distribution panel to be as close as possible to the general alarm battery enclosure in lieu of being adjacent to the battery enclosure. The Coast Guard disagrees since this would reduce the reliability of the system since a fire or other casualty in any intervening space could disrupt the power supply to the distribution panel. This reduction in reliability is unacceptable in this type of emergency alarm system.

In paragraph (f), one comment suggested clarifying the regulation by allowing up to 5 alarm bells or flashing lights or a combination of both in lieu of only 5 bells. The Coast Guard agrees. The regulations have been modified to reflect this change.

One comment suggested that the main machinery space be exempted from the requirement that a branch circuit must not supply bells on more than one deck level. The Coast Guard agrees.

§ 113.25-9. In paragraph (b)(2), one comment requested a definition of moderate weather. The term "moderate weather" is considered self-explanatory and no further definition is necessary.

One comment suggested clarification of the wording in paragraphs (a) and (b) to clearly indicate the locations in which the bells are required to be located or heard. The Coast Guard agrees. The regulations have been clarified.

§ 113.25-10. One comment suggested requiring the flashing red lights to be of a high intensity beam, rotary beacon type, in order that the light may be seen. The Coast Guard agrees that the light should be a high intensity type but disagrees that it should be limited to a rotating beacon type.

§ 113.25-25. Installation requirements for the general alarm systems on manned ocean and coastwise barges have been added to this section.

§ 113.27-1. Three comments suggested that the engineers' alarm be better defined. It was requested that the power

source be specified and the number and location of the bells be specified. The name of the alarm has been changed to an "engineers' assistance-needed alarm" to clarify the intent of the regulations. The Coast Guard considers it unnecessary to specify number and location of bells in that the intent of the bell, to be audible in the engineers' accommodation spaces, is sufficient. The power source should be the general alarm power source since the alarm is probably most needed during an emergency such as a loss of the main power source.

§ 113.30-10. Two comments recommended updating the reference to IEEE Std No. 45 to the 1977 edition by changing section 37.5 to section 37.31. This change has been made.

§ 113.30-25. Three comments suggested that technical requirements and approval procedures be included for sound powered telephones. The Coast Guard considers the requirements in this section to be adequate and the plan submittal procedures to be clear.

Two comments suggested that a light be permitted in addition to the bell in high noise locations. The Coast Guard agrees.

§ 113.35. One comment indicated that mechanical engine order telegraphs were being installed on new vessels and thus the regulations for these devices should remain in the regulations. The Coast Guard agrees. The former regulations are retained in §§ 113.35-9, 113.35-11, 113.35-13, and 113.35-15. The use of corrosion-resistant aircraft type cable has also been permitted as well as the 10 gauge wire to reflect state-of-the-art technology.

One comment stated that problems have been encountered on double-ended ferries when control is transferred, but the transmitter in the unattended wheelhouse remains active. If the handle of that transmitter is inadvertently moved, it would take control and a hazardous situation could develop. Section 113.35-19(d) has been added to require a manually operated transfer switch which will disconnect the transmitter in the unattended wheelhouse.

§ 113.35-3 SNPRM. One comment suggested that sound powered telephone communications be allowed in lieu of an engine order telegraph indicator at local control stations. The Coast Guard agrees; however, this communication system will not be effective due to noise levels in the engine room unless head set type sound powered phones with sound suppressors are used. Therefore, satisfactory operation of the communication system must be

demonstrated while the vessel is being navigated. The circuit between the local control stations and the normal machinery control station must be independent of any other communication stations required by § 113.30-5 due to the possibility of an unsecured head set causing interference on those circuits. Appropriate revisions have been made to §§ 113.30-5, 113.30-20, and 113.35-3.

§ 113.35-5. In paragraph (b), one comment pointed out that standard practice in recent years has been to mark dials in lieu of engraving and suggested the regulation be changed. The Coast Guard agrees.

In paragraph (d), one comment suggested that a knob be allowed on the engineroom indicator. The Coast Guard agrees.

In paragraph (g), the distance at which it must be possible to determine the position of the operating handle has been defined. This change has also been made to § 113.35-9(g).

§ 113.35-7. Two comments suggested that the requirements be modified to allow a dripproof telegraph instrument, provided it is not in the weather. The Coast Guard agrees.

Paragraphs (f) through (h) have been added. These are existing requirements which were inadvertently left out of the NPRM.

§ 113.35-11. One comment suggested changing the word "instrument" to transmitter since indicators do not need the mechanical stop. The Coast Guard agrees. This section has been renumbered as § 113.35-17.

§ 113.35-19. This new section has been added to retain existing requirements for operation of electric engine order telegraph systems which were inadvertently left out of the NPRM.

Subpart 113.37 SNPRM. Two comments indicated confusion with the requirement of § 113.37-10(a) that each indicator be independent of the propulsion control system. They stated that in case of propulsion failure, the indicator would be unnecessary. This is true; however, the regulation requires independency of the propulsion "controls". Should the control system fail, the engines could be controlled manually at the local control station. The indicator in the wheelhouse would then indicate if engine orders are being correctly carried out. Another comment considered the propulsion control handle in the wheelhouse to be sufficient to indicate direction of shaft rotation. In the local control mode, the control handle would no longer indicate what the shaft is doing, nor would it give a correct indication should there be a propulsion control failure.

Two comments suggested that indicators installed in the wheelhouse, out of the way of any entry way, be allowed to be of dripproof construction. The Coast Guard agrees.

Subpart 113.40. Three comments suggested that these requirements for rudder angle indicators be moved to Subpart 111.93. The Coast Guard disagrees. Since the rudder angle indicator is an important communication device that is independent of the steering gear, the requirements should be separate from those for the steering gear and should remain in Part 113.

One comment recommended that rudder angle indicator repeaters be required at all conning positions in addition to the steering station. Coast Guard regulations require that other items for navigation and communications be installed in the wheelhouse with the intention that the central control point for navigation of the vessel be within the wheelhouse. There are presently no requirements to set up conning positions in addition to the wheelhouse.

A statement has been added to § 113.40-10(a) to clarify that the rudder angle system should be independent of the steering gear control system.

Subpart 113.43 SNPRM. Three comments considered this steering failure alarm to serve no purpose on smaller vessels. The rudder reaction and vessel response time on smaller vessels is much quicker than the alarm response time. The Coast Guard has decided to require the alarm for vessels of 1600 gross tons and over.

One comment suggested that these requirements be included with other steering system requirements in Subpart 111.93. The Coast Guard disagrees, since the alarm is required to be independent of the steering system and the other steering system alarms, these requirements should remain in a separate section.

One comment expressed the opinion that the alarm is not needed since the rudder position is already monitored by the rudder angle indicator and that the other alarms required in Subpart 111.93 monitor steering system failure. The Coast Guard feels that this independent alarm is needed to audibly alarm all types of steering failure. The rudder angle indicator will not give an audible alarm and the other alarms required by Subpart 111.93 do not monitor all possible reasons for steering failures.

The wording of § 113.43-3(a) has been revised to clarify that the alarm is applicable to followup control systems and does not apply to autopilot systems. Autopilot systems would have their own

alarm systems to warn the operator of a malfunction.

Two comments suggested changes to the formula of § 113.43-3 which would allow for a time delay. There is already a time delay built into the formula which gives the longest time delay for the smallest ordered rudder change and no time delay for the largest ordered rudder change. This time delay accounts for the time required for the rudder to attain the minimum required rudder rate of two and one-third degrees per second. At the suggestion of one comment, the "5 seconds" and "1 degree" in § 113.43-3(a)(2) have been changed to "6.5 seconds" and "5 degrees" respectively. This revision was made because the alarm is not intended for ordered rudder changes of less than 5 degrees.

One comment considered the power restriction to the alarm of § 113.43-5(a) to be unreasonable and suggested that the alarm could be supplied by the same branch circuit as other wheelhouse alarms. The Coast Guard agrees as long as the steering failure alarm power supply is independent of any steering gear power, control, or alarm circuits.

§ 113.45-5. Three comments suggested that refrigerated space alarms should be dropped in favor of requiring door latches which cannot be locked on the outside. The Coast Guard concludes that it is the operator's decision whether an inside trip free latch or an alarm system should be provided.

§ 113.50-15. A note has been added to Table 113.50-15 to clarify the method of determining required signal and voice levels.

§ 113.65-5. Two comments pointed out that the title to this section was a typographical error and should read "Subpart 113.65 Whistle and siren operators." This error has been corrected.

Three comments suggested that requirements for sirens be dropped since sirens are not commonly installed on vessels. The Coast Guard agrees.

One comment indicated that the referenced section in IEEE Std No 45-1977 should be 37.25 in lieu of the 37.45 indicated.

The following table listing old section numbers of the superseded regulations and the corresponding section numbers of similar items in these revised regulations is published as an aid to interested persons:

DERIVATIVE REFERENCE TABLE

Old section No.	New section No.
110.01-1 to 110.01-10	Deleted.
110.05-1 to 110.05-5	110.01-1.
110.10-1 to 110.10-5	110.10-1.
110.15-1 to 110.15-195	110.15-1.

DERIVATIVE REFERENCE TABLE—Continued

Old section No.	New section No.
110.20-1	Same.
110.25-1 to 110.25-5	Deleted.
111.01-1 to 111.01-5	Deleted.
111.05-1	Deleted.
111.05-5	110.25-1 to 110.25-5.
111.05-10(a)-(b)	110.30-1 to 110.30-3.
111.05-10(c)	Deleted.
111.05-10(d)-(e)	110.30-5 to 110.30-7.
111.05-15(a)-(e), (g)	111.01-1 to 111.01-13.
111.05-15(f)	111.05-3 to 111.05-9.
111.05-20	111.01-15.
111.05-25	111.01-17.
111.05-30	Deleted.
111.10-1	111.10-1 to 111.10-11.
111.10-5 to 111.10-40	111.12-1 to 111.12-7.
111.15-1(a)-(b)	111.15-1.
111.15-1(c)	111.15-3.
111.15-1(d)	111.15-5(f).
111.15-5	111.15-5(a)-(c).
111.15-6	111.15-5(d)-(e).
111.15-10	Same.
111.15-15	111.15-5(g)-(h).
111.15-20	Same.
111.15-25	Same.
111.20-1 to 111.20-5	Same.
111.25-1 to 111.25-5	Same.
111.25-10	111.25-1.
111.25-15	Same.
111.25-20 to 111.25-30(b)	111.25-1.
111.25-30(c)	111.01-9.
111.25-30(d)	111.01-3.
111.25-30(e)	111.105-5.
111.25-35	111.70-1.
111.30-1(a)	111.70-1.
111.30-1(b)	111.30-1 to 111.30-3.
111.30-1(c)	111.30-9.
111.30-1(d)	111.30-5.
111.30-1(e)	111.30-5(f).
111.30-1(f)	Deleted.
111.30-1(g)	111.30-5(c).
111.30-1(h)	111.30-15.
111.30-1(i)	111.30-17.
111.30-1(j)	111.30-13.
111.30-5	111.30-19.
111.30-10(a)	111.30-21.
111.30-10(b) and (c)	Deleted.
111.30-15(a)	Deleted.
111.30-15(b)	111.30-27.
111.30-15(c)	111.30-25.
111.30-20	111.30-29.
111.30-30	111.30-31.
111.35-1 to 111.35-5	111.35-1.
111.40-1(a)	111.40-7.
111.40-1(b)	111.40-5.
111.40-1(c)	111.40-9.
111.40-1(d)	111.40-1.
111.40-1(e)	Deleted.
111.40-1(f) and (g)	111.40-1 and 111.40-15.
111.40-1(h)	111.40-11.
111.50-1	111.50-3.
111.50-5	Same.
111.50-10(a) and (b)	111.50-7.
111.50-10(c) and (d)	111.50-9.
111.50-15(a) and (b)	111.53-1.
111.50-15(e)	111.54-1.
111.50-20(a)	111.53-1(a) and 111.54-1(a)(3).
111.50-20(b)	111.57.
111.50-20(c)	110.25(a)(6) and 111.52-1 to 111.52-5.
111.50-25	110.25(a)(7) and 111.51-1 to 111.51-3.
111.55-1 to 111.55-5	111.55-1 to 111.55-9.
111.60-1(a)-(c)	111.60-1.
111.60-1(d) to 111.60-1(n)	111.60-3 to 111.60-5.
111.60-5	111.60-11 to 111.60-13.
111.60-10	111.60-7.
111.60-15	111.60-5.
111.60-20	111.60-5.
111.60-25(a)-(e)	111.60-5.
111.60-25(f)	111.05-11.
111.60-25(g)	111.20-10.
111.60-25(h)	111.60-15.
111.60-15(f)	Deleted.
111.60-25(m)	111.60-17.
111.60-25(n)	111.60-5.
111.60-25(o)	111.60-9.
111.60-30	111.05-11.
111.60-35	111.05-9.
111.60-40	111.60-19.
111.65-1	111.12-11.
111.65-5 to 111.65-10	111.05-17 and 111.12-11.

DERIVATIVE REFERENCE TABLE—Continued

Old section No.	New section No.
111.65-15	111.12-11.
111.70-1 to 111.70-20(h)	111.70-1.
111.70-20(i)-(q)	111.70-3.
111.70-25	111.70-3(d).
111.70-30	111.70-1.
111.70-35	111.70-5.
111.70-40	111.70-7.
111.75-1	Same.
111.75-3	111.20-15.
111.75-5	Same.
111.75-10	Deleted.
111.75-15(a)-(d)	111.75-15(a)-(e).
111.75-15(e)	111.75-16.
111.75-15(f)	Same.
111.75-15(g)	111.75-17.
111.75-15(h)	111.75-18.
111.75-20	Same.
111.75-25	111.77-1.
111.75-30	111.79-1 to 111.79-15.
111.75-35	111.81-1 to 111.81-13.
111.80-5	111.105-1 to 111.105-27.
111.80-8	111.105-11.
111.80-10 to 111.80-13	111.103-1 to 111.103-9.
111.80-15	111.83-1 to 111.83-5.
111.80-20	111.105-37.
111.80-25	111.105-39.
111.80-30	111.89-1.
111.80-35	111.91-1.
111.80-40	111.101-1 to 111.101-3.
111.80-45	111.97-1 to 111.97-7.
111.80-50	111.99-1 to 111.99-5.
111.80-55	111.95-1 to 111.95-7.
111.80-60	111.87-1 to 111.87-3.
111.80-65	111.77-3 to 111.77-11.
111.80-70	111.93-1 to 111.93-13.
111.85-1 to 111.85-5	Deleted.
111.85-10	111.105-29 to 111.105-32.
111.85-90	110.01-1.
111.90-1 to 111.90-25	110.01-1.
112.01-1	Deleted.
112.05-1 to 112.05-5	Same.
112.05-10	112.43-1 to 112.43-15.
112.05-15	Deleted.
112.10-1 to 112.10-20	112.01-1 to 112.01-20.
112.15-1 to 112.15-10	Same.
112.15-15	112.01-5.
112.20-1 to 112.20-15	Same.
112.25-1 to 112.25-10	Same.
112.30-1 to 112.30-10	Same.
112.35-1 to 112.35-5	112.35-1 to 112.35-7.
112.40-1	112.40-1.
112.45-1 to 112.45-5	112.45-1 to 112.45-5.
112.50-1	112.50-1 to 112.50-7.
112.51-1	112.50-1 to 112.50-7.
112.55-1	111.15-2.
112.55-5 to 112.55-15	Same.
112.90-1 to 112.90-10	110.01-1(c).
113.01-1 to 113.05-1	Deleted.
113.05-5	Same.
113.05-10	111.60-11.
113.10-1	Deleted.
113.10-5(a)	113.10-1.
113.10-5(b)	111.60-1.
113.10-5(c)-(e)	113.10-3 to 113.10-7.
113.10-5(f)	111.01-9.
113.10-90	110.01-1(c).
113.15-1	Deleted.
113.15-5(a)	113.10-1.
113.15-5(b)	111.60-1.
113.15-5(c)-(e)	113.10-3 to 113.10-7.
113.15-5(f)	111.01-9.
113.15-90	110.01-1(c).
113.20-1	Deleted.
113.20-5(a) and (b)	113.20-1.
113.20-5(c)	111.60-1.
113.20-5(d)	113.20-3.
113.20-90	110.01-1(c).
113.25-1	Same.
113.25-5	Same.
113.25-10(a) (1) to (3)	113.25-6.
113.25-10(a) (4) to (5)	113.25-7.
113.25-10(b)	113.25-8.
113.25-10(c)	113.25-9.
113.25-10(d)	113.25-10.
113.25-15(a)	113.25-6(f).
113.25-15(b)	113.25-11.
113.25-15(c) (1) and (2)	113.25-12.
113.25-15(c) (3)	Deleted.
113.25-15(d) (1)	111.60-1.
113.25-15(d) (2)	113.25-14.
113.25-15(d) (3)	113.25-15.
113.25-15(d) (4) and (5)	113.25-16.

DERIVATIVE REFERENCE TABLE—Continued

Old section No.	New section No.
113.25-20 to 113.25-30	Same.
113.25-90	110.01-1(c).
113.30-1 to 113.30-10	Same.
113.30-15	113.30-10.
113.30-20 to 113.30-25	Same.
113.30-90	110.01-1(c).
113.35-1 to 113.35-5	113.35-3.
113.35-10 to 113.35-15	Deleted.
113.35-20 to 113.35-35	113.35-9 to 113.35-15.
113.35-40 to 113.35-50	113.35-5 to 113.35-7 and 113.35-19.
113.35-55 to 113.35-90	110.01-1(c).
113.40-1 to 113.40-10	Same.
113.40-90	110.01-1(c).
113.45-1	Deleted.
113.45-5	Same.
113.45-90	110.01-1(c).
113.50-1 to 113.50-5	Same.
113.50-10	112.15-1(j).
113.50-15 to 113.50-20	Same.
113.50-25(a)	111.60-1.
113.50-25(b)	113.50-25.
113.50-30	Deleted.
113.50-35	78.16-1 and 78.17-10.
113.50-90	110.01-1(c).
113.65-1	Deleted.
113.65-5	Same.
113.65-90	110.01-1(c).
113.70-1	Deleted.
113.70-5(a)	Same.
113.70-5(b)	111.60-1.
113.70-5(c)	113.70-5(b).
113.70-10	112.15-1(n).
113.70-90	110.01-1(c).

Evaluation

These regulations have been evaluated in accordance with the DOT "Policies and Procedures for Simplification, Analysis, and Review of Regulations" (DOT Order 2100.5 of 5-22-80) and E.O. 12291. A copy of the Final Evaluation may be obtained from the Commandant (G-CMC/24), U.S. Coast Guard, Washington, D.C. 20593, (202) 426-1477.

As discussed in the Final Evaluation, most of the changes to the Electrical Engineering Regulations are either editorial or they update technical specifications to reflect the latest practices. There are some changes that will require different construction. Although some of these changes will cause minor cost increases for shipbuilders, others will result in substantial savings. Many of the changes in the rules that would cause cost increases are already current marine industry practice. The remaining changes causing cost increases are more than offset by the cost savings offered by several relaxations in the regulations. These regulations are not retroactive and apply only to new construction.

Overall, it is anticipated that there will be a net cost reduction offered for vessels constructed under these rules, but the exact impact is difficult to determine accurately since it may vary from vessel to vessel. For the purpose of illustration, a typical medium sized tanker of 40,000 gross tons will be used.

For this vessel, cost increases due to improved steering gear requirements, a steering failure alarm, communications to local control stations (if automated), and several other new requirements will amount to approximately \$10,000. On the other hand, due to cost decreases that may result from the relaxation of the requirements for armor on cable, allowance of the use of NEC motors, and reduced number of circuit breakers in panelboards it may be possible to save about \$150,000 on this vessel. On a vessel of less than 1600 gross tons the increased cost is only about \$5,000, whereas the savings can be about \$50,000. On vessels larger than 40,000 gross tons, the overall savings can be up to \$250,000. These savings are expressed using figures that represent the estimated upper extent of the possible savings. Actual savings will depend upon the industry practices followed in each shipyard before and after the effective date of these regulations. Based on the average number and size and typical types of vessels certificated by the Coast Guard per year, the net annual savings offered to the United States shipbuilding industry has been estimated as \$10,000,000 when these regulations are compared to former regulations.

In addition to the savings in material costs, there are several intangible benefits. Due to the increased reference to the National Electrical Code, Underwriters Laboratories Inc., and other national standards, certain equipment items will now be more readily available "off the shelf" without special marine requirements. The fact that the regulations have been updated and obsolete requirements have been removed or amended will relieve the burden on the public created by misleading and old regulations. Also, the volume of the regulations has been reduced by fifty percent making them less cumbersome to the users.

For the above reasons, under the provisions of Executive Order 12291 these regulations have been determined not to be a major rule. In addition, they are considered to be nonsignificant in accordance with guidelines set out in the "Policies and Procedures for Simplification, Analysis, and Review of Regulations" (DOT Order 2100.5 of 5-22-80). Therefore, a Regulatory Impact Analysis has not been conducted.

Although the Regulatory Flexibility Act (94 Stat. 1164) does not apply, since the notice of proposed rulemaking was issued prior to 1 January 1981, the rule has been reviewed and it is the Coast Guard's opinion that a cost savings will be experienced by small entities when

this rule is compared to former regulations. Whenever possible, requirements have been tailored to the size of the vessel and in some cases a relaxation of requirements for smaller vessels has been offered. Small entities will more likely be involved in the building or ownership of smaller vessels than with larger vessels. Therefore, savings related to smaller vessels will in general be passed on to small entities.

List of Subjects in 46 CFR Parts 110, 111, 112, and 113

Administrative Practice and Procedure, Electric Power, Marine Safety, Vessels.

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

PART 31—INSPECTION AND CERTIFICATION

§ 31.10-5 [Amended]

1. By removing in the last sentence in § 31.10-5(a) the words "§ 111.05-5 of."

PART 32—SPECIAL EQUIPMENT, MACHINERY, AND HULL REQUIREMENTS

§ 32.15-5 [Amended]

2. By removing in the last sentence in § 32.15-5(b) the words "of Subparts 113.05 and 113.65."

§§ 32.15-20 and 32.15-25 [Amended]

3. By removing §§ 32.15-20(b) and 32.15-25(b).
4. By revising Subpart 32.25 to read as follows:

Subpart 32.25—General Alarm Systems

§ 32.25-1 General alarm systems for tankships and manned tank barges.

A general alarm system must be installed on tankships and manned tank barges which meets the requirements in Subchapter J (Electrical Engineering Regulations) of this chapter.

§§ 32.25-5 and 32.25-10 [Removed and Reserved]

5. By removing and reserving § 32.25-5 and 32.25-10.
6. By revising §§ 32.30-1 and 32.30-5 to read as follows:

§ 32.30-1 Voice tubes or telephone equipment—T/A11.

Each tankships must have communication equipment which meets the requirements in Subchapter J (Electrical Engineering Regulations) of this chapter.

§ 32.30-5 Engine order telegraph equipment—T/A11.

Each tankship must have an engine order telegraph system which meets the requirements in Subchapter J (Electrical Engineering Regulations) of this chapter.

§ 32.30-10 [Removed]

7. By removing § 32.30-10.

§ 32.40-1 [Amended]

8. By removing in the last sentence in § 32.40-1(d)(4) the words "of § 111.50-15 and Subpart 111.60."

9. By revising § 32.45-1 to read as follows:

§ 32.45-1 Installation and details.

The installation of all electrical engineering or interior communications systems, together with the details of design, construction, and installation, must meet the requirements of Subchapter J (Electrical Engineering Regulations) of this chapter.

§§ 32.45-5 and 32.45-10 [Removed and Reserved]

10. By removing and reserving § 32.45-5 and 32.45-10.
11. By revising § 32.56-25(a) to read as follows:

§ 32.56-25 Category A machinery spaces: Windows and portlights—T/A11.

(a) Except as provided in paragraph (b) of this section and Subpart 111.105, of this chapter, boundaries of Category A machinery spaces and boundaries of cargo pumprooms must not be pierced for windows or portlights.

* * * * *

PART 33—LIFESAVING EQUIPMENT

§ 33.20-1 [Amended]

12. By revising the last sentence in § 33.20-1(c)(3) to read as follows:

* * * * *

(c) * * *

(3) * * * For detailed requirements of such illumination refer to Subchapter J (Electrical Engineering Regulations) of this chapter.

* * * * *

§ 33.50-1 [Amended]

13. By removing in the second sentence of § 33.50-1 the words "§ 111.75-15(h) of."

PART 35—OPERATIONS

14. By revising § 35.30-30 to read as follows:

§ 35.30-30 Portable electric equipment—TB/A11.

Portable electric equipment must not be used in a hazardous location

described in Subpart 111.105 of this chapter except—

(a) Self-contained, battery-fed, explosion-proof lamps approved by Underwriters Laboratories Inc., Factory Mutual Research Corporation, or other independent laboratory recognized by the Commandant, for use in a Class I, Division 1 location for the electrical group classification of the cargo;

(b) Intrinsically safe equipment approved by Underwriters Laboratories Inc., Factory Mutual Research Corporation, or other independent laboratory recognized by the Commandant, for use in a Class I, Division 1 location for the electrical group classification of the cargo; and

(c) Any electrical equipment, if—
(1) The hazardous location is—
(i) Enclosed; and
(ii) Gas free;
(2) The adjacent compartments are—
(i) Gas free;
(ii) Inerted;
(iii) Filled with water;
(iv) Filled with Grade E liquid; or
(v) Spaces where flammable gases are not expected to accumulate; and—

(3) Each compartment where flammable gas is expected to accumulate is—

(i) Closed; and
(ii) Secured.

15. By revising §§ 35.40-1, 35.40-5, and 35.40-6 to read as follows:

§ 35.40-1 General alarm contact maker—TB/A11.

Each general alarm contact maker must be marked in accordance with requirements in Subchapter J (Electrical Engineering Regulations) of this chapter.

§ 35.40-5 General alarm bells—TB/A11.

General alarm bells must be marked in accordance with requirements in Subchapter J (Electrical Engineering Regulations) of this chapter.

§ 35.40-6 Emergency lights—TB/A11.

Emergency lights must be marked in accordance with requirements in Subchapter J (Electrical Engineering Regulations) of this chapter.

PART 37—SPECIAL CONSTRUCTION, ARRANGEMENT, AND OTHER PROVISIONS FOR NUCLEAR VESSELS

§ 37.05-1 [Amended]

16. By removing and reserving § 37.05-1(b).

PART 38—LIQUEFIED FLAMMABLE GASES

17. By revising paragraphs (a)(7) and (a)(8) in § 38.01-2 to read as follows:

§ 38.01-2 Transportation of portable cylinders or portable tanks containing or having previously contained liquefied flammable gases in dry cargo spaces—TB/A11.

(a) * * *

(7) Electrical circuits in the cargo spaces must meet the hazardous area requirements in Subchapter J (Electrical Engineering Regulations) of this chapter. If an electrical circuit does not meet those requirements, it must be deenergized by a positive means and not reenergized until the cargo has been removed and the space has been tested and found free of flammable vapor.

(8) During the stowage of portable cylinders or portable tanks in a hold or compartment that is not fitted with electrical fixtures meeting the hazardous area requirements of Subchapter J (Electrical Engineering Regulations) of this chapter, portable lights must not be used within the space unless the portable lights are explosion-proof. Electrical connections for portable lights must be made from outlets on the weather deck. Hand flashlights used in the stowage area must be explosion-proof.

* * * * *

PART 63—CONTROL SYSTEMS FOR AUTOMATIC AUXILIARY HEATING EQUIPMENT

18. By revising § 63.05-85(b) to read as follows:

§ 63.05-85 Wiring of electrical components.

* * * * *

(b) Electrical cable must be of the type specified by Subchapter J (Electrical Engineering Regulations) of this chapter for damp or wet locations, National Electrical Code moisture resistant type, or other type accepted by the Commandant. Cable must be rated for the maximum temperature that will be encountered after installation.

* * * * *

19. By revising § 63.10-85(b) to read as follows:

§ 63.10-85 Wiring of electrical components.

* * * * *

(b) Electric cable must be of the type specified by Subchapter J (Electrical Engineering Regulations) of this chapter for damp or wet locations, National Electrical Code moisture resistant type, or other type accepted by the Commandant. Cable must be rated for the maximum temperature that will be encountered after installation.

* * * * *

PART 71—INSPECTION AND CERTIFICATION

§ 71.25-30 [Removed and Reserved]

20. By removing and reserving § 71.25-30.

PART 75—LIFESAVING EQUIPMENT

§ 75.30-15 [Amended]

21. By removing in the last sentence of § 75.30-15(a) the words "of § 111.80-55."

§ 75.50-10 [Amended]

22. By revising the last sentence in § 75.50-10 to read as follows:

* * * For detailed requirements of the illumination, see Subchapter J (Electrical Engineering Regulations) of this chapter.

§ 75.50-15 [Amended]

22. By revising the last sentence in § 75.50-15 to read as follows:

* * * For detailed requirements of the illumination, see Subchapter J (Electrical Engineering Regulations) of this chapter.

PART 76—FIRE PROTECTION EQUIPMENT

23. By revising § 76.25-35(i) to read as follows:

§ 76.25-35 Operation and installation.

* * * * *

(i) All piping, valves, fittings, pressure tanks, etc., must meet the applicable requirements of Subchapter F (Marine Engineering) of this chapter.

* * * * *

PART 77—VESSEL CONTROL AND MISCELLANEOUS SYSTEMS AND EQUIPMENT

§ 77.05-1 [Amended]

25. By removing in § 77.05-1(b) the words "§ 111.80-25 of."

PART 78—OPERATIONS

26. By adding a new Subpart 78.16 to read as follows:

Subpart 78.16—Emergency Loudspeaker Systems

§ 78.16-1 Operation.

The emergency loudspeaker system must—

(a) Be used only at the discretion of the master;

(b) Function entirely independently of any public address or music distribution system; and

(c) Not be used for entertainment purposes.

§ 78.17-10 [Amended]

27. By removing in the cross reference of § 78.17-10 the words "§ 113.50-35 of."

28. By revising the section heading and text of § 78.47-5 to read as follows:

§ 78.47-5 General alarm contact makers.

Each general alarm contact maker must be marked in accordance with the requirements in Subchapter J (Electrical Engineering Regulations) of this chapter.

29. By revising § 78.47-40(a) to read as follows:

§ 78.47-40 Exit signs.

(a) Illuminated exit signs are required and must be installed in accordance with Subchapter J (Electrical Engineering Regulations) of this chapter.

§ 78.47-40 [Amended]

30. By removing in the cross reference of § 78.47-40(b) the words "§ 111.75-15(d) of."

PART 79—SPECIAL CONSTRUCTION, ARRANGEMENTS, AND OTHER PROVISIONS FOR NUCLEAR VESSELS

§ 79.05-1 [Amended]

31. By removing and reserving § 79.05-1(b).

PART 92—CONSTRUCTION AND ARRANGEMENT

§ 92.20-45 [Amended]

32. By removing and reserving § 92.20-45(b).

PART 94—LIFESAVING EQUIPMENT

§ 94.30-15 [Amended]

33. By removing in the last sentence in § 94.30-15(a) the words "of Subpart 111.65."

§ 94.50-10 [Amended]

34. By revising the last sentence in § 94.50-10 to read as follows:

* * * For detailed requirements of the illumination, see Subchapter J (Electrical Engineering Regulations) of this chapter.

§ 94.50-15 [Amended]

35. By revising the last sentence in § 94.50-15 to read as follows:

* * * For detailed requirements of the illumination, see Subchapter J (Electrical Engineering Regulations) of this chapter.

PART 96—VESSEL CONTROL AND MISCELLANEOUS SYSTEMS AND EQUIPMENT

§ 96.05-1 [Amended]

36. By removing in § 96.05-1(b) the words "§ 111.65-10 of."

PART 97—OPERATIONS

37. By revising the section heading and text of § 97.37-5 to read as follows:

§ 97.37-5 General alarm bell contact maker.

Each general alarm contact maker must be marked in accordance with requirements in Subchapter J (Electrical Engineering Regulations) of this chapter.

PART 99—SPECIAL CONSTRUCTION, ARRANGEMENTS, AND OTHER PROVISIONS FOR NUCLEAR VESSELS

§ 99.05-1 [Amended]

38. By removing and reserving § 99.05-1(b).

39. By revising the entire Subchapter J to read as follows:

SUBCHAPTER J—ELECTRICAL ENGINEERING

PART 110—GENERAL PROVISIONS

Subpart 110.01—Applicability

Sec.
110.01-1 General.
110.01-3 Repairs.

Subpart 110.10—Reference Specifications, Standards, and Codes

110.10-1 General.

Subpart 110.15—Terms Used in This Subchapter

110.15-1 Definitions.

Subpart 110.20—Equivalents

110.20-1 Conditions under which equivalents may be used.

Subpart 110.25—Plan Submittal

110.25-1 Plans and information required for new construction.
110.25-3 Procedure for submitting plans.

Subpart 110.30—Testing and Inspection

110.30-1 General.
110.30-3 Initial inspection.
110.30-5 Inspection for certification.
110.30-7 Repairs or alterations.

Authority: 46 U.S.C. 170, 367, 369, 375, 390b, 391a, 392, 405, 416, 445, 489, 526p; 49 U.S.C. 1655(b); 49 CFR 1.46.

Subpart 110.01—Applicability

§ 110.01-1 General.

(a) This subchapter applies to electric equipment and systems where Subchapters D, H, I, IA, O, T, or U of this chapter require the installations to be in accordance with this subchapter.

(b) This subchapter applies to vessels and installations contracted for after May 31, 1982.

(c) Installations and equipment accepted by the Coast Guard as meeting the applicable requirements in this subchapter in effect on the date the installation was contracted for and which are maintained in good and serviceable condition to the satisfaction of the Officer in Charge, Marine Inspection, may be continued in use

until replacement is ordered by the Officer in Charge, Marine Inspection, or as specified in the regulations.

(d) Requirements in this subchapter revised or added subsequent to May 31, 1982 will apply to installations contracted for after the effective date of such requirements or as specified in the regulation.

(e) Electrical systems internal to a pressure vessel for human occupancy (PVHO) need not meet the requirements of this subchapter, but must meet the requirements of Subpart B (Commercial Diving Operations) of Part 197 of this Chapter.

§ 110.01-3 Repairs.

(a) Repairs must be done in accordance with the regulations in effect on the date—

- (1) The original installation was contracted for; or
- (2) The repair was contracted for.

Subpart 110.10—Reference Specifications, Standards, and Codes

§ 110.10-1 Incorporation by reference.

(a) Certain materials are incorporated by reference into this part with the approval of the Director of the Federal Register. The Office of the Federal Register publishes a table, "Material Approved for Incorporation by Reference," which appears in the Finding Aids section of this volume. In that table is found the date of the edition approved, citations to the particular sections of this part where the material is incorporated, addresses where the material is available, and the date of the approval by the Director of the Federal Register. To enforce any edition other than the one listed in the table, notice of the change must be published in the **Federal Register** and the material made available. All approved material is on file at the Office of the Federal Register, Washington, DC 20408 and at the Office of Merchant Marine Safety (G-MMT-2/12), Room 1214, U.S. Coast Guard Headquarters Building, 2100 Second Street SW., Washington, D.C. 20593.

(b) The materials approved for incorporation by reference in this Subchapter are:

(1) Rules for Building and Classing Steel Vessels, issued by the American Bureau of Shipping.

(2) The following publications issued by the National Fire Protection Association:

(i) The National Electrical Code (NFPA 70).

(ii) Standard for the Use of Inhalation Anesthetics (NFPA 56A).

- (iii) Standard for Purged and Pressurized Enclosures for Electrical Equipment in Hazardous Locations (NFPA 496).
- (iv) Recommended Practice for Static Electricity (NFPA 77).
- (3) The following publications issued by the National Electrical Manufacturers Association:
 - (i) IPCEA-NEMA Standards Publication Rubber-insulated Wire and Cable for the Transmission and Distribution of Electrical Energy (NEMA WC 3).
 - (ii) IPCEA-NEMA Standards Publication Ethylene-Propylene-Rubber-Insulated Wire and Cable for the Transmission and Distribution of Electrical Energy (NEMA WC 8).
- (4) The following publications issued by the Institute of Electrical and Electronics Engineers, Inc.:
 - (i) Low-Voltage AC Power Circuit Breakers Used in Enclosures (ANSI/IEEE Standard No. C37.13).
 - (ii) Switchgear Assemblies Including Metal-Enclosed Bus (IEEE Standard No. 27, ANSI C37.20).
 - (iii) Recommended Practice for Electric Installations on Shipboard (IEEE Standard No. 45).
 - (iv) Application Guide for AC High-Voltage Circuit Breakers Rated on a Symmetrical Current Basis (IEEE Standard No. 320, ANSI C37.010).
 - (v) Low-Voltage AC Non-Integrally Fused Power Circuit Breakers (Using Separately Mounted Current-Limiting Fuses) (IEEE Standard No. 331, ANSI C37.27).
 - (vi) Low-Voltage AC Integrally Fused Power Circuit Breakers (IEEE Standard No. 538, ANSI C37.13a).
- (5) The following standards issued by Underwriters Laboratories Inc.:
 - (i) Standard for General Use Snap Switches (UL 20).
 - (ii) Standard for Rubber-Insulated Wires and Cables (UL 44).
 - (iii) Standard for Electrical Cabinets and Boxes (UL 50).
 - (iv) Standard for Flexible Cord and Fixture Wire (UL 62).
 - (v) Standard for Panelboards (UL 67).
 - (vi) Standard for Motor Operated Appliances (UL 73).
 - (vii) Standard for Thermoplastic-Insulated Wires (UL 83).
 - (viii) Standard for Enclosed Switches (UL 98).
 - (ix) Standard for Elevator Door Locking Devices and Contacts (UL 104).
 - (x) Standard for Commercial Electric Cooking Appliances (UL 197).
 - (xi) Standard for Household Refrigerators and Freezers (UL 250).
 - (xii) Standard for High-Voltage Industrial Control Equipment (UL 347).

- (xiii) Standard for Knife Switches (UL 375).
- (xiv) Standard for Drinking Water Coolers (UL 399).
- (xv) Standard for Commercial Refrigerators and Freezers (UL 471).
- (xvi) Standard for Electric Wire Connectors and Soldering Lugs for Use with Copper Conductors (UL 486A).
- (xvii) Standard for Molded Case Circuit Breakers and Circuit Breaker Enclosures (UL 489).
- (xviii) Standard for Electrical Attachment Plugs and Receptacles (UL 498).
- (xix) Standard for Electric Industrial Control Equipment (UL 508).
- (xx) Standard for Electrical Outlet Boxes and Fittings (UL 514).
- (xxi) Standard for Marine Type Electric Lighting Fixtures (UL 595).
- (xxii) Standard for Household Electric Dishwashers (UL 749).
- (xxiii) Standard for Electric Motor Control Centers (UL 845).
- (xxiv) Standard for Busways and Associated Fittings (UL 857).
- (xxv) Standard for Commercial Electric Dishwashers (UL 921).
- (xxvi) Standard for Emergency Lighting Equipment (UL 924).
- (xxvii) Standard for Electric Air Heaters (UL 1025).
- (xxviii) Standard for Electric Baseboard Heating Equipment (UL 1042).
- (xxix) Standard for Electric Central Air Heating Equipment (UL 1096).
- (xxx) Standard for Marine Navigation Lights (UL 1104).
- (xxxi) Standard for Electric Battery Chargers (UL 1236).
- (6) The following specifications and guides issued by the Naval Sea Systems Command:
 - (i) Military Specification, Wire, Electrical (Insulated, High Temperature) (MIL-W-16878D).
 - (ii) Military Specification, Wire and Cable, Hook-up, Electrical, Insulated (MIL-W-76B).
 - (iii) Military Specification, Cable and Cord Electrical, for Shipboard Use (MIL-C-915E).
 - (iv) Electrical Cable, Ratings and Characteristics (NAVSEA Design Data Sheet DDS 304-2).
 - (v) A.C. Fault Current Calculations (NAVSEA Design Data Sheet DDS 9620-3).
 - (vi) Military Specification, Matting or Sheet, Floor Covering, Insulating for High Voltage Application (MIL-M-15562F).
- (7) American National Standard Safety Code For Elevators, Dumbwaiters, Escalators, and Moving Walks (ANSI A17.1) (issued by the

American Society of Mechanical Engineers).

(8) The following publications issued by the American National Standard Institute Inc. (ANSI):

- (i) Low-Voltage DC Power Circuit Breakers Used in Enclosures (ANSI C37.14).
- (ii) Rating Structure for AC High-Voltage Circuit Breakers Rated on a Symmetrical Current Basis (ANSI C37.04).
- (iii) AC High-Voltage Circuit Breakers Rated on a Symmetrical Current Basis and a Total Current Basis (ANSI C37.12).
- (9) The following publications issued by the American Society for Testing and Materials:
 - (i) Standard Methods of Salt Spray (Fog) Testing (ASTM B 117).
 - (ii) Standard Specification for Nylon Injection Molding and Extrusion Materials (ASTM D 789).
- (10) Installation of Intrinsically Safe Instrument Systems in Class I Hazardous Locations (ISA RP 12.6) issued by the Instrument Society of America.
- (c) The words "should" or "shall," when used in a reference, are to be considered the same as the word "must" in describing Coast Guard requirements.

Subpart 110.15—Terms Used in This Subchapter

§ 110.15-1 Definitions.

For the purpose of this subchapter.

(a) Electrical and electronic terms are used as defined in the "Dictionary of Electrical & Electronics Terms" (IEEE Standard No. 100), issued by the Institute of Electrical and Electronics Engineers.

(b) In addition to the definitions in paragraph (a) of this section:

- (1) "Boat deck" means a deck on which lifeboats are stowed.
- (2) "Coastwise Vessel" means a vessel that normally navigates the waters of any ocean or the Gulf of Mexico 20 nautical miles or less offshore and is certificated for coastwise navigation by the U.S. Coast Guard.
- (3) "Commandant" means the Commandant of the U.S. Coast Guard (see § 1.01 of this chapter for delegation of authority).
- (4) "Corrosion-resistant finish" means one of the following treatments:
 - (i) Electroplated by cadmium, chromium, nickel, silver, or zinc.
 - (ii) Sherardized.
 - (iii) Galvanized.
- (v) An enameled finish over a zinc chromate primer that is over a surface that has been cleaned and degreased.

(v) A finish that when tested in accordance with the American Society for Testing and Materials Standard Method of Salt Spray (Fog) Testing (B 117) for 200 hours does not show pitting, cracking, or other deterioration more severe than that resulting from a similar test on passivated AISI Type 304 stainless steel.

(5) "Corrosion-resistant material" and "noncorrodible material" means one of the following materials:

- (i) Silver.
- (ii) Corrosion-resistant steel.
- (iii) Copper.
- (iv) Brass.
- (v) Bronze.
- (vi) Copper-nickel.
- (vii) Corrosion-resistant nickel alloys.
- (viii) Aluminum alloys with a copper content of 0.4 percent or less.
- (ix) Plastics.

(x) A material that when tested in accordance with the American Society for Testing and Materials Standard Method of Salt Spray (Fog) Testing (B 117) for 200 hours does not show pitting, cracking, or other deterioration more severe than that resulting from a similar test on passivated AISI type 304 stainless steel.

(6) "Corrosive location" means a location exposed to the weather on vessels operating in salt water.

(7) "Damp or wet location" means—

- (i) A location exposed to the weather;
- (ii) A machinery space;
- (iii) A cargo space;
- (iv) A location within a galley, a laundry, or a public washroom or toilet room that has a bath or shower normally exposed to splashing, water washdown, or other wet conditions;

(v) An area directly inside of an access door to a weather deck if the access door is not protected against entrance of rain or spray by an overhanging deck or by other means; or

(vi) Other spaces with similar moisture levels.

(8) "Deadship condition" means a situation in which the main propulsion plant, boiler, and ship's service generating plant are not in operation due to the absence of power.

(9) "Dripproof" means enclosed equipment so constructed or protected that falling drops or liquid or solid particles striking the enclosure at any angle from 0 to 15 degrees downward from the vertical do not interfere with the operation of the equipment.

Note.—A NEMA Type 1 enclosure with dripshield, a NEMA Type 2 enclosure, or a NEMA Type 12 enclosure meets this definition.

(10) "Dry location" means—

- (i) An accommodation space;

(ii) A pantry;

(iii) A passageway adjacent to quarters;

(iv) A location within a galley, a laundry, or a public washroom or toilet that has a bath or shower not exposed to splashing, water washdown, or other wet conditions.

(v) A public washroom or toilet room that does not have a bath or shower;

(vi) A radio room;

(vii) A gyro room;

(viii) A chart room; or

(ix) Other spaces with similar moisture levels.

(11) "Embarkation deck" means a deck from which persons embark into lifeboats or are assembled before embarking into lifeboats.

(12) "Emergency squad" means the crew designated on the station bill as the nucleus of a damage control party.

(13) "Flashpoint" means the temperature at which a liquid gives off a flammable vapor when heated in a closed-cup tester.

(14) "Great Lakes vessel" means a vessel that navigates exclusively on the Great Lakes.

(15) "Marine inspector" and "inspector" mean any person from the civilian or military branch of the Coast Guard assigned under an Officer in Charge, Marine Inspection, or any other person who is designated for the duties of inspection, enforcement, and administration of Title 52 of the Revised Statutes as amended and rules and regulations promulgated under its authority.

(16) "Nonsparking fan" means a fan that cannot produce sparks that ignite a flammable mixture and has—

(i) Blades or housing of nonmetallic construction;

(ii) Blades and housing of nonferrous material;

(iii) Blades and housing of corrosion-resistant steel;

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

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

Note.—Any combination of an aluminum alloy or a magnesium alloy component and a ferrous component is considered by the Coast Guard to be a sparking hazard regardless of the material that is used as the fixed or rotating component.

(17) "Ocean vessel" means a vessel that navigates the waters of any ocean or the Gulf of Mexico more than 20 nautical miles offshore and is certificated for ocean navigation by the U.S. Coast Guard.

(18) "Qualified person" means a person who by his special knowledge, ability, and experience can competently and safely perform required functions and duties.

(19) "Waterproof machine" means a totally enclosed machine so constructed that a stream of water from a hose with a nozzle one inch in diameter that delivers at least 65 gallons per minute can be played on the machine from any direction from a distance of about 10 feet for a period of not less than 5 minutes without leakage; except leakage that occurs around the shaft may be considered permissible, provided it is prevented from entering the oil reservoir and provision is made for automatically draining the machine.

(20) "Watertight" means enclosed so that equipment does not leak when a stream of water from a hose with a nozzle one inch in diameter that delivers at least 65 gallons per minute is played on the enclosure from any direction from a distance of 10 feet for 5 minutes.

Note.—NEMA Type 4 and 4X meet this definition.

Subpart 110.20—Equivalents

§ 110.20-1 Conditions under which equivalents may be used.

The Commandant (G-MMT) may accept a fitting, material, apparatus, equipment, or arrangement in substitution for a fitting, material, apparatus, equipment, or arrangement required by this subchapter if the substituted item is at least as effective as the one required and provides the degree of safety consistent with the requirements of this subchapter.

Subpart 110.25—Plan Submittal

§ 110.25-1 Plans and information required for new construction.

The following plans, if applicable to the particular vessel, must be submitted for Coast Guard review in accordance with § 110.25-3:

Note.—A Navigation and Vessel Inspection Circular on the Subject of "Coast Guard Review of Merchant Vessel Plans and Specifications" is available from the offices listed in § 110.25-3. The Circular recommends practices and procedures for plan submittals.

(a) Elementary one-line wiring diagram of the power system, supported by cable lists, panelboard summaries, and other information including—

(1) Type and size of generators and prime movers;

(2) Type and size of generator cables, bus-tie cables, feeders, and branch circuit cables;

(3) Power, lighting, and interior communication panelboards with number of circuits and rating of energy consuming devices;

(4) Type and capacity of storage batteries;

(5) Rating of circuit breakers and switches, interrupting capacity of circuit breakers, and rating or setting of overcurrent devices;

(6) Computations of short circuit currents in accordance with Subpart 111.52; and

(7) Overcurrent protective device coordination analysis for each generator distribution system of 1500 kilowatts or above that includes selectivity and shows that each overcurrent device has an interrupting capacity sufficient to interrupt the maximum asymmetrical short-circuit current available at the point of application.

(b) Electrical plant load analysis including connected loads and computed operating loads for each condition of operation.

(c) Elementary and isometric or deck wiring plans, including symbol lists, and manufacturer's name and identification of each item of electric equipment, of each—

(1) Steering gear circuit and steering motor controller;

(2) General alarm system;

(3) Sound powered telephone system;

(4) Power operated boat winch;

(5) Fire detecting and alarm system;

(6) Smoke detecting system;

(7) Electric watertight door system;

(8) Fire screen door holding system;

(9) Emergency loudspeaker system;

(10) Manual alarm system; and

(11) Supervised patrol system.

Each isometric or deck wiring plan must show the location of any cable splice.

(d) Deck wiring or schematic plans of power systems and lighting systems, including symbol lists, with manufacturer's name and identification of each item of electric equipment, and showing—

(1) Locations of cables;

(2) Cable sizes and types;

(3) Locations of each item of electric equipment;

(4) Locations of cable splices.

(e) Switchboard wiring diagram.

(f) Switchboard material and nameplate list.

(g) Elementary wiring diagram of metering and automatic switchgear.

(h) Description of operation of propulsion control and bus transfer switchgear.

(i) Schematic or logic diagrams for automated or centrally controlled propulsion or auxiliary machinery including a written description of operation, giving sequence of events.

(j) The operating maintenance and instruction manuals for automated or centrally controlled propulsion or auxiliary machinery systems that include operational test procedures for verifying the operation of the required safety devices and systems.

(k) For vessels with hazardous locations as defined in Subpart 111.105 of this chapter, plans showing the extent and classification of all hazardous locations. Information including manufacturer's name, model identification, and equipment location must be submitted for all electrical equipment in these hazardous locations.

(l) Plans and installation instructions for each intrinsically safe system approved by Underwriters Laboratories Inc., Factory Mutual Research Corporation, or other independent laboratory recognized by the Commandant (see § 111.105-11).

(m) Motor starter elementary wiring diagram, enclosure drawing, and starter application.

(n) Plans and information sufficient to evaluate equipment required by this subchapter to be approved or accepted by the Commandant.

Note.—This equipment includes soundpowered telephones, navigation lights, submerged cargo pump motors, and equipment to be considered for equivalency under § 110.20-1 of this part.

(o) Plans and information sufficient to evaluate equipment or systems required to meet the specifications of this Subchapter but not to be approved by the Commandant.

Note.—This equipment evaluation is generally done by District Merchant Marine Technical Offices and includes cable splices, signaling lights, shore connection boxes, electric oil immersion heaters, submersible motor-driven bilge pumps, engine order telegraph systems, shaft speed and thrust indicator systems, rudder angle indicators, and steering failure alarm systems.

(p) Plans and information sufficient to evaluate equipment required by this subchapter to meet a reference standard or military specification.

Note.—This equipment evaluation is generally done by District Merchant Marine Technical Offices and includes circuit breakers, switches, lighting fixtures, electric cooking equipment, motor operated appliances, dishwashers, refrigerators, water coolers, air heating equipment, busways, and outlets and junction boxes. Items that are required to meet a UL standard will be considered acceptable based on indication of listing or labeling on a material list or plan. Items required by this subchapter to meet an IEEE, NEMA, or ANSI standard, or a military specification will be considered acceptable if manufacturer's certification of compliance is indicated on a material list or plan.

§ 110.25-3 Procedure for submitting plans.

(a) The plans required by § 110.25-1 must be submitted to one of the following Coast Guard offices:

(1) A field technical office.

(2) The Officer in Charge, Marine Inspection at or nearest the place where the vessel is to be built.

(3) Commandant (G-MMT), U.S. Coast Guard, 2100 Second Street, S.W., Washington, D.C. 20593.

(b) The addresses of the field technical offices are as follows:

(1) Commander, 3rd Coast Guard District (mmt), Governor's Island, New York, NY 10004, for the 1st, 3rd, and 5th Coast Guard Districts.

(2) Commander, 8th Coast Guard District (mmt), Room 1130, Hale Boggs Federal Building, 500 Camp Street, New Orleans, LA 70130, for the 2nd, 7th, and 8th Coast Guard Districts.

(3) Commander, 9th Coast Guard District (mmt), Room 455, 601 Rockwell Street, Cleveland, OH 44114, for the 9th Coast Guard District.

(4) Commander, 12th Coast Guard District (mmt), 630 Sansome Street, San Francisco, CA 94126, for the 11th, 12th, 13th, 14th, and 17th Coast Guard Districts.

(b) Three copies of each plan are required so that one can be returned to the submitter. If the submitter desires additional copies of approved plans, he should submit enough for the necessary distribution.

Note.—The Coast Guard and the American Bureau of Shipping (ABS) coordinate plan review for vessels classed by the ABS in order to eliminate duplication of effort. An applicant for plan review of a vessel that is classed by the ABS should consult a Coast Guard Technical Office to determine applicable procedures for submitting plans.

Subpart 110.30—Testing and Inspection

§ 110.30-1 General.

(a) The general requirements for inspection of vessels are in Parts 31, 71, 91, 107, 151, and 188 of this chapter. This section supplements the general requirements in other parts of this chapter.

(b) In the inspection of electric equipment and installations, the rules of the American Bureau of Shipping for materials and construction, and the certificate of classification that refers to them, except as otherwise provided by this subchapter, are accepted as standard.

(c) This subpart must not be construed to imply that shop tests or factory inspections of electric apparatus or equipment of the types conducted by the

American Bureau of Shipping are conducted by the Coast Guard. Shop tests of electric apparatus or equipment are conducted by the Coast Guard only when required by this chapter or when requested, either by the manufacturer, shipbuilder, owner, or the Coast Guard, and agreed to by all.

§ 110.30-3 Initial inspection.

The initial inspection, which may be a series of inspections during the construction of the vessel, includes a complete inspection of the electric installation and electric equipment or apparatus. The inspection is to determine that the arrangement, materials, and their installations meet this chapter and the approved plans. The inspection also is to determine that the workmanship of all equipment and apparatus and the installation is satisfactory.

§ 110.30-5 Inspection for certification.

The inspection of electric installations at the annual or biennial inspection incident to reissuance of a Certificate of Inspection includes an inspection of the electric installation and electric equipment to determine mechanical and electrical condition and performance. Particular note must be made of circuits added or modified after the initial inspection.

§ 110.30-7 Repairs or alterations.

(a) No extensive repairs or alterations affecting the safety of the vessel may be made without the knowledge of the Officer in Charge, Marine Inspection.

(b) Drawings of alterations must be approved before work is started unless considered unnecessary by the Officer in Charge, Marine Inspection. Drawings are not required for repairs involving no alterations.

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Authority: 46 U.S.C. 170, 367, 369, 375, 390b, 391a, 392, 405, 416, 445, 489, 526p; 49 U.S.C. 1655(b); 49 CFR 1.46.

Subpart 111.01—General**§111.01-1 General.**

Electric installations on vessels must ensure—

(a) Maintenance of services necessary for safety under normal and emergency conditions; and

(b) Protection of passengers, crew, other persons, and the vessel from electrical hazards.

§111.01-3 Placement of equipment.

(a) Electric equipment must be arranged, as far as practicable, to prevent mechanical damage to the equipment from the accumulation of dust, oil vapors, steam, or dripping liquids.

(b) Apparatus that may arc must be ventilated or be in ventilated compartments in which flammable gases, acid fumes, and oil vapors cannot accumulate. Skylights and ventilators must be arranged to prevent flooding of the apparatus.

§111.01-5 Protection from bilge water.

Each generator, motor, and electric coupling must be arranged so that it cannot be damaged by bilge water.

§111.01-7 Accessibility.

The design and arrangement of electric apparatus must allow accessibility to each part that needs inspection or adjustment.

§111.01-9 Watertight and waterproof equipment.

Electric equipment exposed to the weather or in a space where it is exposed to seas, splashing, or similar moisture conditions, must be watertight or be in a watertight enclosure, except a motor, which must be either watertight or waterproof. A watertight enclosure must be designed in such a way that the total rated temperature of the equipment inside the enclosure is not exceeded.

§111.01-11 Corrosion-resistant parts.

Each enclosure and part of electric equipment that can be damaged by corrosion must be made of corrosion-resistant materials or of materials having a corrosion resistant finish.

§111.01-13 Limitations on porcelain use.

Porcelain must not be used for lamp sockets, switches, receptacles, fuse blocks, or other electric equipment where the item is solidly mounted by machine screws or their equivalent, unless the porcelain piece is resiliently mounted.

§111.01-15 Temperature ratings.

(a) In this subchapter an ambient temperature of 40 degrees C is assumed except as otherwise stated.

(b) A 50 degrees C ambient temperature is assumed for boilerrooms, engine rooms and auxiliary machinery spaces unless it can be shown that a 40 degrees C ambient temperature will not be exceeded in these spaces.

(c) If a machine is to be utilized in a space in which the machine's rated ambient temperature is below the assumed ambient temperature of the space, it must be used at a derated load. The assumed ambient temperature of the space plus the machine's actual temperature rise at its derated load must not exceed the machine's total rated temperature (machine's rated ambient temperature plus its rated temperature rise).

§111.01-17 Nature of electric supply.

(a) *Standard systems.* The following systems of distribution are standard:

- (1) Two-wire with direct current or single-phase alternating current.
- (2) Three-wire with direct current or single-phase alternating current.
- (3) Three-wire, three-phase alternating current.
- (4) Four-wire, three-phase alternating current.

(b) *Standard voltages.* The voltages given in Table 111.01-17 (b) are standard.

TABLE 111.01-17(B)—STANDARD VOLTAGES

Generation equipment	Utilization equipment ¹	Lighting devices ²
Direct Current:		
120	115	115
240	230	—
Alternating Current:		
120	115	120
208	200	208
230-240	220-230	240
450-480	440-460	480
600	575	—
2400	2300	—
4160	4000	—

¹ The standard voltages specified for the utilization devices are the ones usually used with the matched generation voltage; however, devices with other voltage ratings may be acceptable.

² Lighting devices are usually rated for the maximum permissible voltages.

(c) *Standard frequency.* A frequency of 60 hertz is recognized as standard for alternating-current lighting and power systems.

(d) *Others.* Distribution systems, voltages, or frequencies that differ from the standard must be accepted by the Commandant.

Subpart 111.05—Equipment Ground, Ground Detection, and Grounded Systems**§111.05-1 Purpose.**

This subpart contains requirements for the grounding of circuits and electric equipment.

Note. Circuits are grounded to limit excessive voltage from lightning, transient surges, and unintentional contact with higher voltage lines, and to limit the voltage to ground during normal operation. Conductive materials enclosing electric conductors and equipment, or forming part of that equipment, are grounded to prevent a voltage above ground on the enclosure materials.

Equipment Ground**§111.05-3 Design, construction, and installation; general.**

(a) An electric apparatus must be designed, constructed, and installed to prevent any person from accidentally contacting energized parts.

(b) Exposed, noncurrent-carrying metal parts of fixed equipment that may become energized because of any condition must be grounded.

(c) Exposed, noncurrent-carrying metal parts of portable equipment must be grounded through a conductor in the supply cable to the grounding pole in the receptacle.

(d) If the installation of the electrical equipment does not ensure a positive ground to the metal hull or equivalent conducting body, the apparatus must be grounded to the hull with a grounding conductor.

§111.05-7 Armored and metallic-sheathed cable.

(a) Each metallic-sheathed, multiconductor multiphase cable and each multiconductor multiphase armored cable must have its metallic covering—

- (1) Electrically and mechanically continuous;
- (2) Grounded to the metal hull at the supply end of final sub-circuits; and
- (3) Grounded to the metal hull at each end on other circuits.

(b) Single conductor alternating-current cable must have its metallic covering grounded only at the midpoint.

§111.05-9 Masts.

Each wooden mast and each wooden topmast must have a lightning ground conductor.

System Grounding**§111.05-11 Hull return.**

(a) A vessel's hull must not carry current as a conductor except for the following systems:

- (1) Impressed current cathodic protection systems.
- (2) Limited and locally grounded systems, such as a battery system for engine starting that has a one-wire system and the ground lead connected to the engine.
- (3) Insulation level monitoring devices if the circulation current does not exceed 30 milliamperes under the most unfavorable conditions.
- (4) Welding systems with hull return except vessels subject to 46 CFR Subchapter D.

§111.05-13 Grounding connection.

Each grounded system must have only one point of connection to ground regardless of the number of power sources operating in parallel in the system.

§111.05-15 Neutral grounding.

(a) Each propulsion, power, lighting, or distribution system having a neutral bus or conductor must have the neutral grounded.

(b) The neutral of a dual-voltage system must be solidly grounded at the generator switchboard.

§111.05-17 Generation and distribution system grounding.

The neutral of each grounded generation and distribution system must—

- (a) Be grounded at the generator switchboard, except the neutral of an emergency power generation system must be grounded with—

(1) No direct ground connection at the emergency switchboard;

(2) The neutral bus permanently connected to the neutral bus on the main switchboard; and

(3) No switch, circuit breaker, or fuse in the neutral conductor of the bus-tie feeder connecting the emergency switchboard to the main switchboard; and

(b) Have the ground connection accessible for checking the insulation resistance of the generator to ground before the generator is connected to the bus.

§ 111.05-19 Tank vessels; grounded distribution systems.

(a) If the voltage of a distribution system is less than 3,000 volts, line-to-line, a tank vessel must not have a grounded distribution system.

(b) If the voltage of a distribution system on a tank vessel is 3,000 volts or more, line-to-line, and the distribution system is grounded, any resulting current must not flow through hazardous locations.

Ground Detection

§ 111.05-21 Ground detection.

There must be ground detection for each—

- (a) Electric propulsion system;
- (b) Ship's service power system;
- (c) Lighting system; and
- (d) Power or lighting distribution system that is isolated from the ship's service power and lighting system by transformers, motor generator sets, or other devices.

§ 111.05-23 Location of ground indicators.

Ground indicators must—

(a) Be at the vessel's ship's service generator distribution switchboard for the normal power, normal lighting, and emergency lighting systems;

(b) Be at the propulsion switchboard for propulsion systems; and

(c) Be readily accessible.

§ 111.05-25 Ungrounded systems.

Ground detection for each ungrounded system must have—

(a) A lamp for each phase that is—

(1) Connected between the phase and ground; and

(2) More than 5 watts and less than 25 watts when operating at one-half voltage in the absence of a ground; and

(b) A normally-closed, spring return-to-normal switch between the lamps and the ground connection.

§ 111.05-27 Grounded neutral alternating-current systems.

Ground detection for each alternating-current system that has a grounded

neutral must have the following equipment that can withstand the maximum available fault current without damage;

(a) An ammeter that—

(1) Indicates the current in the ground connection; and

(2) Has a scale that accurately, and with clear definition, indicates current in the 0 to 10 ampere range; and

(b) An ammeter switch that is the spring return-to-on type.

§ 111.05-29 Dual voltage direct-current systems.

Ground detection for each dual voltage direct-current system must have a zero center ammeter that—

(a) Is in the ground connection;

(b) Has a full scale range of 150 percent of the neutral current rating; and

(c) Has the polarity of the ground marked.

Grounded Conductors

§ 111.05-31 Grounding conductors for systems.

(a) A conductor for grounding a direct-current system must be the larger of—

(1) The largest conductor supplying the system; or

(2) No. 8 AWG (8.4mm²).

(b) A conductor for grounding the neutral of an alternating-current system must meet Table 111.05-31(b).

TABLE 111.05-31(b)—NEUTRAL GROUNDING CONDUCTOR FOR ALTERNATING-CURRENT SYSTEM

Size of the largest generator cable or equivalent for parallel generators—AWG-MCM (mm ²)		Size of the system grounding conductor—AWG (mm ²)
Greater than	Less than or equal to	
2 (33.6)	2 (33.6)	6 (8.4)
0 (53.5)	0 (53.5)	6 (13.3)
0 (53.5)	3/0 (85.0)	4 (21.2)
3/0 (85.0)	350 MCM (177)	2 (33.6)
350 MCM (177)	600 MCM (304)	0 (53.5)
600 MCM (304)	1100 MCM (557)	2/0 (67.5)
1100 MCM (557)		3/0 (85.0)

§ 111.05-33 Equipment grounding conductors.

(a) Equipment grounding conductors must be sized in accordance with Section 250-95 of the National Electrical Code.

(b) Each insulated grounding conductor of a cable must have green braid or insulation.

§ 111.05-37 Overcurrent device.

A permanently grounded conductor must not have an overcurrent device unless the overcurrent device—

(a) Simultaneously opens each ungrounded conductor of the circuit; or

(b) Meets Section 430-36 of the National Electrical Code.

§ 111.05-39 Switch and circuit breaker.

(a) The grounded conductor of a circuit must not be disconnected by a switch or circuit breaker, unless the ungrounded conductors are simultaneously disconnected.

(b) The neutral conductor of the emergency-main switchboard bus-tie must not have a switch or circuit breaker.

Subpart 111.10—Power Supply

§ 111.10-1 Definitions.

As used in this Subpart:

(a) "Ship's service loads" means all auxiliary services necessary for maintaining the ship or drill unit in a normal operational and habitable condition. Ship's service loads include, but are not limited to, all safety, lighting, ventilation, navigational, communications, habitability, cargo refrigeration, and auxiliary propulsion loads. Electrical propulsion motor, bow thruster motor, cargo transfer, drilling, and other industrial type loads are not included.

(b) "Drilling loads" means all loads associated exclusively with the drilling operation including power to the drill table, mud system, and positioning equipment.

§ 111.10-3 Two generating sets.

In addition to the emergency power sources required under Part 112 of this subchapter, each self-propelled vessel must have at least two electric generating sets.

§ 111.10-4 Power requirements; generating sets.

(a) With any ship's service generating set stopped, the combined capacity of the remaining electric ship's service generating set or sets required in § 111.10-3 must be sufficient for the ship's service load.

(b) The capacity of the ship's service generating sets must be sufficient for supplying the ship's service loads without the use of a generating set that is dependent upon the speed or direction of the main propelling engines or shafting.

(c) Operating generators must provide a continuous and uninterrupted source of power for the ship's service load under normal operational conditions. Any vessel speed change or throttle movement must not cause a ship's service load power interruption.

(d) If the ship's service loads are supplied from the same generating plant as an electrical propulsion system, a cargo transfer load, a drilling load, or other industrial type load, the total generating capacity, exclusive of the

emergency generator, must be sufficient to supply both the above-mentioned loads and the ship's service loads.

§ 111.10-5 Multiple energy sources.

Failure of any single generating set energy source such as a boiler, diesel, gas turbine, or steam turbine must not cause all generating sets required in § 111.10-3 to be inoperable.

§ 111.10-7 Dead ship.

(a) The generating plant of each self-propelled vessel must provide the electrical services necessary to start the main propulsion plant from a dead ship condition.

(b) If the emergency generator is used for part or all of the electric power necessary to start the main propulsion plant from a dead ship condition, the emergency generator must be capable of providing power to all emergency lighting, emergency internal communications systems, and fire detection and alarm systems in addition to the power utilized for starting the main propulsion plant.

§ 111.10-9 Ship's service supply transformers; 2 required.

If transformers are used to supply the ship's service distribution system required by this subpart for ships and mobile offshore drilling units, there must be at least two separate ship's service supply systems.

Note.—A ship's service supply system would consist of transformers, overcurrent protective devices, and cables, and would normally be located between a medium voltage bus and a low voltage ship's service switchboard.

§ 111.10-11. Power requirements; transformers.

With any one ship's service supply systems de-energized, the remaining supply system must have sufficient capacity to supply the ship's service loads.

Subpart 111.12—Generator Construction and Circuits

§ 111.12-1 Prime movers.

(a) Requirements for prime movers are in Subpart 58.10 of this chapter. Additional requirements for prime movers for emergency generators are in Subpart 112.50 of this subchapter.

(b) Each diesel engine prime mover must have an overspeed device that is independent of the normal operating governor and adjusted so that the speed cannot exceed the maximum rated speed by more than 15 percent.

(c) Each prime mover must shut down automatically upon loss of lubricating pressure to the generator bearings

unless otherwise accepted by the Commandant.

§ 111.12-3 Excitation.

Excitation must meet Section 35.23 of the American Bureau of Shipping's "Rules for Building and Classing Steel Vessels," except a static exciter must not be used for excitation of an emergency generator unless it is provided with a permanent magnet or a residual magnetism type exciter that has the capability of voltage build-up after two months of no operation.

§ 111.12-5 Generator construction and testing.

(a) Each generator must meet the applicable construction and test requirements of Section 35 of the American Bureau of Shipping's "Rules for Building and Classing Steel Vessels."

(b) Each generator must be a drip-proof and protected machine and have dampers in each non-recirculating system air duct.

(c) Each emergency generator must have means to prevent moisture condensation in the machine.

(d) No steam heating coil may have a pipe joint in a generator casing.

§ 111.12-7 Voltage regulation and parallel operation.

(a) Generator voltage regulation and parallel operation must meet Sections 35.31 and 35.33 of the American Bureau of Shipping "Rules for Building and Classing Steel Vessels."

(b) Each voltage regulation supply circuit—

(1) Must be taken from the generator side of the generator circuit breaker; and

(2) Must not be protected by an overload device.

(c) If the voltage regulation supply circuit is provided with short circuit protection, the overcurrent device must be set at not less than 500 percent of the expected current.

§ 111.12-9 Generator cables.

(a) The current-carrying capacity of generator cables must not be—

(1) Less than 115 percent of the continuous generator rating; or

(2) Less than 115 percent of the overload for a machine with a 2 hour or greater overload rating.

(b) Generator cables must not be in the bilges.

§ 111.12-11 Generator protection.

(a) *Applicability.* This section applies to each generator except a propulsion generator.

(b) *General.* Each ship's service generator and emergency generator must be protected by an individual, trip-free, air circuit breaker whose

tripping characteristics can be set or adjusted to closely match the generator capabilities and meet the coordination requirements of Subpart 111.51. Each circuit breaker must contain the trips required by this section.

(c) *Type of trips.* A circuit breaker for a generator must—

(1) Have inverse time overcurrent trips or relays set as necessary to coordinate with the trip settings of the feeder circuit breakers; and

(2) Not have an instantaneous trip with the exception that an instantaneous trip is required if—

(i) Three or more alternating-current generators can be paralleled; or

(ii) The circuit breaker is for a direct current generator.

(d) *Setting of inverse time trips.* The pickup setting of the longtime overcurrent trip of a generator circuit breaker must not be larger than—

(1) 115 percent of the generator rating for a continuous rated machine; or

(2) 115 percent of the overload rating for a machine with a 2-hour or greater overload rating.

(e) *Setting of instantaneous trips.* The instantaneous trip of a generator circuit breaker must be set above, but as close as practicable to, the maximum asymmetrical short circuit available from any one of the generators that can be paralleled.

(f) *Reverse-power and reverse-current trips.* Each generator arranged for parallel operation must have reverse-power or reverse-current trips.

(g) *Location.* A ship's service generator overcurrent protective device must be on the ship's service generator switchboard. The generator and its switchboard must be in the same space. (For the purposes of this section, the following are not considered separate from the machinery space: (1) A control room that is inside of the machinery casing and (2) a dedicated switch-gear and semiconductor rectifier (SCR) compartment on a mobile offshore drilling unit that is separate from but directly adjacent to and on the same level as the generator room).

(h) *Three-wire, single-phase and four-wire, three-phase generators.* There must be circuit breaker poles for each generator lead, except in the neutral lead.

(i) *Three-wire, direct-current generators.* Each three-wire, direct current generator must meet the following requirements:

(1) *Circuit breaker poles.* There must be separate circuit breaker poles for the positive and negative leads, and, unless the main poles provide protection, for each equalizer lead. If there are

equalizer poles for a three-wire generator, each overload trip must be of the "Algebraic" type. If there is a neutral pole in the generator circuit breaker, there must not be an overload trip element for the neutral pole. In this case, there must be a neutral overcurrent relay and alarm system that is set to function at a current value not more than the neutral rating.

(2) *Equalizer buses.* For each three-wire generator, the circuit breaker must protect against a short circuit on the equalizer bus.

§ 111.12-13 Propulsion generator protection.

For general requirements, see § 111.35-1 of this chapter.

Subpart 111.15—Storage Batteries and Battery Chargers: Construction and Installation

§ 111.15-1 General.

Each battery must be a lead-acid or alkaline type and meet the requirements of this subpart. Other types of storage batteries must be accepted by the Commandant.

§ 111.15-2 Battery construction.

(a) Each battery must withstand vessel pitch, vibration, and roll, and exposure to a salt water atmosphere.

(b) A battery cell must not spill electrolyte if the battery is inclined at 30 degrees from the vertical.

(c) Each positive plate of a lead-acid battery for a general alarm system or for an emergency lighting and power system, except for an engine cranking system, must be at least 6.35 mm (0.25 in.) thick.

(d) Except as required under paragraph (c), each positive plate of a lead-acid battery must be at least 3.17 mm (0.125 in.) thick.

(e) Each fully charged lead-acid battery must have a specific gravity that meets Section 16.2 of IEEE Standard No. 45.

§ 111.15-3 Battery categories.

A battery installation is classified as one of three types, based upon power output of the battery charger, as follows:

(a) *Large.* A large battery installation is one connected to a battery charger that has an output of more than 2 kw computed from the highest possible charging current and the rated voltage of the battery installation.

(b) *Moderate.* A moderate battery installation is one connected to a battery charger that has an output of between 0.2 kw and 2 kw computed from the highest possible charging current and the rated voltage of the battery installation.

(c) *Small.* A small battery installation is one connected to a battery charger that has an output of less than 0.2 kw computed from the highest possible charging current and the rated voltage of the battery installation.

§ 111.15-5 Battery installation.

(a) *Large batteries.* Each large battery installation must be in a room that is only for batteries or in a box on deck. Electric equipment in a battery room must be approved by Underwriters Laboratories Inc., Factory Mutual Research Corp., or other independent laboratory recognized by the Commandant for a Class I, Division 1, Group B location. Devices that may arc, such as switches, battery chargers, and similar devices, must not be in a battery room. Except conductors for engine cranking batteries, each battery conductor must have an overcurrent protective device that is next to, but outside the battery room. Electric cables, other than those for the battery or battery room lighting, must not be in a battery room. A fixed danger notice must be on each door of a battery room and on each cover of a battery deck box, stating that a naked light or smoking in this room or in this area is not allowed.

(b) *Moderate batteries.* Each moderate battery installation must be in a battery room, in a box on deck, or in a box or locker in another space such as an engineroom, storeroom, or similar space, except if a moderate battery installation is in a ventilated compartment such as the engineroom and is protected from falling objects, a box or locker is not required. A moderate battery installation must not be in a sleeping space. An engine cranking battery for one or more engines must be as close as possible to the engine or engines.

(c) *Small batteries.* Small size battery installations must be located in well-ventilated spaces. They must not be located in closets, storerooms, or similar spaces.

(d) *Battery trays.* Each battery tray must be chocked with wood strips or their equivalent to prevent movement, and each tray must have non-absorbent insulating supports on the bottom and similar spacer blocks at the sides, or equivalent provisions for air circulation space all around each tray. Each battery tray must be accessible, with at least 254 mm (10 in.) of head room.

(e) *Tiers.* When batteries are arranged in two or more tiers, each shelf must have at least 50.8 mm (2 in.) of space front and back for circulation of air.

(f) *Nameplates.* The battery manufacturer's name or trade mark and type designation, the ampere-hour rating

at a specific rate of discharge, and, for a lead-acid battery, the specific gravity of the electrolyte when fully charged, must be on a fixed nameplate on each tray or molded on the tray case.

(g) *Lining in battery rooms and lockers.* Each battery room and locker must have a watertight lining that is—

(1) On—
(i) Each shelf to a height of at least 3 in. (76.2 mm); or
(ii) The deck to a height of at least 6 in. (152.4 mm);

(2) For lead-acid batteries, $\frac{1}{16}$ in. (1.6 mm) thick lead or other material that is corrosion-resistant to the electrolyte of the battery; and

(3) For alkaline batteries, $\frac{1}{8}$ in. (0.8 mm) thick steel or other material that is corrosion-resistant to the electrolyte of the battery.

(h) *Lining of battery boxes.* Each battery box must have a watertight lining to a height of at least 3 in. (76.2 mm) that meets paragraphs (g)(2) and (g)(3).

§ 111.15-10 Ventilation.

(a) *General.* Each room, locker, and box for storage batteries must be arranged or ventilated to prevent accumulation of flammable gas.

(b) *Power ventilation.* If power ventilation is required, the following must be met:

(1) The power ventilation system must be separate from ventilation systems for other spaces.

(2) Electric motors must be outside the duct and compartment and—

(i) Have an explosion-proof motor for a Class I, Division 1, Group B location; or

(ii) Be at least 10 ft. (3 m) from the exhaust end of the duct.

(3) Each blower must have a non-sparking fan.

(4) The power ventilation system must be interlocked with the battery charger so that the battery cannot be charged without ventilation.

(c) *Large battery installations.* Each battery room for large battery installations must have a power exhaust ventilation system and have openings for intake air near the floor that allow the passage of the quantity of air that must be expelled. The quantity of the air expelled must be at least:

$$q = 3.89(i)(n).$$

where: q = quantity of expelled air in cubic feet per hour.

i = Maximum charging current during gas formation, or one-fourth of the maximum obtainable charging current of the charging facility, whichever is greater.

n = Number of cells.

(d) *Moderate and small battery installations.* Each battery room or battery locker for moderate or small battery installations must have louvers near the bottom of the room or locker for air, and must be ventilated by—

(1) Ventilation that meets paragraph (c) of this section;

(2) An exhaust duct—

(i) That ends in a mechanically ventilated space or in the weather;

(ii) That extends from the top of the room or locker to at least 3 ft. (1 m) above the top of the room or locker;

(iii) That is at an angle of 45 degrees or less from the vertical; and

(iv) That has no appliances, such as flame arresters, that impede free passage of air or gas mixtures; or

(3) A duct from the top of the room or locker to an exhaust ventilation duct.

(e) *Deck boxes.* Except for a deck box for a small battery installation, each deck box must have a duct from the top of the box to at least 4 ft. (1.2 m) above the box ending in a gooseneck or mushroom head that prevents entrance of water. Holes for air must be on at least two parallel sides of each box.

(f) *Weathertight.* Each deck box must be weathertight.

(g) *Boxes for small battery installation.* Each box for a small battery installation must have openings near the top to allow escape of gas.

§ 111.15-20 Conductors.

(a) If a conductor enters a battery room, the hole must be made watertight.

(b) Each connection within a battery room must be resistant to the electrolyte.

(c) The end of each cable must be sealed to prevent the entrance of electrolyte by spray or creepage.

(d) The current-carrying capacity of a connecting cable must be at least as large as the maximum charging current or maximum discharge current, whichever is greater.

§ 111.15-25 Overload and reverse current protection.

(a) An overload protective device must be in each battery conductor, except conductors of engine cranking batteries and batteries with a nominal potential of 6 volts or less. For large storage battery installations, the overcurrent protective devices must be next to, but outside of, the battery room.

(b) Except when a rectifier is used, the charging equipment for all batteries with a nominal voltage more than 20 percent of line voltage must protect automatically against reversal of current.

§ 111.15-30 Battery chargers.

Each battery charger must be dripproof and meet UL 1236.

Subpart 111.20—Transformer Construction, Installation, and Protection

§ 111.20-1 General requirements.

Each transformer winding must be resistant to moisture, sea atmosphere, and oil vapor.

§ 111.20-5 Temperature rise.

(a) The temperature rise, based on an ambient temperature of 40 degrees C, must not exceed the following:

(1) For Class A insulation, 55 degrees C.

(2) For Class B insulation, 80 degrees C.

(3) For Class F insulation, 115 degrees C.

(4) For Class H insulation, 150 degrees C.

(b) If the ambient temperature is higher than 40 degrees C, the transformer must be derated so that the total temperature stated in this section is not exceeded. The temperature must be taken by the resistance method.

§ 111.20-10 Autotransformers.

An autotransformer must not supply feeders or branch circuits.

§ 111.20-15 Transformer overcurrent protection.

Each transformer must have protection against overcurrent that meets Article 450 of the National Electrical Code.

Subpart 111.25—Motors

§ 111.25-1 General requirements.

The requirements for generators contained in § 111.12-5 (a) and (b) apply to motors.

§ 111.25-5 Marking.

(a) Each motor must have a marking or nameplate that meets Section 430-7 of the National Electrical Code.

(b) The marking or nameplate for each motor that is in a corrosive location must be corrosion-resistant.

§ 111.25-15 Duty cycle.

Each motor must be rated for continuous duty, except a motor for an application listed in Table 111.25-15 or a similar duty must meet the minimum short-time rating stated in the table.

TABLE 111.25-15

Application of motor	Minimum short-time rating of motor, in hours
Deck winch and direct acting capstan.	Half.
Deck winch with hydraulic transmission.	Continuous at no load followed by 1/4 hr. at full load.
Direct acting windlass.	One fourth.
Windlass with hydraulic transmission.	Half hour idle pump operation, followed by 1/4 hr. full load operation.
Steering gear, direct acting.	One.
Steering gear, indirect drive.	Continuous operation at 15 pct. load followed by 1 hr. at full load.
Watertight door operators.	1/2.
Boat winches.	1/2.

Subpart 111.30—Switchboards

§ 111.30-1 Location and installation.

(a) Each switchboard must—

- (1) Be in as dry a location as possible;
- (2) Have a working space of at least 1 m (3 ft.) in front of the switchboard;
- (3) Have a working space behind the switchboard that is at least 0.6 m (24 in.) from the nearest bulkhead and at least 0.5 m (18 in.) from the nearest stiffener or frame, or have no rear access; and
- (4) If it is a main switchboard, be in a machinery space that has a ship's service generator. (See § 111.12-11(g) for additional requirements).

(b) Piping must not be run over or in the vicinity of switchboards if practicable. When such runs of piping are necessary, welded joints only must be used and shielding must be installed to prevent spray from steam or pressurized liquids or any leakage from impinging on the switchboard from the top, bottom, or sides in the event of accidental spillage or piping failures.

§ 111.30-3 Accessibility of switchboard components and connections.

Each component and bus bar connection on a switchboard that is not accessible from the rear, except a bus bar connection for a draw-out type circuit breaker, must be within 0.5 m (20 in.) of the front of the switchboard.

§ 111.30-4 Circuit breakers removable from front.

Circuit breakers of the molded-case type, when installed on generator or distribution switchboards, must be mounted or arranged in such a manner that the circuit breaker may be removed from the front without first unbolting bus or cable connections or deenergizing the supply.

§ 111.30-5 Construction.

(a) Insulating material for panels, bases, and supports for a switchboard must be moisture resistant and incombustible.

(b) A switchboard must have—

(1) No wood except in handrails and guardrails;

(2) Positioners and stops on hinged panels with a height greater than 45 inches (1.14m) or a width greater than 24 inches (0.6m); and

(3) Wearing parts readily replaceable.

(c) Each switchboard must be of sturdy construction with a metal frame. Panels must not be made of metal unless the live parts mounted on it are properly insulated. The supporting framework for all panels must be of rigid construction.

(d) Each switchboard must be secured to a solid foundation and be—

(1) Self-supporting; or

(2) Braced to the bulkhead or deck above.

(e) If a switchboard is braced, the means of bracing must be flexible to allow deflection of the ship's structure without buckling the control cell or assembly structure.

(f) Each switchboard must have a dead front.

§ 111.30-9 Mechanical protection.

Each switchboard must have—

(a) Enclosed sides;

(b) A dripshield;

(c) A door at each entrance to a rear working space;

(d) Front non-conducting handrails; and

(e) Rear non-conducting guardrails if the switchboard has a rear working space.

§ 111.30-11 Mats or gratings.

Electric grade deck coverings meeting MIL-M-15562, non-conducting mats, or non-conducting gratings must be in each working area in front of and behind each switchboard.

§ 111.30-13 Grounding.

The following must be grounded:

(a) The metal case of each—

(1) Instrument;

(2) Relay;

(3) Meter; and

(4) Instrument transformer.

(b) The secondary winding of each instrument transformer.

§ 111.30-15 Nameplates.

(a) Each device must have a nameplate showing the device's function.

(b) Each nameplate for a circuit breaker must show the electrical load served and the setting of the circuit breaker.

§ 111.30-17 Protection of instrument circuits.

(a) Each circuit that supplies a device on a switchboard, except a circuit under paragraph (b) of this section, must have overcurrent protection.

(b) A circuit that supplies a device on a switchboard must not have overload protection if it supplies—

(1) An electric propulsion control;

(2) A voltage regulator;

(3) A ship's service generator circuit breaker tripping control; or

(4) A device that creates a hazard to the vessel if deenergized.

(c) If short circuit protection is used in any of the circuits listed in paragraph (b) of this section, it must be set at not less than 500% of the expected current.

(d) A secondary circuit of a current transformer must not be fused, and the circuit from a current transformer to a device that is not in the switchboard must have a high voltage protector to short the transformer during an open circuit.

§ 111.30-19 Buses and wiring.

(a) *Bus capacity.* Each bus must have the following current-carrying capacity, except a feeder bus that has the same capacity as the capacity of the generator bus to which it is connected:

(1) Each bus and each bus connection must have a current-carrying capacity that is at least the total of 75 percent of the combined full-load rated currents of the equipment supplied and 50 percent of the combined ratings of the spare circuit breakers, except a bus under paragraphs (a)(2) through (a)(4).

(2) Each feeder bus must have the current carrying capacity for the full-load rated currents supplied to units in continuous operation.

(3) Each generator bus that is supplied by a single generator must have a current-carrying capacity that is at least the total of—

(i) The continuous current rating of the generator; and

(ii) Any overload current rating of the generator that is more than 30 minutes.

(4) Each generator bus that is supplied by more than one generator and has all the generating capacity feeding through one section must have a current carrying capacity that is at least the total of—

(i) The continuous current rating of the largest generator;

(ii) Any overload current rating of more than 30 minutes for the largest generator; and

(iii) 80 percent of the continuous current rating of each additional generator.

(b) *Bus rating.* The size and arrangement of each bus must be such that its rating in Table A27 (Appendix) of IEEE Standard No. 45 is not less than the capacity required in paragraph (a) of this section.

(c) *Bus bracing.* Each bus must be braced to prevent damage from the

maximum available short-circuit current.

(d) *Spacing.* The spacing between live metal parts must meet Section 384-26 of the National Electrical Code.

(e) *Connections.* Each bus and wiring connection must have a locking device to prevent loosening due to vibration and must be accessible.

(f) *Wiring.* Instrument and control wiring must be—

(1) National Electrical Code Type TA, TBS, or SIS wire;

(2) Stranded copper;

(3) No. 14 AWG (2.1 mm) or larger;

(4) Flame-retardant meeting UL 83; and

(5) Extra flexible, if used on a hinged panel.

§ 111.30-21 High temperature devices.

Each rheostat and other device that operates at high temperature must be isolated by barriers and naturally ventilated.

§ 111.30-23 Medium voltage switchboards.

Each switchboard having a root-mean-square (RMS) voltage of 1000 volts or more must meet ANSI C37.20 for metal-clad switchgear.

§ 111.30-24 Generation systems greater than 3000 kw.

Except on a mobile offshore drilling unit, when the total installed electric power of the ship's service generation system is more than 3000 kw, the switchboard must have the following:

(a) At least two sections of the main bus that are connected by—

(1) A non-automatic circuit breaker;

(2) A disconnect switch; or

(3) Removable links.

(b) As far as practicable, the connection of generators and duplicated equipment equalized between the sections of the main bus.

§ 111.30-25 Alternating-current ship's service switchboards.

(a) Except as allowed in paragraph (g) of this section, each alternating-current ship's service switchboard must have the equipment required by paragraphs (b) through (f) of this section.

(b) For each connected generator, each switchboard must have the following:

(1) A circuit breaker that meets § 111.12-11 and § 111.50-5.

(2) A disconnect switch or link for each generator conductor, except a switchboard having a draw-out or plug-in type generator circuit breaker that disconnects—

(i) Each generator conductor; or

(ii) If there is a switch in the generator neutral, each ungrounded conductor.

(3) A pilot lamp connected between the generator and the circuit breaker.

(4) An ammeter with a selector switch that connects the ammeter to show the current in each phase.

(5) A voltmeter with a selector switch that connects the voltmeter to show the—

(i) Generator voltage of each phase; and

(ii) Bus voltage of one phase.

(6) A voltage regulator and voltage regulator functional cut-out switch.

(c) For each generator that is not excited from a variable voltage or rotary amplifier that is controlled by a voltage regulator unit acting on the exciter field, each switchboard must have—

(1) A generator field rheostat;

(2) A double-pole field switch;

(3) Discharge clips; and

(4) A discharge resistor.

(d) If generators are arranged for parallel operation, each switchboard must have—

(1) A speed control for the prime mover of each generator;

(2) An indicating wattmeter for each generator; and

(3) A synchroscope and synchronizing lamp that have a selector switch to show synchronization for paralleling generators.

(e) Each switchboard must have the following:

(1) Ground detection that meets Subpart 111.05 for the—

(i) Ship's service power system;

(ii) Normal lighting system; and

(iii) Emergency lighting system.

(2) A frequency meter with a selector switch to connect the meter to each generator.

(3) An exciter field rheostat.

(f) For each shore power connection each switchboard must have—

(1) A circuit breaker or fused switch;

(2) A pilot light connected to the shore side of the circuit breaker or fused switch; and

(3) One of the voltmeters under paragraph (b)(5) of this section connected to show the voltage of each phase of the shore power connection.

(g) The equipment under paragraphs (b), (d) (e), and (f) of this section, except the equipment under paragraphs (b)(1), (b)(2), and (f)(1), must be on the ship's service switchboard or on a central control console that—

(1) Is in the same control area as the main ship's service switchboard or can remotely control the ship's service generator circuit breaker;

(2) Has a generator section that has only generator functions;

(3) Has the generator section segregated from each other console section by a fire-resistant barrier; and

(4) Has cabling from the main switchboard to the generator section of the console that—

(i) Has only generator control and generator instrumentation circuits; and

(ii) Is protected from mechanical damage.

§ 111.30-27 Direct current ship's service switchboards.

(a) Each direct current ship's service switchboard must have the equipment required by paragraphs (b) through (f) of this section.

(b) For each connected generator, each switchboard must have the following:

(1) A circuit breaker that meets § 111.12-11 and § 111.50-5.

(2) A disconnect switch or link for each generator conductor, except a switchboard having a draw-out or plug-in type generator circuit breaker that disconnects—

(i) Each conductor; or

(ii) If there is a switch in the generator neutral, each ungrounded conductor.

(3) A field rheostat.

(4) A pilot lamp connected between the generator and circuit breaker.

(c) For each two-wire generator, each switchboard must have—

(1) An ammeter; and

(2) A voltmeter with a selector switch that connects the voltmeter to show—

(i) Generator voltage; and

(ii) Bus voltage.

(d) For each three-wire generator, each switchboard must have the following:

(1) An ammeter for—

(i) The positive lead; and

(ii) The negative lead.

(2) A center zero type ammeter for the neutral ground connection.

(3) A voltmeter with a selector switch that connects the voltmeter to show generator and bus voltage—

(i) Positive to negative;

(ii) Positive to neutral; and

(iii) Neutral to negative.

(e) Each switchboard must have ground detection that meets Subpart 111.05 for the—

(1) Main power system;

(2) Main lighting system; and

(3) Emergency lighting system.

(f) For each shore power connection, each switchboard must have—

(1) A circuit breaker or fused switch; and

(2) A pilot light connected to the shore side.

(g) One of the voltmeters under paragraph (c)(2) or (d)(3) of this section must be connected to show—

(1) For each two-wire system, shore connection voltage; and

(2) For each three-wire system, shore connection voltage—

(i) Positive to negative;

(ii) Positive to neutral; and

(iii) Neutral to negative.

§ 111.30-29 Emergency switchboards.

(a) Each emergency generator must have an emergency switchboard.

(b) Each alternating-current emergency switchboard must have the equipment required by paragraphs (c) through (e) of this section.

(c) For each connected emergency generator, each emergency switchboard must have—

(1) A circuit breaker that meets § 111.12-11;

(2) A disconnect switch or link for each emergency generator conductor, except for a switchboard with a draw out or plug-in type generator circuit breaker that disconnects—

(i) Each generator conductor; and

(ii) If there is a switch in the generator neutral, each ungrounded conductor; and

(3) A pilot lamp connected between the generator and circuit breaker.

(d) For each emergency generator that is not excited from a variable voltage or rotary amplifier exciter that is controlled by a voltage regulator unit acting on the exciter field, each emergency switchboard must have—

(1) A generator field rheostat;

(2) A double pole field switch;

(3) Discharge clips; and

(4) A discharge resistor.

(e) Each emergency switchboard must have the following:

(1) An ammeter with a selector switch that connects the ammeter to show the current for each phase.

(2) A voltmeter with a selector switch that connects the voltmeter to show—

(i) Generator voltage of each phase; and

(ii) Bus voltage of one phase.

(3) Ground detection that meets Subpart 111.05 for the emergency lighting system.

(4) A frequency meter.

(5) An exciter field rheostat.

(6) A voltage regulator and a voltage regulator functional cut-out switch.

(f) Each direct-current emergency switchboard must have the—

(1) Equipment under § 111.30-27 (b) through (d); and

(2) Ground detection under Subpart 111.05 for the emergency lighting system.

§ 111.30-31 Tests.

Each switchboard must meet the test requirements in section 35 of the

American Bureau of Shipping's "Rules for Building and Classing Steel Vessels."

Subpart 111.33—Power Semiconductor Rectifier Systems

§ 111.33-1 General.

This subpart is applicable to all power semiconductor rectifier systems. In addition to the regulations contained in this subpart, the requirements of §§ 111.30-11, 111.30-19 and 111.30-21 of this part must be met, if applicable.

§ 111.33-3 Nameplate data.

(a) Each semiconductor rectifier system must have a nameplate containing the words "marine semiconductor rectifier," and the following information:

- (1) Manufacturer's name and address.
- (2) Manufacturer's serial number.
- (3) Type.
- (4) Rated AC volts.
- (5) Rated AC amperes.
- (6) Number of phases.
- (7) Frequency.
- (8) Rated DC volts.
- (9) Rated DC amperes.
- (10) Ambient temperature range.
- (11) Duty cycle.
- (12) Cooling medium.

(b) If, on small rectifiers, the information required by paragraph (a) of this section cannot be shown because of space limitations, the nameplate must be at least large enough to contain the manufacturer's name and serial number. The remaining information must be shown on the schematic diagram.

§ 111.33-5 Installation.

(a) Each semiconductor rectifier system must have an adequate heat-removal system that prevents overheating. Rectifiers may be naturally cooled, forced-air-cooled, or water-cooled. An immersed type rectifier must not be used unless—

- (1) A non-flammable liquid is used; and
- (2) The rectifier system is capable of operation without leakage when the ship is inclined to an angle of 30 degrees each side of the vertical.

(b) Semiconductor rectifier systems must not be located near sources of radiant heat such as steam pipes and engine exhausts.

(c) Semiconductor rectifier systems rated for continuous 50 degrees C ambient temperatures must be installed, except where provisions are made for ensuring an ambient temperature of 40 degrees C or less. Installed systems must be capable of satisfactory operation down to 0 degrees C ambient temperature.

(d) Naturally cooled rectifiers must be installed such that—

(1) The air circulation to and from the rectifier is not restricted; and

(2) The inlet air temperature does not exceed the values for which it was designed.

(e) Forced-air or water-cooled semiconductor rectifiers systems must be installed to prevent application or retention of power on the rectifier unless the cooling is maintained or the maximum operating temperature of the semiconductor rectifier system is not exceeded.

(f) Water-cooled semiconductor rectifiers must operate satisfactorily with an inlet cooling water temperature of 30 degrees C.

(g) Rectifier stacks must have an enclosure that is watertight or drip-proof.

§ 111.33-7 Alarms and shutdowns.

Each power semiconductor rectifier must have a high temperature alarm or shutdown, except as provided in § 111.33-11.

§ 111.33-9 Ventilation exhaust.

The exhaust of each forced-air semiconductor rectifier system must—

- (a) Terminate in a location other than a hazardous location under Subpart 111.105 of this part; and
- (b) Not impinge upon any other electric device.

§ 111.33-11 Propulsion systems.

(a) Each power semiconductor rectifier system in a propulsion system must—

- (1) Meet section 35.84.4 of the American Bureau of Shipping's "Rules for Building and Classing Steel Vessels;"
- (2) Have current limiting and current rate limiting circuits;
- (3) Have external overcurrent protection;

(4) Have a high temperature alarm that activates prior to any high temperature shutdown;

(5) Have internal fuses or other acceptable overcurrent devices that—

- (i) Do not operate under external faults; and
- (ii) Are coordinated with thyristor capability to protect from internal faults involving only a fraction of the total number of branches in each leg;

(6) Have a system for detecting blown internal fuses; and

(7) Be installed in a place that is as dry as possible.

(b) Each power semiconductor rectifier system in a propulsion system must not have piping run over or in its vicinity, if practicable. If such runs of piping are necessary, welded joints only must be used and shielding must be installed to prevent spray from steam or pressurized liquids or any leakage from

impinging on the power semiconductor rectifier from the top, bottom, or sides in the event of accidental spillage or piping failures.

Subpart 111.35—Electric Propulsion

§ 111.35-1 Electrical propulsion installations.

Each electric propulsion installation must meet sections 35.79, 35.81, 35.83, and 35.84 of the American Bureau of Shipping's "Rules for Building and Classing Steel Vessels".

Subpart 111.40—Panelboards

§ 111.40-1 Panelboard standard.

Each panelboard must meet UL 67, Standard for Panelboards, including the Marine Supplement.

§ 111.40-5 Enclosure.

Each panelboard enclosure must be—

- (a) Watertight, if the panelboard is part of a general alarm system; or
- (b) Drip-proof, if the panelboard is where liquid might drip on it.

§ 111.40-7 Location.

Each panelboard must be accessible but not in—

- (a) The weather;
- (b) A cargo hold, except a cargo hold on a Roll on/Roll off vessel;
- (c) A bunker; or
- (d) A storeroom.

§ 111.40-9 Locking device.

The door of each panelboard enclosure that is accessible to any passenger must have a locking device.

§ 111.40-11 Numbered switching unit and panelboard directory.

(a) Each panelboard switching unit must be numbered.

(b) Each panelboard must have—

- (1) A circuit directory cardholder; and
- (2) A circuit directory that has—
 - (i) The circuit designation of each circuit;
 - (ii) A description of the load of each circuit; and
 - (iii) The rating or setting of the overcurrent protective device for each circuit.

§ 111.40-13 Rating.

Each panelboard must have a current rating not less than the feeder circuit capacity.

§ 111.40-15 Overcurrent device.

The total load on any overcurrent device located in a panelboard must not exceed 80 percent of its rating if, in normal operation, the load will continue for 3 hours or more; except if the assembly, including the overcurrent

device, is rated for continuous duty at 100% of its rating.

Subpart 111.50—Overcurrent Protection

§ 111.50-1 Protection of equipment.

Overcurrent protection of electric equipment must meet the following listed subparts of this chapter:

- (a) Appliances, Subpart 111.77.
- (b) Generators, Subpart 111.12.
- (c) Motors, motor circuits, and controllers, Subpart 111.70.
- (d) Transformers, Subpart 111.20.

§ 111.50-3 Protection of conductors.

(a) *Purpose.* The purpose of overcurrent protection for conductors is to open the electric circuit if the current reaches a value that will cause an excessive or dangerous temperature in the conductor or conductor insulation. A grounded conductor is protected from overcurrent if a protective device of a suitable rating or setting is in each ungrounded conductor of the same circuit.

(b) *Overcurrent protection of conductors.* Each conductor must be protected in accordance with its current carrying capacity, except a conductor for the following circuits which must meet the following listed subparts of this chapter:

- (1) Propulsion circuits, Subpart 111.35.
- (2) Steering circuits, Subpart 111.93.
- (3) Motor circuits, Subpart 111.70.
- (4) Flexible cord and fixture wire for lighting circuits, Subpart 111.75.
- (5) Switchboard circuits, Subpart 111.30.

(c) *Fuses.* If the allowable current-carrying capacity of the conductor does not correspond to a standard size fuse that meets Section 240-6 of the National Electrical Code and the next larger size or rating is used, it must not be larger than 150 percent of the allowable current carrying capacity of the conductor. The effect of heat on the operation of fuses must be taken into consideration in the application of the fuses if they are subjected to extremely low or high temperatures.

(d) *Circuit breakers.* If the allowable current-carrying capacity of the conductor does not correspond to a standard circuit breaker rating that meets Section 240-6 of the National Electrical Code and the next larger rating is used, it must not be larger than 150 percent of the allowable current-carrying capacity of the conductor. The effect of the heat on the operation of thermally controlled circuit breakers must be taken into consideration in the application of these circuit breakers if

they are subjected to extremely low or extremely high temperatures.

(e) *Parallel overcurrent protective devices.* An overcurrent protective device must not be connected in parallel with another overcurrent protective device.

(f) *Thermal devices.* A thermal cutout, thermal relay, or other device not designed to open a short circuit, must not be used for protection of a conductor against overcurrent due to a short circuit or ground, except in a motor circuit as described in Article 430 of the National Electrical Code.

(g) *Ungrounded conductors.* A fuse or overcurrent trip unit of a circuit breaker must be in each ungrounded conductor. A branch switch or circuit breaker must open all conductors of the circuit, except grounded conductors.

(h) *Grounded conductor.* An overcurrent device must not be in a permanently grounded conductor, except—

(1) An overcurrent device that simultaneously opens all conductors of the circuit, unless prohibited by § 111.05-17 for the bus-tie feeder connecting the emergency and main switchboards; and

(2) For motor-running protection described in Article 430 of the National Electrical Code.

§ 111.50-5 Location of overcurrent protective devices.

(a) *Location in circuit.* Overcurrent devices must be at the point where the conductor to be protected receives its supply, except as follows:

(1) The generator overcurrent protective device must be on the ship's service generator switchboard. (See § 111.12-11(g) for additional requirements.)

(2) The overcurrent protection for the shore connection conductors must meet § 111.30-25.

(3) If the overcurrent device that protects the larger conductors also protects the smaller conductors, an overcurrent device is not required at the supply to the smaller conductors.

(4) If the overcurrent device protecting the primary side of a single phase transformer (two wire with single-voltage secondary) also protects the conductors connected to the secondary side, as determined by multiplying the current-carrying capacity of the secondary conductor by the secondary to primary transformer voltage ratio, and this protection meets § 111.20-15 of this chapter, an overcurrent device is not required at the supply to the secondary side conductors.

(b) *Location on vessel.* Each overcurrent device—

(1) Must be—

(i) Readily accessible; and
(ii) In a distribution panelboard, switchboard, motor controller, or similar enclosure; and

(2) Must not be—

(i) Exposed to mechanical damage; and
(ii) Near an easily ignitable material or where explosive gas or vapor may accumulate.

§ 111.50-7 Enclosures.

(a) Each enclosure of an overcurrent protective device must meet Sections 240-30 and 240-33 of the National Electrical Code.

(b) No enclosure may be exposed to the weather unless accepted by the Commandant.

§ 111.50-9 Disconnecting and guarding.

Disconnecting and guarding of overcurrent protective devices must meet Part D of Article 240 of the National Electrical Code.

Subpart 111.51—Coordination of Overcurrent Protective Devices

§ 111.51-1 Purpose.

The purpose of this subpart is to provide continuity of service for equipment vital to the propulsion, control or safety of the vessel under short-circuit conditions through coordination and selective operation of overcurrent protective devices.

§ 111.51-3 Protection of vital equipment.

Overcurrent protective devices must be installed so that—

(a) A short-circuit on a circuit that is not vital to the propulsion, control, or safety of the vessel does not trip equipment that is vital; and

(b) A short-circuit on a circuit that is vital to the propulsion, control, or safety of the vessel is cleared only by the protective device that is closest to the point of the short-circuit.

Subpart 111.52—Calculation of Short-Circuit Currents

§ 111.52-1 General.

The available short-circuit must be computed—

(a) From the aggregate contribution of all generators that can simultaneously operate in parallel;

(b) From the largest probable motor load; and

(c) With a three phase fault on the load terminals of the protective device.

§ 111.52-3 Systems below 1500 kilowatts.

The following short-circuit assumptions must be made for a system

with an aggregate generating capacity below 1500 kilowatts, unless detailed computations in accordance with § 111.52-5 are submitted:

(a) The maximum short-circuit current of a direct current system must be assumed to be 10 times the aggregate normal rated generator currents plus six times the aggregate normal rated currents of all motors that may be in operation.

(b) The maximum asymmetrical short-circuit current for an alternating current system must be assumed to be 10 times the aggregate normal rated generator currents plus four times the aggregate normal rated currents of all motors that may be in operation.

(c) The average asymmetrical short-circuit current for an alternating-current system must be assumed to be $8\frac{1}{2}$ times the aggregate normal rated generator currents plus $3\frac{1}{2}$ times the aggregate normal rated currents of all motors that may be in operation.

§ 111.52-5 Systems 1500 kilowatts or above.

Detailed short-circuit calculations must be submitted for systems with an aggregate generating capacity of 1500 kilowatts or more utilizing one of the following calculation methods:

(a) An exact calculation utilizing actual impedances or reactances of the electrical equipment.

(b) An estimated calculation utilizing the Naval Sea Systems Command Design Data Sheet DDS 9620-3, "A.C. Fault Current Calculations."

Subpart 111.53—Fuses

§ 111.53-1 General.

(a) Each fuse must—

(1) Meet Parts E and F of Article 240 of the National Electrical Code;

(2) Have an interrupting rating sufficient to interrupt the maximum asymmetrical RMS short-circuit current at the point of application; and

(3) Be listed by Underwriters Laboratories Inc. or other independent laboratory recognized by the Commandant.

(b) Plug fuses of the Edison-base type and renewable link cartridge-type fuses must not be used.

Subpart 111.54—Circuit Breakers

§ 111.54-1 Circuit breakers.

(a) Each circuit breaker must—

(1) Meet Part G of Article 240 of the National Electrical Code;

(2) Meet Subpart 111.55 of this chapter;

(3) Have an interrupting rating sufficient to interrupt the maximum

asymmetrical short-circuit current available at the point of application; and

(4) Be the air type.
(b) Molded case circuit breakers must not be used in circuits having a nominal voltage of more than 600 volts. Each molded case circuit breaker must meet UL 489, except as noted in paragraph (e) of this section.

(c) Circuit breakers, other than the molded case types that are for use in—
(1) An alternating current system having a nominal voltage of 600 volts or less must meet—

- (i) ANSI/IEEE Standard C37.13;
- (ii) IEEE Standard No. 538; or
- (iii) IEEE Standard No. 331.

(2) A direct current system of 3000 volts or less must meet ANSI C37.14; and

(3) An alternating current system having a nominal voltage greater than 600 volts must meet—

- (i) ANSI C37.04 including all reference supplements;
- (ii) IEEE Standard No. 320 including all referenced supplements; and
- (iii) ANSI C37.12.

(d) A circuit breaker must not—

(1) Be dependent upon mechanical cooling to operate within its rating; or

(2) Have a long-time-delay trip element set above the continuous current rating of the trip element or of the circuit breaker frame.

(e) Each circuit breaker located in an engine room, boiler room, or machinery space must be calibrated for a 50 degree C ambient temperature. If the circuit breaker is located in an environmentally controlled machinery control room where provisions are made for ensuring an ambient temperature of 40 degree C or less, a circuit breaker must have at least the standard 40 degrees C ambient temperature calibration.

Subpart 111.55—Switches

§ 111.55-1 General.

(a) Each switch must meet Article 380 of the National Electrical Code.

(b) Each switch that is in the weather must be in a watertight enclosure and be externally operable.

§ 111.55-3 Circuit connections.

The load side of each circuit must be connected to the fuse end of a fused-switch or to the coil end of a circuit breaker, except a generator which is connected to either end of a circuit breaker.

§ 111.55-5 Knife switches.

Each knife switch must meet UL 363.

§ 111.55-7 Snap switches.

Each snap switch must meet UL 20.

§ 111.55-9 Enclosed switches.

Each enclosed switch must meet UL 98.

Subpart 111.57—Current-Limiting Devices

§ 111.57-1 Current-limiting device requirements.

(a) The maximum peak let-through current (I_p) of a current-limiting device that protects an overcurrent device must not be greater than 90 percent of the peak current which the overcurrent device can withstand (I_w). This can be expressed by the formula:

$$I_p < I_w \times 0.9 \text{ amperes}$$

where

$$I_w = I_{rms} \times K \text{ amperes}$$

I_{rms} = Symmetrical RMS short circuit current rating of the overcurrent device being protected

K = Ratio of maximum instantaneous peak amperage in one phase during the first cycle after short-circuit occurs to the symmetrical RMS short-circuit current the circuit breaker was tested at.

(b) Current-limiting devices must open in a maximum of $\frac{1}{2}$ cycle, or the let-through energy (I^2t) must not be greater than that given by the following formula:

$$I^2t < (I_{rms})^2 \times 0.01 \text{ ampere}^2 \text{ sec}$$

(c) The values used in paragraphs (a) and (b) of this section are to be obtained as follows:

(1) " I_p " and " I^2t " from fuse manufacturer's curves.

(2) " I_{rms} " from circuit breaker nameplate data.

(3) " K " of molded case circuit breakers meeting the requirements of UL 489 are as follows:

CIRCUIT BREAKER INTERRUPTING

Rating (amperes)	K
10,000 or less	1.61
10,001 to 20,000	1.91
Over 20,000	2.14

(4) " K " of low voltage power circuit breakers meeting ANSI/IEEE Standard C37.13 is 2.3.

(d) Current-limiting fuses in a three-phase motor circuit must be interlocked to prevent single-phase operation of the three-phase motor.

Note.—A fused circuit breaker using current-limiting fuses meeting the requirements of UL 489, Standard for Molded Case Circuit Breakers or IEEE standard No. 538, Low Voltage AC Integrally Fused Power Circuit Breakers for such a combination can be considered as satisfactorily meeting paragraphs (a) and (b) of this section.

Subpart 111.59—Busways**§ 111.59-1 General.**

Each busway must meet—

- (a) Article 364 of the National Electrical Code; and
- (b) UL 857.

§ 111.59-3 No mechanical cooling.

A busway must need mechanical cooling to operate within its rating.

Subpart 111.60—Wiring Materials and Methods**§ 111.60-1 Cable construction and testing.**

Each cable must meet section 18 of IEEE Standard No. 45 or be one of the following exceptions:

(a) Electric cable constructed in accordance with Military Specification MIL-C-915 if—

(1) It is substituted for the equivalent IEEE Standard No. 45 cable type or is a thermocouple or pyrometer cable;

(2) The particular type of cable can pass the flammability test contained in section 18.13.5 of IEEE Standard No. 45; and

(3) The maximum current for any conductor does not exceed the current carrying capacities specified in NAVSEA Design Data Sheet DDS 304-2.

(b) Electric cable which has a polyvinyl chloride insulation with a

nylon jacket (Type N), if it meets the requirements for polyvinyl chloride insulated cable in Section 18 of IEEE Standard No. 45 except—

(1) The thickness of the polyvinyl chloride insulation must meet UL 83 for type THWN wire;

(2) Each conductor must have a nylon jacket;

(3) The thickness of the nylon jacket must meet UL 83 for type THWN wire;

(4) The material of the nylon jacket must meet ASTM D789 Type VIII; and

(5) The cable must have identification provided by a durable printing or embossing on the cable jacket, or a marker under the cable jacket that, at intervals not exceeding 24 inches (610 mm), gives—

(i) The information required by Section 18.8 of IEEE Standard No. 45;

(ii) The information required by Section 310-11 of the NEC; or

(iii) The manufacturer's name, identification code, voltage rating, number of conductors, and conductor size.

(c) Cable constructed in accordance with other standards if accepted for specific applications by the Commandant.

§ 111.60-3 Cable application.

(a) Cable application must meet Section 19 except 19.6.1 and 19.6.4 of IEEE Standard No. 45.

(b) Cable application of Type N Cable must meet Section 19 of IEEE Standard No. 45 for polyvinyl chloride insulated cable.

§ 111.60-4 Minimum cable conductor size.

(a) Each cable conductor must be No. 18 AWG (0.82 mm²) or larger except—

(1) Each power and lighting cable conductor must be No. 14 AWG (2.08 mm²) or larger; and

(2) Each thermocouple or pyrometer cable conductor must be No. 22 AWG (0.33 mm²) or larger.

§ 111.60-5 Cable installation.

(a) Each cable installation must meet Sections 20 and 22, except 20.11, of IEEE Standard No. 45.

(b) Cable must not be located in any tanks except to supply equipment or instrumentation specially designed for and compatible with such location and whose function require its installation in the tank. The cable must be compatible with the liquid or gas in the tank or be protected by an enclosure.

§ 111.60-7 Demand loads.

Generator, feeder, and bus-tie cables must be selected on the basis of a computed load of not less than the demand load given in Table 111.60-7.

TABLE 111.60-7—DEMAND LOADS

Type of circuit	Demand load
Generator cables	115 percent of continuous generator rating.
Switchboard bus-tie, except ship's service to emergency switchboard bus-tie	75 percent of generating capacity of the larger switchboard.
Emergency switchboard bus-tie	115 percent of continuous rating of emergency generator.
Motor feeders	Article 430, National Electrical Code.
Galley equipment feeder	100 percent of either the first 50 KW or one-half the connected load, whichever is the larger, plus 65 percent of the remaining connected load, plus 50 percent of the rating of the spare switches or circuit breakers on the distribution panel.
Lighting feeder	100 percent of the connected load plus the average active circuit load for the spare switches or circuit breakers on the distribution panels.
Grounded neutral of a dual voltage feeder	100 percent of the capacity of the ungrounded conductors when grounded neutral is not protected by a circuit breaker overcurrent trip, or not less than 50 percent of the capacity of the ungrounded conductors when the grounded neutral is protected by a circuit breaker overcurrent trip or overcurrent alarm.

§ 111.60-9 Segregation of vital circuits.

(a) *General.* A branch circuit that supplies equipment vital to the propulsion, control, or safety of the vessel must not supply any other equipment.

(b) *Passenger vessels.* (1) Each passenger vessel with firescreen bulkheads that form main fire zones must have distribution systems arranged so that fire in a main fire zone does not interfere with essential services in another main fire zone.

(2) Main and emergency feeders passing through a main fire zone must

be separated vertically and horizontally as much as practicable.

§ 111.60-11 Wire.

(a) Wire must be in an enclosure.

(b) Wire must be of the stranded type.

(c) Wire in a lighting fixture must meet UL 595.

(d) Switchboard wire must meet Subpart 111.30.

(e) Wire, except in lighting fixtures and switchboards, must meet—

- (1) MIL-W-76;
- (2) MIL-W-16878 type B, C, D, E, EE, or FF;
- (3) UL 44; or
- (4) UL 83.

(f) The installation of wire that meets UL 44 or UL 83 must meet Tables 310-16 and 310-17 of the National Electrical Code.

(g) Each wire must be No. 18 AWG (0.82 mm²) or larger, except in switchboards where it must be No. 14 AWG (2.08 mm²) or larger.

§ 111.60-13 Flexible electric cord and cables.

(a) *Construction and testing.* Each flexible electric cord and cable must meet—

- (1) UL 62;
- (2) NEMA WC 3;
- (3) NEMA WC 8; or

(4) MIL-C-915.

(b) *Application.* A flexible cord must be used—

(1) Only as allowed under Sections 400-7 and 400-8 of the National Electrical Code; and

(2) In accordance with Table 400-4 of the National Electrical Code.

(c) *Allowable current-carrying capacity.* A flexible cord must not carry more current than allowed under Table 400-5 of the National Electrical Code, NEMA WC 3 or NEMA WC 8.

(d) *Conductor size.* Each flexible cord must be No. 18 AWG (0.82 mm²) or larger.

(e) *Splices.* Each flexible cord and cable must be without splices or taps except for a cord or cable No. 12 AWG (3.3 mm²) or larger spliced for repairs in accordance with § 111.60-19.

(f) *Pull at joints and terminals.* Each flexible cord and cable must be connected to a device or fitting by a knot, tape, or special fitting so that tension is not transmitted to joints or terminal screws.

§ 111.60-17 Connections and terminations.

(a) Each connection to a conductor or terminal part of a conductor that is larger than No. 10 AWG (5.3 mm²) must be made within an enclosure and have—

(1) A pressure-type connector on each conductor;

(2) A solder lug on each conductor;

(3) A splice made with a pressure-type connector to a flexible lead or conductor; or

(4) A splice that is soldered, brazed, or welded to a flexible lead or conductor.

(b) Each connection to a conductor or a terminal part of a conductor that is No. 10 AWG (5.3 mm²) or smaller must be made within an enclosure and—

(1) Meet paragraph (a) of this section; or

(2) Have clamps or screws with terminal plates that have up turned lugs or other suitable means to capture the terminal.

(c) A connector or lug of the set screw type must not be used with stranded conductors smaller than No. 14 AWG (2.1 mm²) except if there is a nonrotating follower that travels with the setscrew and makes pressure contact with the conductor.

(d) Each pressure-type wire connector and lug must meet UL 486A.

(e) Each terminal block must have 6-32 terminal screws or larger and spacings that meet Table 111.60-17(e).

TABLE 111.60-17(E).—TERMINAL BLOCK SPACINGS IN INCHES (MILLIMETERS)

Voltage	Minimum spacing between opposite polarity and between live parts and ground	
	Through air	Over surface
0 to 250.....	¼ (6.4)	¾ (9.5)
251 to 600.....	¾ (9.5)	¾ (9.5)

(f) Wire connectors utilized in conjunction with screw-type terminal blocks must be of the captive type such as the ring or the flanged spade type.

§ 111.60-19 Cable splices.

(a) A cable must not be spliced except;

(1) A cable installed in a subassembly spliced to a cable installed in another subassembly.

(2) For a vessel receiving alterations, a cable spliced to extend a circuit.

(3) A cable having a large size or exceptional length spliced to facilitate its installation.

(4) A cable spliced to replace a damaged section of the cable if, before replacing the damaged section, the insulation resistance of the remainder of the cable is measured and it is determined that the condition of the insulation is unimpaired.

(b) Each cable splice must be made by a qualified person with a one cycle compression tool and must have the following:

(1) A pressure-type butt connector that meets UL 486A.

(2) Replacement insulation that has—

(i) The same or greater thickness than that of the cable insulation;

(ii) Electrical properties that are the same as or better than the electrical properties of the cable insulation; and

(iii) A heat transfer capability that is the same as or better than that of the original cable insulation.

(3) A watertight replacement jacket that is heat shrinkable or prestretched tubing of the same or a greater thickness than that of the cable jacket and that has properties that are the same as or better than those of the cable jacket. This includes meeting the jacket requirements of section 18.9 and Tables A11 and A12 of IEEE Standard No. 45.

(4) For armored cable, replacement armor or a jumper that connects to the cable armor on each side of the splice and that maintains the electrical continuity of the cable armor.

(c) All material in a cable splice must be chemically compatible with all other material in the splice and with the materials of the cable.

(d) A cable must not be spliced in a hazardous location using the method of

this section except in intrinsically safe circuits.

§ 111.60-21 Cable insulation tests.

All electric power and lighting cable and associated equipment must be checked for proper insulation resistance to ground and between conductors. The insulation resistance must not be less than that in paragraph 46.2.1 of IEEE Standard No. 45.

Subpart 111.70—Motor Circuits, Controllers and Protection

§ 111.70-1 General.

(a) Each motor circuit, controller, and protection must meet Article 430 of the National Electrical Code, except—

(1) Each fire pump motor circuit and protection must meet the same requirements in the National Electrical Code as each other motor circuit in lieu of the protection requirements contained in the fire pump portions of sections 430-31 and 430-72;

(2) Each steering gear motor circuit and protection must meet Subpart 111.93 of this chapter; and

(3) Each propulsion motor circuit and protection must meet Subpart 111.35 of this chapter;

(b) In three phase alternating-current systems, only two motor-running protective devices need be utilized in any two ungrounded conductors in lieu of the three specified by Table 430-37 of the National Electrical Code except when a wye-delta or a delta-wye transformer is utilized.

(c) The motor disconnecting means must be an externally operable switch or circuit breaker.

§ 111.70-3 Motor controllers and motor control centers.

(a) *General.* Each controlling apparatus, except for those installed in a compartment meeting the requirements of paragraph (b) must be protected by an enclosure case that is either drip-proof or watertight, depending on its location. Indoor metal enclosed switchgear must be installed in dry locations. If there is a cable entrance plate in a watertight enclosure or in the top of a drip-proof enclosure, the plate must be at least ¼ inch (3.18 mm) thick and have a gasket. Each watertight enclosure must have external feet or lugs for mounting.

(b) *Open type.* A control apparatus of the open type must—

(1) Be in a compartment or enclosure that is—

(i) Only for electric control equipment; and

(ii) Accessible only to qualified persons; or—

(2) Have screens or guardrails, if the compartment in which it is installed is used for other apparatus and the location of the open controller is where it is subject to accidental contact.

(c) *Hinged doors.* Each controller hinged door with a height greater than 45 inches (1.14 m), or a width greater than 24 inches (0.6 m) must have door positioners and stops. Equipment mounted on a hinged door must be constructed or shielded so that no live part of the door-mounted equipment is exposed to accidental contact by a person when the door is open and the circuit energized.

(d) *Construction.* Each motor controller for use at 600 volts or less must meet UL 508, including the marine supplement. Each motor controller for use above 600 volts must meet UL 347. Each motor control center must meet UL 845.

(e) *Wearing parts.* Each wearing part of a controller must be accessible for inspection and renewal.

(f) *Low voltage release.* Each motor controller for a fire pump, elevator, steering gear, or auxiliary that is vital to the vessel's propulsion system, except a motor controller for a vital propulsion auxiliary that can be restarted from a central control station, must have low voltage release if automatic restart after a voltage failure is not hazardous. If automatic restart is hazardous, the motor controller must have low voltage protection. Motor controllers for other motors must not have low voltage release unless the starting current and the short-time sustained current of the additional low voltage release load is within the capacity of one generator.

Note.—Automatic sequential starting of low voltage release controllers is acceptable to meet this requirement.

(g) *Low voltage protection.* Each motor controller must have low voltage protection, except—

(1) A motor controller that has low voltage release under paragraph (f) of this section; and

(2) A motor controller for a motor of less than 2 horsepower (1.5 kw).

(h) *Identification of controllers.* In addition to the markings required by UL Standards referenced in paragraph (d) of this section, each controller must—

(1) Identify on the external surface of its enclosure the motor that it controls; and

(2) Contain a durable heat-resistant elementary wiring diagram of the controller fixed to the inside of its door.

(i) *Manually-operated controllers.* Each manually-operated controller must operate without the operator opening the enclosed case. In each panel-type

manually-operated controller, the starting arm must be arranged so that the motor stops if the arm is left on a starting point. In each regulating drum controller, the resistor must be proportioned for the duty cycle.

(j) *Alternating-current manual autostarters.* Each alternating-current manual autostarter with a self-contained autotransformer must have a switch of the quick-make-and-break type, and the starter must be arranged so that it is impossible for an operator to throw the switch to the running position without having first thrown the switch to the starting position. If oil is necessary, the starter must not leak when tilted to an angle of 30 degrees and must be constructed to prevent the liquid from splashing out due to the rolling of the vessel.

(k) *Heel angle.* Each controller contactor must be designed for satisfactory operation at a 22.5 degree angle of inclination in any direction, and any controller that utilizes liquid must not leak when inclined at a 30 degree angle.

§ 111.70-5 Heater circuits.

(a) If an enclosure for a motor, master switch, or other equipment, except a motor controller, has an electric heater inside the enclosure that is energized from a separate circuit, the heater circuit must be disconnected from its source of potential by a disconnect device independent of the enclosure containing the heater. The heater disconnecting device must be adjacent to the equipment disconnect device, and a fixed sign, warning the operator to open both devices, must be on the enclosure of the equipment disconnect device except as provided in paragraph (b) of this section.

(b) If the location of the enclosure for a motor, master switch, or other equipment for deck machinery is remote from the motor and controller disconnect device, a sign must be fixed to the enclosure if the disconnect arrangement required by paragraph (a) of this section is not used. The sign must warn the operator of the presence of two sources of potential within the enclosure and show the location of the heater circuit disconnect device.

§ 111.70-7 Remote control, interlock, and indicator circuits.

(a) *Overcurrent protection.* A conductor of a control, interlock, or indicator circuit of a motor controller must be protected against overcurrent unless—

(1) The conductor is wholly within the controller enclosure;

(2) The rating or setting of the branch circuit overcurrent device is not more than 300 percent of the current-carrying capacity of the control, interlock, or indicator circuit conductor;

(3) There is an overcurrent device in each side of the line that has a rating or setting of not more than 300 percent of the current-carrying capacity of the control, electrical interlock, or indicator circuit conductor, except if under operating conditions there is no appreciable difference in potential between the external conductors, overcurrent protection need only be at the supply of that side of the line; or

(4) The opening of the control, interlock, or indicator circuit creates a hazard.

Note.—For overcurrent protection of steering gear control and indicator circuits, see Subpart 111.93 of this chapter.

(b) *Accidental ground.* The controller must be designed to prevent an accidental ground in a remote control circuit from causing the stop switches to fail to operate or causing the motor to start.

(c) *Source of potential.* The potential for a control, interlock, or indicator circuit must be derived from the load side of the motor and controller disconnect device, except if the control functions require circuits that must be common to two or more controllers, the switching arrangement in paragraph (d) of this section must be met.

(d) *Switching.* In the design of a control, interlock, or indicator circuit, all practicable steps must be taken to eliminate all but one source of potential in an enclosure. If the control functions make it impracticable to energize a control interlock or indicator circuit from the load side of a motor and controller disconnect device and the potential of the control, interlock, or indicator circuit is more than 24 volts, there must be one of the following alternative methods of switching:

(1) Each conductor of a control, interlock, or indicator circuit must be disconnected from all sources of potential by a disconnect device independent of the motor and controller disconnect device. The two independent devices must be adjacent to each other, and a fixed sign, warning the operator to open both devices to disconnect completely the motor and controller, must be on the exterior of the door of the main disconnect device.

(2) Each conductor of a control, interlock or indicator circuit must be disconnected from all sources of potential by a disconnect device actuated by the opening of the controller

door. The disconnect device and its connections, including each terminal block for terminating the vessel's wiring, must not have any electrically uninsulated or unshielded surface.

Subpart 111.75—Lighting Circuits and Protection

§ 111.75-1 Lighting feeders.

(a) *Passenger vessels.* On a passenger vessel with firescreen bulkheads forming fire zones, the lighting distribution system must be arranged so that, to the extent possible, a fire in any main fire zone does not interfere with the lighting in any other main fire zone. This requirement is met if main and emergency feeders passing through any zone are separated both vertically and horizontally as widely as practicable.

(b) *Machinery spaces.* Lighting for engine rooms, boiler rooms, and auxiliary machinery spaces must be supplied from two or more feeders. One of these feeders must be a ship's service feeder.

(c) *Cargo spaces.* There must be separate feeders for cargo space lighting. Distribution panels must be outside cargo spaces except on roll on/roll off vessels.

Note.—Special requirements for emergency lighting, feeders, and branch circuits are in Subpart 112.43 of this chapter.

§ 111.75-5 Lighting branch circuits.

(a) *Loads.* A lighting distribution panel must not supply branch circuits rated at over 30 amperes.

(b) *Voltages.* A lighting branch circuit voltage must not exceed 150 volts to ground, except a cargo hold or deck lighting branch circuit supplying only the ballasts of electric-discharge lamps mounted in permanently installed fixtures which must not exceed 500 volts between conductors.

(c) *Connected load.* The connected load on a lighting branch circuit must not be more than 80 percent of the rating of the overcurrent protective device, computed on the basis of the lamp sizes, but must be at least 50 watts for each outlet unless the design of the fixture prevents the use of a lamp of a higher wattage than the original lamp. Each circuit supplying electric discharge type lamps must be computed on the basis of ballast input current. A receptacle outlet for the convenience of passengers or crew to which no ship's service apparatus such as a room fan, desk lamp, or table lamp is connected, is not considered connected load.

(d) *Lighting fixtures on lighting circuits.* Each lighting fixture must be on a lighting branch circuit.

(e) *Overcurrent protection.* Each lighting branch circuit must be protected

by an overcurrent device rated at 20 amperes or less, except as allowed under paragraph (f) of this section. Each lighting branch circuit with an overcurrent device rated or set at—

(1) 15 amperes or less must have a No. 14 AWG (2.1 mm²) or larger branch circuit conductor and fixture wire or flexible cord in each lighting fixture of No. 18 AWG (0.82 mm²) or larger; and

(2) 20 amperes must have a No. 12 AWG (3.3 mm²) or larger branch circuit conductor and fixture wire or flexible cord in each lighting fixture of No. 14 AWG (2.1 mm²) or larger.

(f) *25 or 30 ampere lighting branch circuits.* Lighting branch circuits rated at 25 and 30 amperes supplying only fixed nonswitched lighting fixtures for cargo hold or deck lighting having only lampholders of the mogul type, or other lampholding devices required for lamps of more than 300 watts, may be supplied by a 30 ampere branch circuit wired with at least No. 10 AWG (5.3 mm²) conductors if each fixture wire used in wiring each lighting fixture is No. 12 AWG (3.3 mm²) or larger.

(g) *Connections to screw-shell lampholders.* On each branch circuit with a grounded conductor, the screw shell of each lampholder must be connected to the grounded neutral.

§ 111.75-15 Lighting requirements.

(a) *Lights in passageways, public spaces, and berthing compartments.* The supply to lights in each passageway, public space, or berthing compartment accommodating more than 25 persons must be divided between two or more branch circuits, one of which may be an emergency branch circuit.

(b) *Lights in machinery spaces.* Alternate groups of lights in an engine room, boiler room, or auxiliary machinery space must be arranged so that the failure of one branch circuit does not leave an area without light.

(c) *Illumination of passenger and crew spaces.* Each space used by passengers or crew must have illumination that is sufficient for reading .125 in (3.2 mm) print throughout the normally occupied areas.

(d) *Berth lights.* Each crew berth must have a fixed berth light that is not wired with a flexible cord. The berth light must have minimum horizontal projection so that the light may not be covered with bedding.

(e) *Exit lights.* Each exit light required on passenger vessels under § 112.15-1 of this subchapter must have the word "Exit" in red block letters at least 2 inches (50 mm) high.

(f) *Pilot ladders.* There must be a means for lighting each station from which a pilot may be deployed.

§ 111.75-16 Lifeboat and liferaft floodlights.

Each vessel must have floodlights for illumination of lifeboat and liferaft launching that meet the following requirements:

(a) Floodlights must be where they can be directed to illuminate launching devices and the area for launching, from the stowage position to the water.

(b) Each floodlight must—

(1) Have a manual means of training that does not need tools;

(2) Connect to the supply circuit by a short length of Type S or Type SO flexible cord without the use of a receptacle outlet; and

(3) Be supplied from the emergency source of lighting and power.

§ 111.75-17 Navigation lights.

Each navigation light system must meet the following:

(a) *Feeders.* On vessels required to have a final emergency power source by § 112.05-5(a) of this chapter, each navigation light panel must be supplied by a feeder from the emergency switchboard (see § 112.43-13). The feeder must be protected by overcurrent devices rated or set at a value of at least twice that of the navigation light panel main fuses.

(b) *Navigation light indicator panel.* Each self-propelled vessel must have a navigation light indicator panel in the wheelhouse to control side, masthead, stern, and range lights. The panel must visually and audibly signal the failure of each of these navigation lights. Each light source must be connected to a separate fused branch circuit. The panel must have a fused feeder disconnect switch, and the fuses must have at least twice the rating of the largest branch circuit fuse and must be greater than the maximum panel load.

(c) *Dual light sources.* Each self-propelled vessel must have duplicate light sources for the side, masthead, stern, and range lights.

(d) *Navigation lights.* Each navigation light must—

(1) Be of a type approved by the Commandant;

(2) Meet the technical details in the applicable navigation rules;

(3) Meet UL 1104; and

(4) If it is a flashing light, have its intensity determined by the formula:

$$I_e = C / (0.2 + t_2 - t_1)$$

Where

I_e = Luminous Intensity.

C = Integral of I_{dt} evaluated between the limits of t_1 and t_2 .

t_1 = Time in seconds of the beginning of the flash.

t_2 = Time in seconds of the end of the flash.

I=Instantaneous intensity during the flash.

Note.—The limits, t_1 and t_2 , are to be chosen so as to maximize I_e .

(e) *Installation of navigation lights.*

Each navigation light must—

(1) Be installed so that its location and its angle of visibility meet the applicable navigation rules;

(2) Except as permitted by the applicable navigation rules, be arranged so that light from a navigation light is not obstructed by any part of; the vessel's structure or rigging;

(3) Be wired by a short length of heavy-duty, flexible cable to a watertight receptacle outlet next to the light; and

(4) If is a double lens, two-lamp type, have each lamp connected to its branch circuit conductors by an individual flexible cable and receptacle plug.

(f) *Light screens.* Light screens must meet the applicable navigation rules.

§ 111.75-18 *Signaling lights.*

(a) Each self-propelled vessel of 300 gross tons and over on an international voyage must have a daylight signaling light that meets the following:

(1) The signaling light must produce a narrow, high intensity beam of light for daylight blinker communication at speeds up to 180 dots or dashes per minute.

(2) The axial luminous intensity of the beam must be at least 60,000 candelas.

(3) The luminous intensity of the beam in every direction within an angle of 0.7 degree from the axial must be at least 50 percent of the axial luminous intensity.

(4) The signaling light must have a sighting arrangement that the operator can use to direct the beam to the receiving station.

(5) Signaling must be by keying the current through the lamp or by movement of shutters.

(6) Each signaling light must be—

(i) A fixed unit mounted on the top of the wheelhouse;

(ii) A semi-fixed unit with arrangements for quick mounting at either wing of the navigating bridge; or

(iii) A portable unit.

(7) Each fixed or semi-fixed signaling light must be energized from the emergency lighting and power system. Each portable signaling light must be energized from a self-contained storage battery that can operate the light continuously for two hours without recharging.

(b) Each self-propelled vessel of over 150 gross tons and less than 300 gross tons on an international voyage must have—

(1) A daylight signaling light that meets the requirements of § 111.75-18(a); or

(2) A hand held portable light of at least 60,000 candelas with a means for rapidly switching on and off and energized from a self-contained storage battery that can operate the light continuously for two hours without recharging.

§ 111.75-20 *Lighting fixtures.*

(a) The construction of each lighting fixture must meet UL 595.

(b) Each fixture globe, lens, or diffuser must have a high strength guard or be made of high strength material, except in an accommodation space, wheelhouse, gyro room, radio room, galley, or similar space where it is not subject to damage.

(c) No fixture may be used as a connection box for a circuit other than the branch circuit supplying the fixture.

(d) Lighting fixtures must be installed as follows:

(1) Each fixture in the weather or in a location exposed to splashing water must be watertight. Each fixture in a damp or wet location must at least be drip-proof.

(2) Each fixture and lampholder must be fixed. A fixture must not be supported by the screw shell of a lampholder.

(3) Each pendant-type fixture must be suspended by and supplied through a threaded, rigid conduit stem.

(4) Each tablelamp, desk lamp, floorlamp, and similar equipment must be secured in place so that it cannot be displaced by the roll or pitch of the vessel.

Subpart 111.77—Appliances and Appliance Circuits

§ 111.77-1 *Overcurrent protection.*

If a circuit supplies only one appliance or device, the rating or setting of the branch circuit overcurrent device must not be more than 150 percent of the rating of the appliance or device, or 15 amperes, whichever is greater.

§ 111.77-3 *Electric cooking equipment.*

(a) Each item of electric cooking equipment must meet UL 197, including the Marine Supplement.

(b) All equipment must be mounted to prevent dislodgment by roll or pitch.

§ 111.77-5 *Electric motor-operated appliances.*

(a) Each electric motor-operated appliance must meet UL 73.

(b) Each electric motor-operated commissary appliance motor and controller in a damp or wet location must be—

(1) in a watertight enclosure; or

(2) totally enclosed.

§ 111.77-7 *Dishwashers.*

Each dishwasher must meet UL 749 or UL 921.

§ 111.77-9 *Refrigerators.*

Each refrigerator must meet UL 250 or UL 471.

§ 111.77-11 *Refrigerated drinking water coolers.*

Each refrigerated drinking water cooler must meet UL 399.

Subpart 111.79—Receptacles

§ 111.79-1 *Receptacle outlets; general.*

(a) There must be enough receptacle outlets throughout the crew's accommodations for electric razors, radios, and similar items.

(b) There must be enough receptacle outlets throughout each machinery space for lighting any machine that is necessary for the operation of the vessel with a portable light having a 75 foot (24 m) flexible cord.

(c) The rating of each receptacle must meet Section 210-21 of the National Electrical Code.

(d) Each interior unit of a receptacle outlet or plug must meet UL 498.

§ 111.79-3 *Grounding pole.*

Each receptacle outlet that operates at 100 volts or more must have a grounding pole.

§ 111.79-5 *Damp or wet locations and weather locations.*

(a) Each receptacle outlet in a damp or wet location must be designed so that when the plug is in, the plug is held in positive contact and establishes and maintains a watertight enclosure.

(b) Each receptacle outlet in a damp or wet location must be designed so that, when the plug is not in, the plug opening may be closed to establish and maintain a watertight enclosure. If a threaded cap is used for this purpose, the cap must be mechanically fastened to the cover or enclosure by a link or hinged strap.

(c) Each receptacle outlet and plug in a damp or wet location must be made of corrosion-resistant materials or of materials with corrosion-resistant finishes, except that a receptacle outlet or plug for a corrosive location must be made of corrosion-resistant materials.

(d) Each receptacle outlet in a location in the weather must be designed so that, with the plug opening uncovered, water does not collect in the interior of the box.

§ 111.79-7 *No live parts.*

A receptacle outlet in a location that is accessible to other than a qualified

person must not have any exposed live parts with the plug opening uncovered. Each screw, rivet, contact, or similar item that is accessible and in electrical connection with any live metal part, must be connected in a hole not more than $\frac{3}{32}$ in. (7.2 mm) in diameter and recessed at least $\frac{3}{16}$ in. (4.8 mm).

§ 111.79-9 Transmitting power between receptacles.

(a) If it is necessary to transmit current in one direction between two receptacle outlets by a flexible cable with a plug on each end, such as a battery charging lead between a receptacle outlet on a ship and a receptacle outlet in a lifeboat, the plug that may be energized when not in the receptacle outlet must be female.

(b) If a receptacle outlet may be used as a source of power and as a receiver of power, such as the receptacles on barges that may have to supply power to adjoining barges in some makeup and receive power from the towboat or adjoining barge in other makeups, the receptacles must be male and reverse service. Plugs of flexible cable must be female and must be at both ends of the flexible lead. The female plug must meet § 111.79-7.

§ 111.79-11 Lifeboat receptacles.

Each receptacle outlet on a lifeboat for connection to a vessel's electrical system must allow the plug to pull free when the lifeboat is lowered.

§ 111.79-13 Different potentials on a vessel.

If receptacle outlets on a vessel are supplied by different potentials or by different types of potentials, each receptacle outlet must preclude the plugging of a portable device into a receptacle outlet of an incompatible potential.

§ 111.79-15 Receptacles for refrigerated containers.

Receptacles for refrigerated containers must meet one of the following:

(a) Each receptacle for refrigerated containers must have a switch interlocked in such a way that the receptacle's contacts are deenergized before the making or breaking of the connection between the plug and receptacle contacts.

(b) Each group of receptacles for refrigerated containers must have—

(1) A switch near the receptacles that disconnects all power to those receptacles; and

(2) A sign stating that the switch should be opened before cables are disconnected from the receptacles or refrigerated containers.

(c) Each receptacle for refrigerated containers must be designed for circuit breaking service.

Subpart 111.81—Outlet Boxes and Junction Boxes

§ 111.81-1 Outlet boxes and junction boxes: general.

(a) The requirements of this subpart apply to each outlet box used with a lighting fixture, wiring device, or similar item, including each separately installed connection and junction box.

(b) An outlet box must be at each outlet, switch, receptacle, or junction point.

(c) Each outlet or junction box must have a cover unless a fixture canopy, switch cover, receptacle cover, or other cover is used.

§ 111.81-3 Cables entering boxes.

Each cable entering a box or fitting must be protected from abrasion and must meet the following:

(a) Each opening through which a conductor enters must be closed.

(b) Cable armor must be secured to the box or fitting.

(c) Each cable entrance in a damp or wet location must be made watertight by a terminal or stuffing tube.

§ 111.81-5 National Electrical Code.

Each outlet box and junction box installation must meet Section 370-6 of the National Electrical Code.

§ 111.81-7 Degree of enclosure.

Each outlet box in a damp or wet location must be watertight.

§ 111.81-9 Mounting.

(a) Each outlet box must be fixed.

(b) Each watertight outlet box must have external mounting feet.

§ 111.81-11 Penetration of walls.

A hole in a wall of a watertight outlet box for the attachment of a part on the exterior or interior of the box, for securing the cover, or similar purpose, must not penetrate the total thickness of the box wall.

§ 111.81-13 Construction.

(a) The construction of each box must meet UL 50 or UL 514.

(b) A sheet steel outlet box must not be installed in a corrosive location.

Subpart 111.83—Shore Connection Boxes

§ 111.83-1 General.

Each shore connection box must be of a size that accommodates the connections of the flexible and fixed cables.

§ 111.83-3 Spacing: Live parts and live parts and ground.

(a) The minimum spacing between live parts and between live parts and ground in each shore connection box must meet Section 384-26 of the National Electrical Code.

(b) A cable lug must not rotate.

(c) Paragraph (b) of this section must be met by means other than friction between parts.

§ 111.83-5 Bottom entrance and protected enclosures.

Each shore connection box must have a bottom entrance for the shore connection cable. The box must provide protection to the shore connection when the connection is in use.

Subpart 111.85—Electric Oil Immersion Heaters

§ 111.85-1 Electric oil immersion heaters.

Each oil immersion heater must have the following:

(a) An operating thermostat.

(b) Heating elements that have no electrical contact with the oil.

(c) A high temperature limiting device that—

(1) Opens all conductors to the heater;

(2) Is manually reset; and

(3) Actuates at a temperature below the flashpoint of the oil.

(d) A low fluid level device that, if not submerged, opens all conductors to the heater, or a flow device that opens all conductors to the heater if there is inadequate flow.

Subpart 111.87—Electric Air Heating Equipment

§ 111.87-1 Applicability.

This subpart applies to electrically energized units or panels for heating a room or compartment. This subpart does not apply to electrically energized units for heating the air in an enclosed apparatus, such as a motor or controller.

§ 111.87-3 General requirements.

(a) Each electric heater must meet UL 1025 except—

(1) Each electric baseboard heater must meet UL 1042; and

(2) Each electric duct heater must meet UL 1096.

(b) Each heater element must be an enclosed type. The heater element case or jacket must be of a corrosion-resistant material.

(c) Each heater must have a thermal cutoff of the manually-reset type that prevents overheating and must have a thermal regulating switch.

(d) Each heater for bulkhead mounting must have its top slanted or otherwise

designed to prevent hanging anything on the heater. If a heater is portable, it must have a clip or bracket to hold the heater in a fixed position.

(e) The external temperature of a heater enclosing case must not be over 125 degrees C, except that the external temperature of the enclosing case of a flush-mounted heater must not be over 100 degrees C. If a heater is mounted on or next to a deck or bulkhead, the heater must not cause the temperature of the nearest deck or bulkhead to be over 55 degrees C. For test purposes, an ambient temperature of 25 degrees C must be used.

Subpart 111.89—Motion Picture Projectors

§ 111.89-1 Motion picture projectors.

Each motion picture projector must be installed to meet Article 540 of the National Electrical Code.

Subpart 111.91—Elevators and Dumbwaiters

§ 111.91-1 Control and interlock circuits.

Each electric control and interlock circuit of an elevator or dumbwaiter must meet ANSI A17.1.

§ 111.91-3 Control switches.

The construction of each control switch must meet UL 104.

Subpart 111.93—Electric Steering Systems

§ 111.93-1 Applicability.

This subpart applies to each steering gear installation that has—

- (a) A main steering gear that is electrically powered;
- (b) An auxiliary steering gear that is electrically powered; or
- (c) A steering gear control system that is electric or partially electric.

§ 111.93-3 Definitions.

As used in this subpart—

(a) "Steering gear" means the machinery, the power units and ancillary equipment, and the means of applying torque to the rudder stock, tiller, or quadrant necessary for effecting movement of the rudder for the purpose of steering the ship under normal operating conditions.

(b) "Power unit" means—

(1) In the case of an electric steering gear, an electric motor and its associated electrical equipment such as the motor controller and disconnect switch; and

(2) In the case of an electro-hydraulic steering gear, an electric motor, connected pump, and its associated

electrical equipment such as the motor controller and disconnect switch.

(c) "Control system" means the equipment by which orders for rudder movement are transmitted from the navigating bridge to the steering gear power units. Steering gear controls include, but are not limited to—

- (1) Transmitters;
- (2) Receivers;
- (3) Feedback devices;
- (4) Hydraulic control pumps, and their associated motors and motor controllers;
- (5) Differential units; and
- (6) All gearing, piping, shafting, and cables associated with steering gear controls.

§ 111.93-5 General.

When the main and auxiliary steering gears described by § 58.25-20 of this chapter are electrically powered and controlled or when an arrangement of two or more identical power units are utilized in accordance with § 58.25-25 of this chapter, the vessel must have two separate steering systems each consisting of a power unit, steering control system, steering gear feeder, and associated cable and ancillary equipment. The two systems must be separate and independent on a port and starboard basis. Other steering gear systems and arrangements are accepted by the Commandant if they are equivalent to the one covered in this section.

§ 111.93-7 Feeder circuits.

(a) Vessels with one or more electric driven steering power units must have at least two feeder circuits. One of these feeder circuits must be supplied from the ship's service switchboard. On vessels where the rudder stock is required to be over 9 inches (230 mm) diameter in way of the tiller, excluding strengthening for navigation in ice; and a final emergency power source is required by § 112.05-5(a) of this chapter, the other feeder circuit must be supplied from—

- (1) The emergency switchboard; or
- (2) An alternative power supply that—
 - (i) Is available automatically within 45 seconds of loss of power supply from the ship's service switchboard;
 - (ii) Is from an independent source of power located in the steering gear compartment;
 - (iii) Is used for no other purpose; and
 - (iv) Has capacity sufficient for one-half hour of continuous operation of the rudder from 15 degrees on one side to 15 degrees on the other side in not more than 60 seconds with the ship at its deepest sea-going draft while running at one-half of its maximum ahead service

speed or 7 knots, whichever is the greater.

(b) Vessels that have a steering gear with two electric motor driven power units must be arranged so that one power unit is supplied by one feeder and the other power unit is supplied by the other feeder.

(c) Each steering gear feeder circuit must be separated as widely as practicable from the other.

(d) Each feeder circuit must have a disconnect switch in the steering gear room.

(e) Each feeder circuit must have a current-carrying capacity of—

- (1) 125 percent of the full load current rating of the electric steering gear motor or power unit; and
- (2) 100 percent of the normal current of one steering control system including any associated motors.

§ 111.93-9 Steering control systems.

(a) Each steering power unit must have at least one steering control system.

(b) Each steering control system must be capable of being operated from the wheelhouse, except for an alternative steering station control system provided as described by § 58.25-50 of this chapter.

(c) Each steering control system on vessels of 500 gross tons and above must be arranged so that each steering gear power unit can be controlled in the steering gear room.

(d) The steering control system for a steering power system must be separated as widely as practicable from each other steering control system and each steering power system that it does not control.

(e) Each wheelhouse steering control system must have a switch in the wheelhouse that is arranged in such a way that one action of the switch's handle automatically puts into operation a complete steering control system and the associated steering power unit.

(f) If there is more than one steering control system, the switch required by paragraph (e) of this section must be—

- (1) Operated by one handle;
- (2) Arranged so that not more than one steering control system and its associated steering power system can be energized from the wheelhouse at any one time;
- (3) Arranged so that the handle passes through an "off" position when transferring from one steering control system to another; and
- (4) Arranged so that the switches for each system are in separate enclosures or separated by fire-resistant barriers.

(g) Each steering control system must receive its power from the feeder circuit for its steering power system in the steering gear room.

(h) Each steering control system must have a switch that—

- (1) Is in the steering gear room; and
- (2) Disconnects the steering control system from its power source.

(i) Each motor controller for a steering gear must—

- (1) Be in the steering gear room; and
- (2) Have low voltage release.

(j) A means to start and stop each motor for a steering gear must be in the steering gear room.

§ 111.93-11 Overcurrent protection for steering systems.

(a) *Feeder circuits.* Each steering feeder circuit must be protected by a circuit breaker that is on the switchboard from which it is supplied and has an instantaneous trip set at a current of at least—

(1) 300 percent and not more than 375 percent of the rated full-load current of one steering gear main motor for a direct-current steering gear motor; and

(2) 175 percent and not more than 200 percent of the locked-rotor current of one steering gear main motor for an alternating-current steering gear motor.

(b) *No other protection.* A steering feeder circuit must not have any overcurrent protection, except that required under paragraph (a).

(c) *Motor overloads.* A main steering gear motor and a motor for a steering control system must not be protected by an overload protective device. The motor must have a device that operates an audible and visual alarm at the main machinery control station if there is an overload that would cause overheating of the motor.

(d) *Short-circuit protection.* Each control circuit of a motor controller, each steering control system, and each indicating and alarm system must have—

(1) Short-circuit protection that is instantaneous and rated at 400 to 500 percent of—

- (i) The current-carrying capacity of the conductor; or
- (ii) The normal load of the system; and

(2) No other overcurrent protection.

(e) *Protection of steering control systems.* The short-circuit protective device for each steering control system must be—

- (1) In the steering gear room; and
- (2) In the control circuit just after the steering control system disconnect switch.

§ 111.93-13 Indicating and alarm systems for steering installations.

(a) Visual and audible alarms must activate in the wheelhouse and at the main machinery control station upon low oil level of each oil reservoir of a hydraulic power-operated steering system.

(b) Visual and audible alarms must activate in the wheelhouse upon—

- (1) Failure of the electrical power supply to any steering gear control system; and
- (2) Failure of the power supply to any steering gear power unit.

(c) Visual and audible alarms must activate in the machinery space upon—

- (1) Failure of any phase of a three phase supply; and
- (2) Overload that would cause overheating of the motor.

(d) Each steering gear power motor and each auxiliary motor for control of the rudder must have a pilot light that lights in the wheelhouse and machinery space when the motor is energized.

(e) The audible alarms required by this section must not be sounded by the same device unless the visual alarms indicate the particular failure.

Note.—Where size or configuration of the vessel will not allow all of the steering gear room equipment to be located in a steering gear room, a single alternative location adjacent to the steering gear room may be provided for the equipment which cannot be located in the steering gear room.

Subpart 111.95—Electric Power-Operated Boat Winches

§ 111.95-1 Applicability.

(a) The electric installation of each electric power-operated boat winch must meet the requirements in this subpart, except that limit switches must be adapted to the installation if there are no gravity davits.

(b) The provisions of this subpart supplement the requirements of § 33.10-5 and Subparts 75.30, 94.35, and 160.015 of this chapter.

§ 111.95-3 General requirements.

(a) Each switch and motor controller must be designed to prevent corrosion of its working parts. Each structural part, such as an enclosing case, if not made of corrosion-resistant materials, must have a corrosion-resistant finish.

(b) Insulating material must have low water absorption and the effect of such water absorption upon the dielectric properties consistent with the other necessary characteristics.

(c) If a gasket is used for a water seal between parts of an assembly, the gasket must be fixed to prevent its falling out or becoming loose when the unit is disassembled.

(d) A hole in a wall of an equipment housing for the purposes of providing means for the attachment of a part on its interior or for securing a cover or similar device must not penetrate the total thickness of the housing wall.

(e) Each totally enclosed unit must have a valve, or at least one hole closed by a ¼-inch pipe plug. The valve or hole must be at the bottom of the enclosure or as near the bottom as practicable.

(f) Each main line emergency disconnect switch, if accessible to an unauthorized person, must have a means to lock the switch in the open-circuit position with a padlock or its equivalent. The switch must not lock in the closed-circuit position.

§ 111.95-5 Detail construction requirements.

(a) *Enclosures.* Each enclosure for a motor controller or switching device must be watertight if in the weather.

(b) *Electrical clearances.* The creepage and air clearance distance between live parts of different polarity of motor controllers, master switches, and control circuit limit switches must be at least equal to the values in Table 111.95-5(b). The electrical clearances for power circuit limit switches and main line emergency disconnect switches must meet Subpart 111.55 of this chapter.

(c) *Motors.* Motors must be waterproof or watertight.

TABLE 111.95—MINIMUM SPACINGS IN INCHES (MILLIMETERS)

Location	Potential in volts		
	0 to 150	151 to 300	301 to 600
Between any uninsulated live part and an uninsulated live part of opposite polarity, an uninsulated grounded part other than the enclosure, or an exposed metal part:			
Through air.....	½ (6.4)	¾ (7.9)	¾ (9.5)
Over surface.....	¾ (12.7)	¾ (15.9)	¾ (19.0)
Between any uninsulated live part and the walls of a metal enclosure, including fittings for cable entrance:			
Through air.....	½ (12.7)	¾ (12.7)	¾ (12.7)
Over surface.....	¾ (19.0)	¾ (19.0)	¾ (19.0)

§ 111.95-7 Wiring of boat winch components.

(a) If the motor controller of a boat winch power unit is next to the winch, the main line emergency switch must disconnect all parts of the boat winch power unit, including the motor controller and limit switches, from all sources of potential. Other power circuit switches must be connected in series with the main line emergency switch

and must be ahead of the motor controller. The main line emergency switch must be the motor and controller disconnect required by Subpart 111.70 and must have a horsepower rating of at least that of the winch motor.

(b) If the motor controller of a boat winch power unit is remote from the winch, there must be a switch at the controller that can disconnect the entire winch electric installation from all sources of potential. The switch must be in series with and on the supply side of the main line emergency switch.

(c) Each davit arm limit switch, whether connected in the power circuit or in the control circuit, must disconnect all ungrounded conductors of the circuit controlled.

(d) If one motor is used with two winches, there must be a main line emergency switch, a clutch interlock switch, and a master switch for each winch, except that a single main line emergency switch located as required by paragraph (e) of this section may be used for both winches. The main line emergency switches must be connected, in series, ahead of the motor controller. The master switches must be connected in parallel and each, in series, with the corresponding clutch interlock switch for that winch. Each clutch interlock switch must open the circuit to its master switch, except when the power unit is clutched to the associated winch. There must be a means to prevent the power unit from being clutched to both winches simultaneously.

(e) The main line emergency disconnect switch must be adjacent to the master switch, within reach of the winch operator, accessible to the person in charge of the boat stowage, and for gravity davit installations, in a position from which the movement of boat davit arms can be observed as they approach the final stowed position.

Note.—Typical boat winch wiring diagrams and arrangement drawings are shown in Figures 111.95-7(e)(1) through 111.95-7(e)(5). The arrangement of the equipment shown is diagrammatical. The fact that some show direct-current motors and some show alternating-current motors has no particular significance.

BILLING CODE 4910-14-M

TYPICAL ELEMENTARY WIRING DIAGRAM AND ARRANGEMENT PLAN OF GRAVITY DAVIT AND BOAT WINCH EMPLOYING DOUBLE-POLE LIMIT SWITCHES AND MAIN LINE EMERGENCY SWITCH IN ACCORDANCE WITH SUBPART 160.015, SUBCHAPTER Q OF THIS CHAPTER

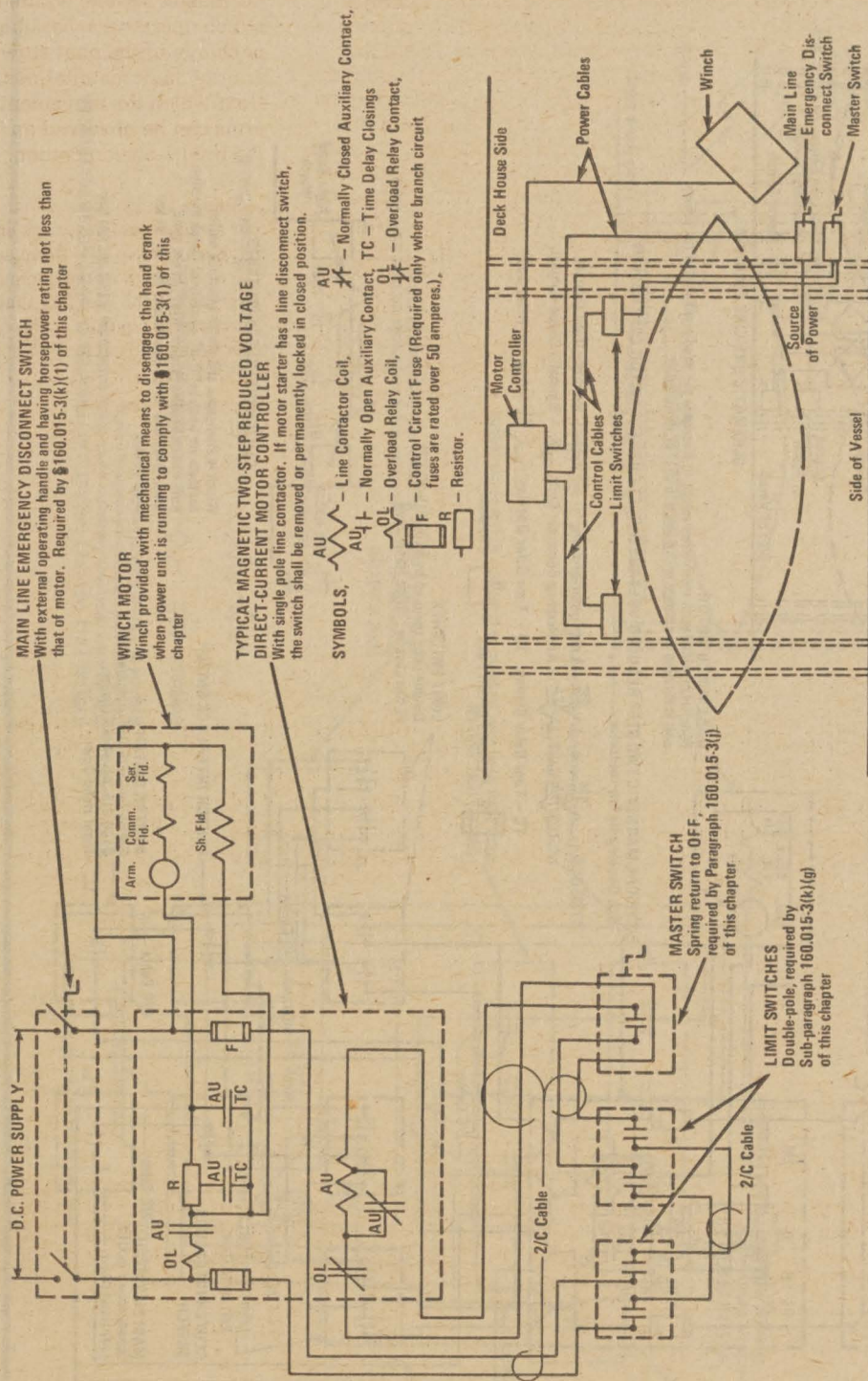


Figure 111.95-7(e)(1)

TYPICAL ELEMENTARY WIRING DIAGRAM AND ARRANGEMENT PLAN OF GRAVITY DAVIT AND BOAT WINCH EMPLOYING POWER LIMIT SWITCHES AND COMBINED STARTER AND MAIN LINE EMERGENCY DISCONNECT SWITCH IN ACCORDANCE WITH SUBPART 160.015, SUBCHAPTER Q

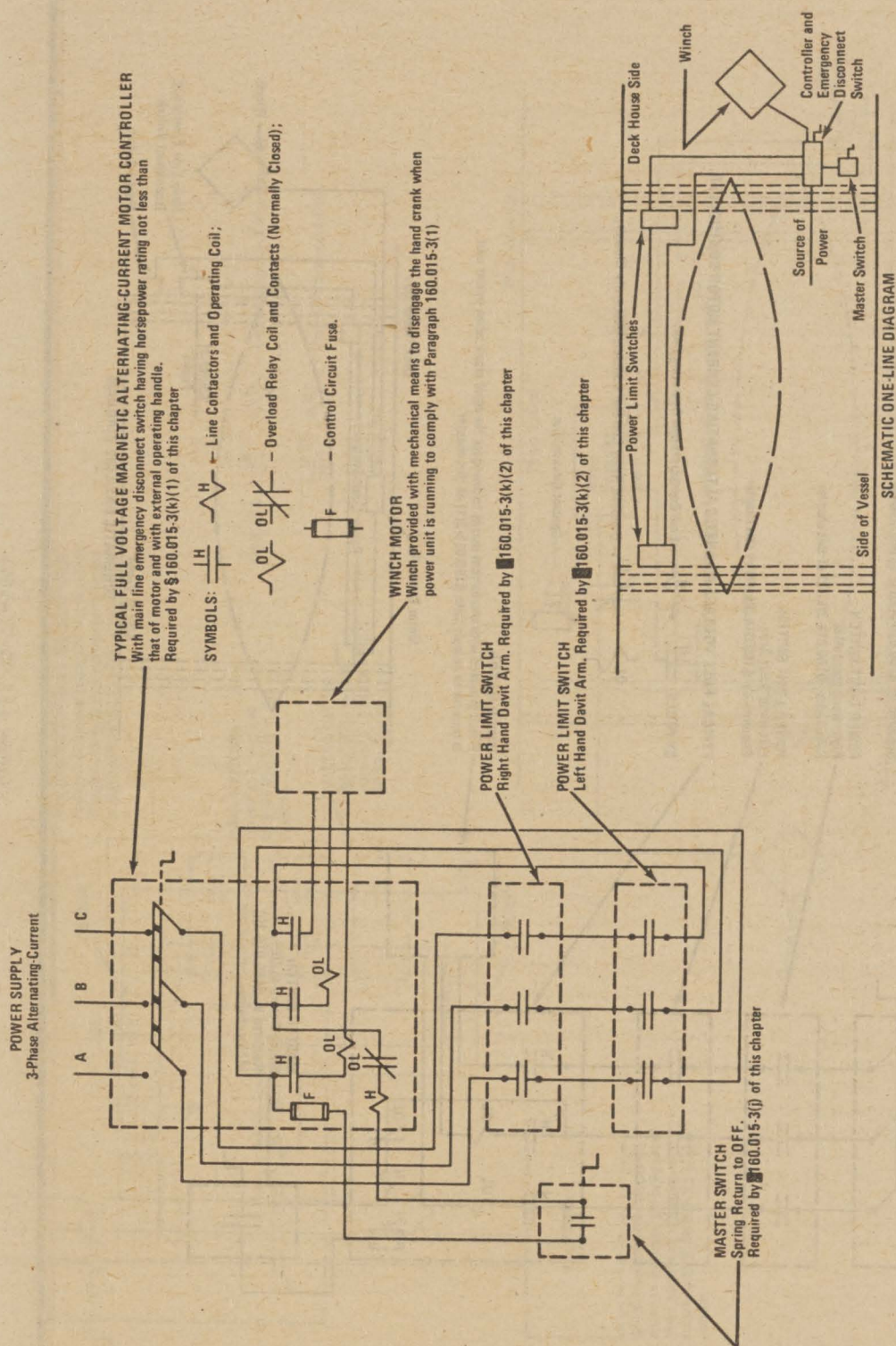


Figure 111.95-7(e)(3)

TYPICAL ELEMENTARY WIRING DIAGRAM AND ARRANGEMENT PLAN OF GRAVITY DAVIT AND BOAT WINCH EMPLOYING MAIN LINE EMERGENCY SWITCH AND POWER LIMIT SWITCHES IN ACCORDANCE WITH SUBPART 160.015, SUBCHAPTER Q

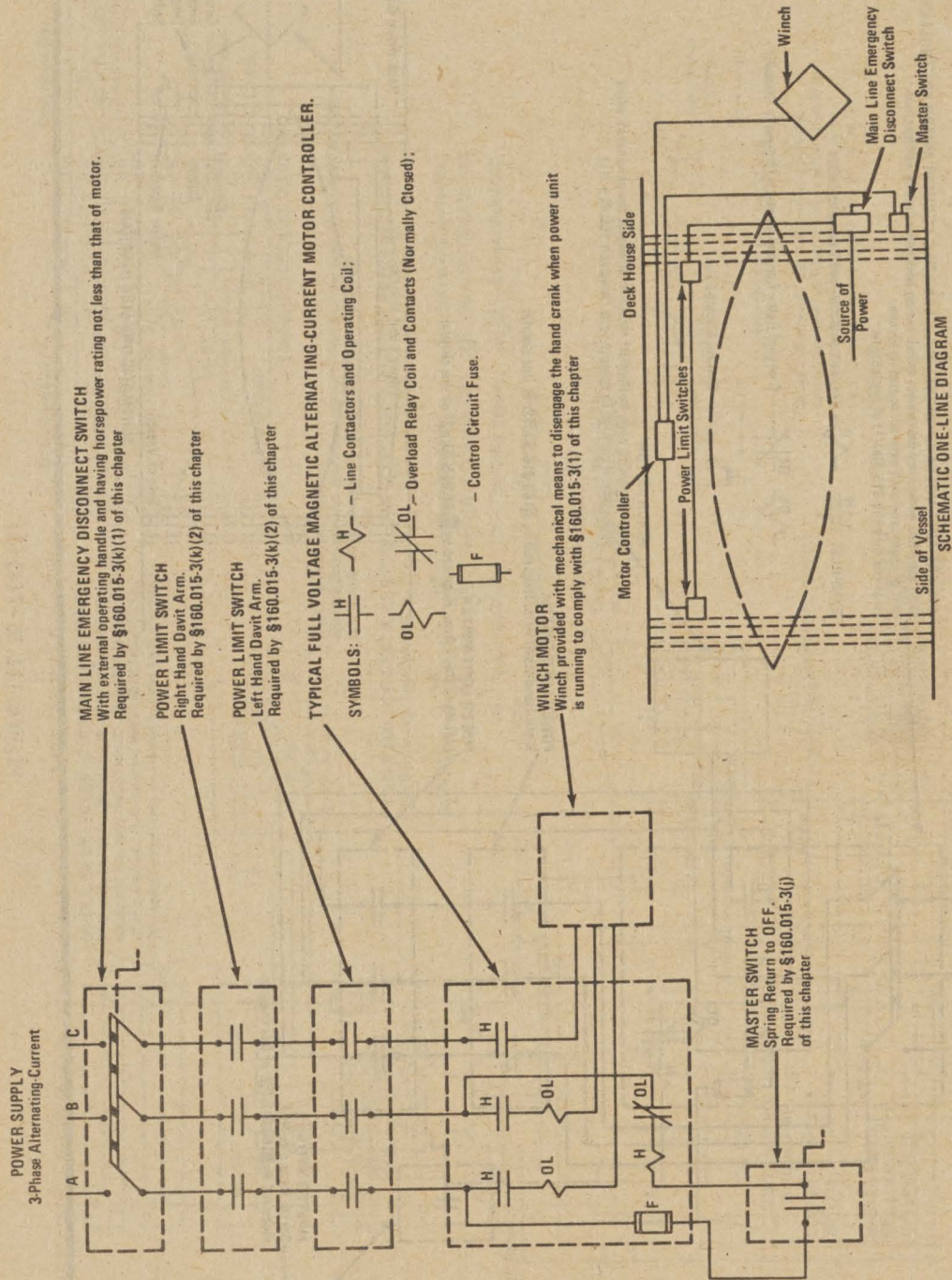


Figure 111.95-7(e)(4)

TYPICAL ELEMENTARY WIRING DIAGRAM AND ARRANGEMENT PLAN OF GRAVITY DAVIT AND BOAT WINCH EMPLOYING DOUBLE-POLE LIMIT SWITCHES AND COMBINED STARTER AND MAIN LINE EMERGENCY DISCONNECT SWITCH IN ACCORDANCE WITH SUBPART 160.015, SUBCHAPTER Q OF THIS CHAPTER

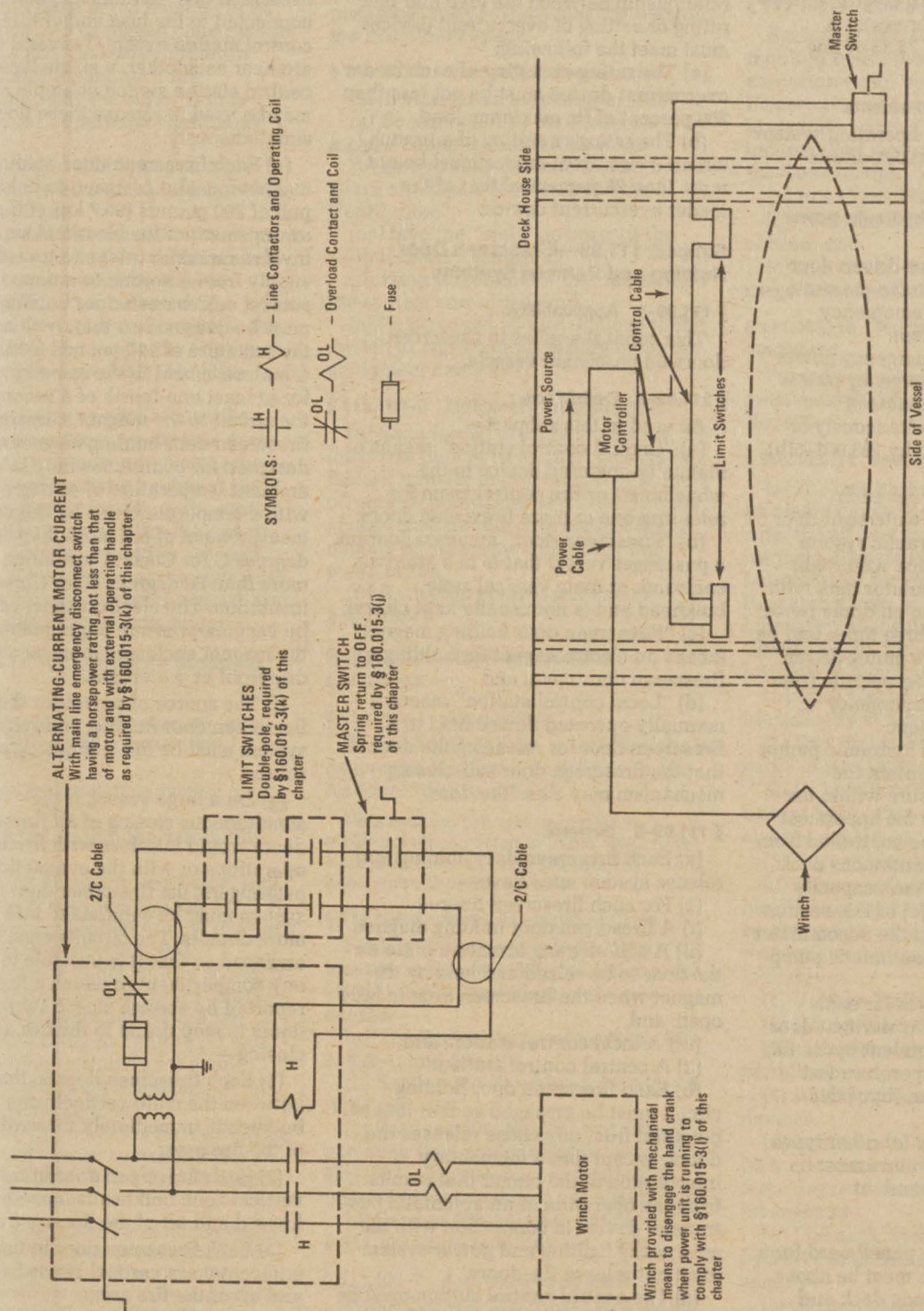


Figure 111.95-7(e)(5)

Subpart 111.97—Electric Power-Operated Watertight Door Systems

§ 111.97-1 Applicability.

This subpart applies to electric power-operated watertight door systems required under Subpart 73.35 of this chapter.

§ 111.97-3 General requirements.

Each watertight door operating system must meet Subpart § 163.001 of this chapter.

§ 111.97-5 Electric and hydraulic power supply.

(a) Each electric motor-driven door operating system must have the same source of power as the emergency lighting and power system.

(b) The temporary emergency power source and the final emergency power source must each be capable of operating all doors simultaneously or sequentially as allowed by 163.001-5(b) of this chapter.

(c) The power supply for each hydraulically operated watertight door system that uses a hydraulic system common to more than one watertight door must be an accumulator tank with enough capacity to open all doors twice and to close all doors three times and be supplied by one or more motor-driven hydraulic pumps that can operate from the final source of the emergency lighting and power system.

(d) The motor-driven hydraulic pumps must automatically maintain the accumulator tank pressure within the design limits, be above the uppermost continuous deck, and be controlled from above the uppermost continuous deck.

(e) The accumulator tank capacity required in paragraph (c) of this section must be available when the accumulator tank pressure is at the automatic pump "cut-in" pressure.

(f) The source of power for each hydraulically operated watertight door system using an independent hydraulic system for each door operator must meet paragraphs (a) and (b) of this section.

(g) The power supply for other types of watertight door operators must be accepted by the Commandant.

§ 111.97-7 Distribution.

(a) Each distribution panelboard for a watertight door system must be above the uppermost continuous deck and must have means for locking.

(b) Each feeder supplying a watertight door operating system must be above the uppermost continuous deck.

(c) Each watertight door operating system must have a separate branch circuit.

§ 111.97-9 Overcurrent protection.

Overcurrent devices must be arranged to isolate a fault with as little disruption of the system as possible. The relationship between the load and the rating or setting of overcurrent devices must meet the following:

(a) The rating or setting of each feeder overcurrent device must be not less than 200 percent of its maximum load.

(b) The rating or setting of a branch circuit overcurrent device must be not more than 25 percent of that of the feeder overcurrent device.

Subpart 111.99—Firescreen Door Holding and Release Systems

§ 111.99-1 Applicability.

This subpart applies to firescreen doors on passenger vessels.

§ 111.99-3 Definitions.

As used in this subpart—

(a) "Central control station" means a manually-operated device in the wheelhouse or fire control room for releasing one or more firescreen doors;

(b) "Firescreen door" means a door on a passenger vessel that is in a stairway enclosure or main vertical zone bulkhead and is not usually kept closed;

(c) "Firescreen door holding magnet" means an electromagnet for holding a firescreen door open; and

(d) "Local control station" means a manually-operated device next to a firescreen door for releasing the door so that the firescreen door self-closing mechanism may close the door.

§ 111.99-5 General.

(a) Each firescreen door holding and release system must have—

(1) For each firescreen door—

(i) A firescreen door holding magnet;

(ii) A self-aligning armature plate on the door to be seized and held by the magnet when the firescreen door is fully open; and

(iii) A local control station; and

(2) A central control station.

(b) Each firescreen door holding circuit must be arranged so that loss of potential from any cause releases the doors, except that a momentary interruption of the circuit that results from the operation of an automatic bus-transfer device in connection with the emergency lighting and power system must not release the doors.

(c) The central control station must be an enclosed switch, circuit breaker, or magnetic contactor of a rating large enough to interrupt the connected load. The switching unit must be an externally operable, maintaining type.

(d) The local control station must be an enclosed, externally operable, fused

switch having a rating of not less than 10-T amperes and 125 volts, and may be either the momentary contact type or the maintaining contact type. A single firescreen door holding magnet must be connected to the fuse end of this local control station except if several doors are near each other, a single local control station switch of ample rating may be used to release these doors simultaneously.

(e) Each firescreen door holding magnet must be designed to hold with a pull of 200 pounds (90.7 kg). If the arrangement of the electrical supply involves transfer relays to transfer the supply from a normal to a temporary source, a firescreen door holding magnet must be designed so that, with a pull on the armature of 110 pounds (50 kg), the armature is held in the sealed position for at least one-fourth of a second after the circuit to the magnet is opened. The firescreen door holding magnet must be designed for continuous duty in an ambient temperature of 40 degrees C with a temperature rise by thermometer measurement of not more than 55 degrees C for Class A insulation and not more than 80 degrees C for Class B insulation. The electromagnet coil must be vacuum-pressure impregnated and the magnet enclosure must be either drip-proof or watertight.

(f) The source of power for the firescreen door holding and release system must be the emergency power source.

(g) On a large vessel, if the simultaneous closing of all firescreen doors would interfere with firefighting operations or with the evacuation of passengers, the firescreen door release system must be subdivided into two or more circuits. The circuits must be arranged so that it is possible to isolate any compartment in which a fire is reported by enough closed firescreen doors to stop drafts to the fire area by closing—

(1) Each firescreen door in the area between the main vertical zone bulkheads immediately forward and aft of the fire area;

(2) Each firescreen door in the main vertical zone bulkheads immediately forward and aft of the fire area; and

(3) Each firescreen door in the adjacent main vertical zones forward and aft of the fire area.

Subpart 111.101—Submersible Motor-Driven Bilge Pumps

§ 111.101-1 Applicability.

This subpart applies to each submersible motor-driven bilge pump

required on certain vessels under § 56.50-55(a)(2)(i) of this chapter.

§ 111.101-3 General requirements.

(a) Each electric motor driving a submersible bilge pump must be in an open end air bell of rugged construction and be of a size that does not allow water to enter the motor if the compartment that the motor is in is flooded to the uppermost continuous deck.

(b) The motor, if of the open type, must be protected from splashing water from the bottom.

(c) The cable to each motor must enter through the open bottom of the air bell.

(d) Each motor must be able to operate continuously at rated load under any condition, dry or with water in the air bell at any level up to the maximum allowed under paragraph (a) of this section.

(e) Each motor controller must be above the uppermost continuous deck. There must be a master switch at the controller and a master switch at the motor. The master switch at the motor must be disconnected from the circuit when the motor is started or stopped from the master switch at the controller.

(f) Each motor must be energized from the final emergency power source.

Subpart 111.103—Remote Stopping Systems

§ 111.103-1 Power ventilation systems except machinery space ventilation systems.

Each power ventilation system must have—

(a) A control to stop the ventilation that is—

(1) Outside the space ventilated; and

(2) Grouped with the controls for every power ventilation system to which this section is applicable; and

(b) In addition to the control required by paragraph (a), a stop control that is—

(1) As far as practicable from the control required by paragraph (a) and grouped with the controls for every power ventilation system to which this section is applicable; or

(2) The circuit breakers for ventilation grouped on the main switchboard and marked, "In Case of Fire Trip to Stop Ventilation."

Note.—The requirements of this section do not apply to closed ventilation systems for motors or generators, diffuser fans for refrigerated spaces, room circulating fans, or exhaust fans for private toilets of an electrical rating comparable to that of a room circulating fan.

§ 111.103-3 Machinery space ventilation.

(a) Each machinery space ventilation system must have two controls to stop

the ventilation, one of which may be the supply circuit breaker.

(b) The controls required in paragraph (a) of this section must be grouped so that they are operable from two positions, one of which must be outside the machinery space.

§ 111.103-7 Ventilation stop stations.

Each ventilation stop station must—

(a) Be protected by an enclosure with a glass-paneled door on the front;

(b) Be marked, "In Case of Fire Break Glass and Operate Switch to Stop Ventilation;"

(c) Have the "stop" position of the switch clearly identified;

(d) Have a nameplate that identifies the system controlled; and

(e) Be arranged so that damage to the switch or cable automatically stops the equipment controlled.

§ 111.103-9 Machinery stop stations.

(a) Each forced draft fan, induced draft fan, blower of an inert gas system, fuel oil transfer pump, fuel oil unit, fuel oil service pump, and any other fuel oil pumps must have a stop control that is outside of the space containing the pump or fan.

(b) Each stop control must meet § 111.103-7.

Subpart 111.105—Hazardous Locations

§ 111.105-1 Applicability.

This subpart applies to installations in hazardous locations, as defined in the National Electrical Code.

Note.—Chemicals and materials in addition to those listed in Table 500-2 of the National Electrical Code are listed in Subchapter O of this chapter.

§ 111.105-5 National Electrical Code.

Each installation in a hazardous location must meet Articles 500 through 503 of the National Electrical Code, except—

(a) The first sentence of Sections 501-1, 502-1, and 503-1;

(b) Section 501-4, which § 111.105-15 replaces;

(c) Sections 502-14(a)(1) and 503-12 and each final sentence of Sections 502-4(a), 502-4(b), 503-3(a), and 503-3(b), which are replaced by § 111.105-17; and

(d) Section 502-14(a)(2), which § 111.105-35(d) modifies.

§ 111.105-7 Approved equipment.

If the National Electrical Code states that an item of electrical equipment is to be "approved," that item must be—

(a) One that is listed by Underwriters Laboratories Inc., Factory Mutual Research Corp., or other independent laboratory recognized by the

Commandant, for use in the hazardous location in which it is located; or

(b) Purged and pressurized equipment that meets NFPA No. 496.

§ 111.105-9 Explosion-proof equipment.

Each item of electric equipment that is required under this subpart to be explosion-proof must be listed by Underwriters Laboratories Inc., Factory Mutual Research Corp., or other independent laboratory recognized by the Commandant, for use—

(a) In a Class I Division 1 location;

(b) With the Group of the cargo carried; and

(c) In a Group B atmosphere, if the cargo is inorganic acid on a tankship.

§ 111.105-10 Purged and pressurized equipment.

Purged and pressurized equipment must meet the requirements of NFPA No. 496.

§ 111.105-11 Intrinsically safe systems.

(a) If a rule in this subpart states that an electric system is to be intrinsically safe, the system must be listed as intrinsically safe by Underwriters Laboratories Inc., Factory Mutual Research Corp., or other independent laboratory recognized by the Commandant, for use in the hazardous location in which it is located.

(b) Each electric cable for an intrinsically safe system must—

(1) Be 2 inches (50 mm) or more from cable of non-intrinsically safe circuits;

(2) Be partitioned by a grounded metal barrier from other non-intrinsically safe electric cables; or

(3) Be a shielded cable.

(c) The manufacturer must submit installation instructions and restrictions on the approved system. Typical restrictions that must be specified include—

(1) Voltage limitations;

(2) Allowable cable parameters;

(3) Maximum length of cable permitted; and

(4) Ability of system to accept passive devices.

(d) Intrinsically safe systems must not be interconnected unless the systems were approved with the particular arrangement.

(e) The deck wiring diagram required by Part 110 of this subchapter must specify—

(1) System identification as to manufacturer's model number;

(2) System use;

(3) Cable parameter including length and type of cable;

(4) Wiring and equipment locations; and

(5) Installation details.

§ 111.105-15 Wiring methods for Class I hazardous locations.

(a) Cable for a Class I, Division 1, hazardous locations, and locations designated in §§ 111.105-31 and 111.105-32, except as provided in paragraphs (b) and (c) of this section must—

(1) Be armored or MI type cable; and
(2) Meet Subpart 111.60 of this chapter.

(b) Cable for use in an intrinsically safe system must meet—

(1) Subpart 111.60 and § 111.105-11(b) of this chapter; and

(2) The recommendations of ISA RP 12.6 "Installation of Intrinsically Safe Instrument Systems in Class I Hazardous Locations," except Appendix A.1.

(c) Flexible cords and cables must meet § 111.60-13 of this chapter.

(d) Each explosion-proof enclosure that is in a Class I location must have an approved explosion-proof seal fitting that is—

(1) Treated directly into the enclosure; or

(2) Connected to the enclosure by a piece of approved explosion-proof rigid metal conduit that is 18 inches (460 mm) or less in length.

§ 111.105-17 Wiring methods for Class II and Class III hazardous locations.

(a) Cable for a Class II or III hazardous location must—

(1) Be armored or MI type cable if installed in a Division 1 hazardous location; and

(2) Meet Subpart 111.60 of this part.

(b) Each cable entrance to electric equipment in Class II and Class III hazardous locations must have a dust-tight terminal tube.

§ 111.105-19 Switches.

Each explosion-proof switch and each switch controlling explosion-proof equipment must have a pole for each ungrounded circuit conductor.

§ 111.105-21 Fans.

Each fan for ventilation of a hazardous location must be a nonsparking fan.

§ 111.105-23 Fan motors.

Each electric motor for a fan that ventilates a hazardous location must be listed by Underwriters Laboratories, Inc., Factory Mutual Research Corp., or other independent laboratory recognized by the Commandant, for the same class, division, and group as the ventilated location or be—

(a) Outside the ventilation duct;
(b) 10 ft. (3 m) from the ventilation duct termination; and

(c) In a non-hazardous location.

§ 111.105-25 Ventilation ducts.

For the purpose of this subpart, a ventilation duct that ventilates a hazardous space has the classification of that space.

§ 111.105-27 Belt drives.

Each belt drive in a hazardous location must have—

(a) A conductive belt; and
(b) Pulleys, shafts, and driving equipment grounded to meet NFPA No. 77.

§ 111.105-29 Combustible liquid cargo carriers.

Each vessel that carries combustible liquid cargo with a closed-cup flashpoint of 60 degrees C (140 degrees F) or higher must have—

(a) Only intrinsically safe electric systems in cargo tanks; and

(b) No storage battery in any cargo handling room.

§ 111.105-31 Flammable or combustible cargo with a flashpoint below 60 degrees C (140 degrees F), liquid sulphur carriers, and inorganic acid tankships.

(a) *Applicability.* Each vessel that carries combustible or flammable cargo with a closed-cup flashpoint lower than 60 degrees C (140 degrees F) or liquid sulphur cargo, or a tankship that carries inorganic acid cargo must meet the requirements of this section, except—

(1) A vessel carrying bulk liquefied flammable gases as a cargo, cargo residue, or vapor which must meet the requirements of § 111.105-32; and

(2) A vessel carrying carbon disulfide must have only intrinsically safe electric equipment in the locations listed in paragraphs (e) through (l) of this section.

(b) *Cable location.* Electric cable must be as close as practicable to the centerline and must be away from cargo tank openings.

(c) *Lighting circuits.* An enclosed hazardous space that has explosionproof lighting fixtures must—

(1) Have at least two lighting branch circuits;

(2) Be arranged so that there is light for relamping any deenergized lighting circuit; and

(3) Not have the switch within the space for those spaces containing explosionproof lighting fixtures under paragraphs (g), (i) and (j) of this section.

(d) *Submerged cargo pump motors.* If a submerged cargo pump motor is in a cargo tank—

(1) Low liquid level, motor current, or pump discharge pressure must automatically shutdown power to the motor if the pump loses suction;

(2) An audible and visual alarm must be actuated by the shutdown of the motor; and

(3) There must be a lockable circuit breaker or lockable switch that disconnects power to the motor.

(e) *Cargo tanks.* A cargo tank must not contain any electric equipment except—

(1) Intrinsically safe equipment;
(2) Submerged cargo pumps; and
(3) Supply cable for submerged cargo pumps.

(f) *Cargo handling rooms.* A cargo handling room must not have any electric cable or other electric equipment, except—

(1) Intrinsically safe equipment;
(2) Explosionproof lighting fixtures;
(3) Cables supplying intrinsically safe equipment in the cargo handling room; and

(4) Armored or MI type cables that supply explosionproof lighting fixtures that are in the cargo handling room.

(g) *Lighting of cargo handling rooms.* Lighting for a cargo handling room except a cargo handling room under paragraph (h) of this section, must be lighted through fixed glass lenses in the bulkhead or overhead. Each fixed glass lens must be wire-inserted glass that is at least .025 inches (6.35 mm) thick and arranged to maintain the watertight and gastight integrity of the structure. The fixed glass lens may form a part of a listing fixture if the following are met:

(i) There is no access to the interior of the fixture from the cargo handling room.

(ii) The fixture is vented to the engineroom or a similar nonhazardous area.

(iii) The fixture is wired from outside the cargo handling room.

(iv) The temperature on the cargo handling room surface of the glass lens, based on an ambient temperature of 40 degrees C, is not higher than 180 degrees C.

(h) A cargo handling room which precludes the lighting arrangement of paragraph (g) of this section, or where the lighting arrangement of paragraph (g) of the section does not give the required light, must have explosionproof lighting fixtures.

(i) *Enclosed spaces.* An enclosed space that is immediately above, below, or next to a cargo tank must not contain any electric equipment except equipment allowed for cargo handling rooms in paragraphs (f) and (g), and—

(1) Through runs of armored or MI type cable; and
(2) Watertight enclosures with bolted and gasketed covers containing only—
(i) Depth sounding devices;

(ii) Log devices; and

(iii) Impressed-current cathodic protection system electrodes.

(j) *Cargo hose stowage space.* A cargo hose stowage space must not have any electrical equipment except explosionproof lighting fixtures and through runs of armored or MI type cable.

(k) *Cargo piping in a space.* A space that has cargo piping must not have any electrical equipment except explosionproof lighting fixtures and through runs of armored or MI type cable.

(l) *Weather locations.* A location in the weather, except on a tankship carrying inorganic acid, must have only explosionproof electric equipment, purged and pressurized equipment, and through runs of armored or MI type cable if it is—

- (1) Within 10 feet (3 m) of—
 - (i) A cargo tank vent outlet;
 - (ii) A cargo tank ullage opening;
 - (iii) A cargo pipe flange;
 - (iv) A cargo valve;
 - (v) A cargo handling room entrance;

or

(vi) A cargo handling room ventilation opening; or

(2) On a tankship and on the open deck over the cargo area and 10 feet (3 m) forward and aft of the cargo area on the open deck and up to 8 feet (2.4 m) above the deck.

(m) *Other spaces.* Except for those spaces listed in paragraphs (e) through (k), a space that has a direct opening to any space listed in paragraphs (e) through (l) must have only the electric installations that are allowed for the space to which it opens.

§ 111.105-32 Bulk liquefied gas and ammonia carriers.

(a) Each vessel that carries bulk liquefied flammable gases or ammonia as a cargo, cargo residue, or vapor must meet the requirements of this section.

(b) As used in this section:

(1) The terms "gas-safe" and "gas-dangerous" spaces are used as defined in § 154.3 of this chapter.

(2) The term "gas-dangerous" does not include the weather deck of an ammonia carrier.

(c) Each submerged cargo pump motor installation must be approved by the Commandant.

(d) Electrical equipment must not be installed in a gas-dangerous space or zone, except—

- (1) Intrinsically safe electrical equipment and wiring, and
- (2) Other equipment as allowed in this section.

(e) A submerged cargo pump motor, if installed in a tank, must meet the following requirements:

(1) Low liquid level, motor current, or pump discharge pressure must automatically shut down power to the pump motor if the pump loses suction.

(2) There must be an audible and visual alarm at the cargo-control station that activates if the motor shuts down under the requirements of subparagraph (1) of this paragraph.

(3) There must be a lockable circuit breaker or lockable switch that disconnects the power to the motor.

(f) Electrical equipment must not be installed in a hold space that has a tank that is not required to have a secondary barrier under § 154.459 of this chapter, except—

- (1) Through runs of armored or MI type cable;
- (2) Explosionproof lighting fixtures;
- (3) Depth sounding devices in gastight enclosures;

(4) Log devices in gastight enclosures;

(5) Impressed current cathodic protection system electrodes in gastight enclosures; and

(6) Armored or MI type cable for a submerged cargo pump motor.

(g) Electrical equipment must not be installed in a space that is separated by a gastight steel boundary from a hold space that has a tank that must have a secondary barrier under the requirements of § 154.459 of this chapter, except—

- (1) Through runs of armored or MI type cable;
- (2) Explosionproof lighting fixtures;
- (3) Depth sounding devices in gastight enclosures;

(4) Log devices in gastight enclosures;

(5) Impressed current cathodic protection system electrodes in gastight enclosures;

(6) Explosionproof motors that operate cargo system valves or ballast system valves;

(7) Explosionproof bells for general alarm systems; and

(8) Armored or MI type cable for a submerged cargo pump motor.

(h) A cargo-handling room must not have any installed electrical equipment, except explosionproof lighting fixtures.

(i) A space for cargo hose storage or a space that has cargo piping must not have any installed electrical equipment, except—

- (1) Explosionproof lighting fixtures; and
- (2) Through runs of armored or MI type cable.

(j) A gas dangerous zone on the open deck must not have any installed electrical equipment, except—

(1) Explosionproof equipment that is necessary for the operation of the vessel; and

(2) Through runs of armored or MI type cable.

(k) A space, except those named in paragraphs (f) through (i) of this section, that has a direct opening to gas-dangerous spaces or zones must have no electrical equipment except as allowed in the gas-dangerous space or zone.

(l) Each gas-dangerous space that has lighting fixtures must have at least two branch circuits for lighting.

(m) Each switch and each overcurrent protective device for any lighting circuit that is in a gas-dangerous space must open all conductors of the circuit simultaneously.

(n) Each switch and each overcurrent protective device for lighting in a gas-dangerous space must be in a gas-safe space.

§ 111.105-33 Mobile offshore drilling units.

(a) *Applicability.* This section applies to each mobile offshore drilling unit.

(b) *Definitions.* As used in this section—

(1) "Enclosed spaces" are locations delineated by floors, bulkheads, or decks which may have doors or windows.

(2) "Semi-enclosed spaces" are locations where natural conditions of ventilation are notably different from those on open deck due to the presence of structures such as roofs, windbreaks, and bulkheads which are so arranged that dispersion of gas may not occur.

(c) The internal space of each pressure vessel, tank, and pipe for drilling mud and for gas venting must have only intrinsically safe electric equipment.

(d) The following are Class I, Division 1 locations:

(1) An enclosed space that contains any part of the mud circulating system that has an opening into the space and is between the well and final degassing discharge.

(2) An enclosed or semi-enclosed location that is below the drill floor and contains a possible source of gas release such as the top of a drilling nipple.

(3) An enclosed space that is on the drill floor and is not separated by a solid, gas-tight floor from the spaces specified in paragraph (d)(2) of this section.

(4) A space that would normally be considered a Division 2 location under paragraph (e) of this section but where combustible or flammable gases might accumulate. This could include pits, ducts, and similar structures

downstream of the final degassing discharge.

(5) A location in the weather or a semi-enclosed location, except as provided in paragraph (d)(2) of this section, that is within 5 feet (1.5 m) of the boundary of any—

(i) Equipment or opening specified in paragraph (d)(1) of this section;

(ii) Ventilation outlet, access, or other opening to a Class I, Division 1 space; or

(iii) Gas vent outlet.

(6) Except as provided in paragraph (f) of this section, an enclosed space that has an opening into a Class I, Division 1 location.

(e) The following are Class I, Division 2 locations:

(1) An enclosed space that has any open portion of the mud circulating system from the final degassing discharge to the mud suction connection at the mud pit.

(2) A location in the weather that is—

(i) Within the boundaries of the drilling derrick up to a height of 10 feet (3m) above the drill floor;

(ii) Below the drill floor and within a radius of 10 feet (3m) of a possible source of release, such as the top of a drilling nipple; or

(iii) Within 5 feet (1.5m) of the boundaries of any ventilation outlet, access, or other opening to a Class I, Division 2 space.

(3) A location that is—

(i) Within 5 feet (1.5m) of a semi-enclosed Class I, Division 1 location indicated in paragraph (d)(2) of this section; or

(ii) Within 5 feet (1.5m) of a Class I, Division 1 space indicated in paragraph (d)(5).

(4) A semi-enclosed area that is below and contiguous with the drill floor to the boundaries of the derrick or to the extent of any enclosure which is liable to trap gases.

(5) A semi-enclosed derrick to the extent of its enclosure above the drill floor, or to a height of 10 feet (3m) above the drill floor, whichever is greater.

(6) Except as provided in paragraph (f) of this section, an enclosed space that has an opening into a Class I, Division 2 location.

(f) An enclosed space that has direct access to a Division 1 or Division 2 location is the same division as that location, except—

(1) An enclosed space that has direct access to a Division 1 location is not a hazardous location if—

(i) The access has self-closing gas-tight doors that form an air lock;

(ii) The ventilation causes greater pressure in the space than in the Division 1 location; and

(iii) Loss of ventilation overpressure is alarmed at a manned station;

(2) An enclosed space that has direct access to a Division 1 location can be considered as a Division 2 location if—

(i) The access has a self-closing, gas-tight door that opens into the space and that has no hold-back device;

(ii) Ventilation causes the air to flow with the door open from the space into the Division 1 location; and

(iii) Loss of ventilation is alarmed at a manned control station; and

(3) An enclosed space that has direct access to a Division 2 location is not a hazardous location if—

(i) The access has a self-closing, gas-tight door that opens into the space and that has no hold-back device;

(ii) Ventilation causes the air to flow with the door open from the space into the Division 2 location; and

(iii) Loss of ventilation actuates an alarm at a manned control station.

(g) Electrical equipment and devices installed in spaces made non-hazardous by the methods indicated in paragraph (f) of this section must be limited to essential equipment.

§ 111.105-35 Vessels carrying coal.

(a) The following are Class II, Division 1 locations on a vessel that carries bituminous coal:

(1) The interior of each coal bin and cargo hold.

(2) Each compartment that has a coal transfer point where coal is dropped or dumped.

(3) Each open area within 10 feet (3 m) of a coal transfer point where coal is dropped or dumped.

(b) Each space that has a coal conveyor on a vessel that carries bituminous coal is a Class II, Division 2 space.

(c) Each location listed in paragraphs (a) and (b) is a Class II, Division 1 location on a vessel that carries anthracitic coal.

(d) A space that has a coal conveyor on a vessel that carries bituminous coal must have electrical equipment approved for Class II, Division 2 hazardous locations, except watertight general alarm bells.

§ 111.105-37 Flammable anesthetics.

Each electric installation where a flammable anesthetic is used or stored must meet NFPA No. 56A.

§ 111.105-39 Gasoline or other highly volatile motor fuel carried in vehicles.

(a) *Applicability.* This section applies to spaces that are "specially suitable for vehicles" as defined in §§ 70.10-44 and 90.10-38 of this chapter.

(b) *General requirements.* Electric equipment which is within 18 inches

(460 mm) of the deck must meet Article 501 of the National Electrical Code for Class I, Division 2, Group D locations. Electric equipment which is 18 inches (460 mm) or more above the deck must be totally enclosed or be drip-proof, and protected by guards or screens to prevent escape of sparks or metal particles.

(c) *Loss of ventilation alarm.* Loss of ventilation in a space that is "specially suitable for vehicles" must actuate an audible and visual alarm at a manned location.

§ 111.105-41 Battery rooms.

Each electric installation in a battery room must meet Subpart 111.15 of this chapter.

§ 111.105-43 Paint stowage or mixing spaces.

A space for the stowage or mixing of paint must not have any electric equipment, except—

(a) Intrinsically safe electric equipment approved for a Class I, Division 1, Group D location;

(b) Explosionproof electric equipment approved for a Class I, Division 1, Group D location; or

(c) Through runs of armored or MI type cable.

Subpart 111.107—Industrial Systems

§ 111.107-1 Industrial systems.

(a) A system on a mobile offshore drilling unit that is used only for the industrial function of the unit and meets the National Electrical Code must meet only the following requirements in this subchapter:

(1) The Underwriters Laboratories Inc. standards in § 110.10-1(b)(5) of this subchapter.

(2) The switchgear standards in § 110.10(b)(4) and (b)(8).

(3) Subpart 110.25—Plan Submittal.

(4) Subpart 111.01—General Considerations.

(5) Subpart 111.05—Grounding, Ground Detection, and Grounded Systems.

(6) Subpart 111.105—Hazardous Locations.

(b) Cables that penetrate a deck or bulkhead must—

(1) Be installed in accordance with the requirements of § 111.60-5; and

(2) Meet the flammability test requirements of section 18.13.5 of IEEE Standard No. 45.

PART 112—EMERGENCY LIGHTING AND POWER SYSTEMS**Subpart 112.01—Definitions of Emergency Lighting and Power Systems.**

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- 112.25-1 General.
- 112.25-3 Normal source for emergency loads.
- 112.25-5 Failure of power from the normal source.
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Subpart 112.30—Emergency Systems Having an Automatically Connected Storage Battery as the Sole Emergency Power Source

- 112.30-1 General.
- 112.30-3 Normal source of emergency loads.
- 112.30-5 Transfer of emergency loads.
- 112.30-10 Restoration of normal source potential.

Subpart 112.35—Manually Controlled Emergency Systems Having a Storage Battery or a Diesel Engine or Gas Turbine Driven Generator as the Sole Emergency Power Source

- 112.35-1 General.
- 112.35-3 Normal source for emergency loads.
- 112.35-5 Manually started emergency systems.
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Subpart 112.37—Temporary Emergency Power Source

- 112.37-1 General.

Subpart 112.39—Battery Operated Lanterns Sec.

- 112.39-1 General.
- 112.39-3 Operation.

Subpart 112.40—Alternating-Current Temporary Source of Supply

- 112.40-1 General requirements.

Subpart 112.43—Emergency Lighting Systems.

- 112.43-1 Switches.
- 112.43-3 Controls; general.
- 112.43-5 Controls on island type vessels.
- 112.43-7 Wheelhouse distribution panel.
- 112.43-9 Signaling lights.
- 112.43-11 Illumination for launching operations.
- 112.43-13 Navigation light indicator panel supply.
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Subpart 112.45—Visible Indicators and Test Switch

- 112.45-1 Visible indicators.
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Subpart 112.50—Emergency Diesel and Gas Turbine Engine Driven Generator Sets

- 112.50-1 General.
- 112.50-3 Hydraulic starting.
- 112.50-5 Electric starting.
- 112.50-7 Compressed air starting.

Subpart 112.55—Storage Battery Installation

- 112.55-1 General.
- 112.55-5 Emergency lighting loads.
- 112.55-10 Storage battery charging.
- 112.55-15 Capacity of storage batteries.

Authority: 46 U.S.C. 170, 367, 369, 375, 390b, 391a, 392, 405, 416, 445, 489, 526p; 49 U.S.C. 1655(b); 49 CFR 1.46.

Subpart 112.01—Definitions of Emergency Lighting and Power Systems**§ 112.01-1 Purpose.**

The purpose of this subpart is to define types of emergency lighting and power systems.

§ 112.01-5 Manual emergency lighting and power system.

A manual emergency lighting and power system is one in which a single manual operation, such as the manual operation of a switch from an "off" to an "on" position, is necessary to cause the emergency power source to supply power to the emergency loads.

§ 112.01-10 Automatic emergency lighting and power system.

An automatic emergency lighting and power system is one in which a reduction in potential from the ship's service power and lighting plant causes the emergency power source to supply power to the emergency loads.

§ 112.01-15 Temporary emergency power source.

A temporary emergency power source is one of limited capacity that carries, for a short time, selected emergency loads while an emergency power source of larger capacity is being started.

§ 112.01-20 Final emergency power source.

A final emergency power source is one that functions after the temporary emergency power source is disconnected.

Subpart 112.05—General**§ 112.05-1 Purpose.**

(a) The purpose of this part is to ensure a dependable independent emergency power source with the capacity to supply all those services that are necessary for the safety of the passengers, crew, and other persons in an emergency.

(b) No load may be powered from an emergency power source, except—

(1) A load required by this part to be powered from the emergency power source;

(2) A bus-tie to the main switchboard that meets § 112.05-3; and

(3) Emergency loads that may be necessary to maintain or restore the propulsion plant, such as control systems, controllable pitch propellers, hydraulic pumps, control air compressors, and machinery necessary for dead-ship start-up.

§ 112.05-3 Main-emergency bus-tie.

Each bus-tie between a main switchboard and an emergency switchboard must—

(a) Disconnect automatically upon loss of potential at the emergency switchboard;

(b) Be arranged to prevent parallel operation of an emergency power source with any other source of electric power, except for interlock systems for momentary transfer of loads; and

(c) If arranged for feedback operation, open automatically upon overload of the emergency power source before the emergency power source is tripped off the line from the overload.

§ 112.05-5 Emergency power source.

(a) The emergency power source must meet table 112.05-5(a) and have the capacity to supply all loads that can be simultaneously connected to it, except a load on a bus-tie to the main switchboard.

TABLE 112.05-5(a)

Size of vessel and service	Type of emergency power source or lighting	Period of operation and minimum capacity of emergency power
Passenger vessels: Ocean, Great Lakes, or coastwise; or on an international voyage.	Temporary emergency power source; and final emergency power source (automatically connected storage battery or an automatically started generator).	36 hours. ¹
Other than Ocean, Great Lakes, or coastwise and not on an international voyage.	Final emergency power source (automatically connected storage battery or an automatically started generator).	8 hours or twice the time of run, whichever is less. ²
Cargo vessels; miscellaneous self-propelled vessels; tankships; barges with sleeping accommodations for more than 6 persons; mobile offshore drilling units; and oceanographic vessels: Ocean, Great Lakes, or coastwise and 500 GT or more; on an international voyage and 500 GT or more; or all waters and 1600 GT or more.	Final emergency power source (automatically connected storage battery or an automatically started generator).	18 hours. ^{1,3}
Ocean, Great Lakes, or coastwise and less than 500 GT; or other than ocean, Great Lakes, or coastwise, 300 GT or more but less than 1600 GT, and not on an international voyage.	Emergency lighting provided by an automatically connected or manually controlled storage battery; automatically or manually started generator; or relay-controlled, battery-operated lanterns. ⁴	6 hours or twice the time of run, whichever is less.

¹ For a vessel on an international voyage of short duration, the time period may be reduced to twice the time of run but not less than 12 hours.

² The capacity for the operation of the steering gear, as required by § 111.93, is for a period of 30 minutes continuous operation.

³ The emergency lighting requirements of § 112.15-1 (b), (c), (f), and (g) must be met.

⁴ Requirements of Subpart 112.39 must be met by the relay-controlled, battery-operated lanterns.

(b) The emergency power source must be independent of the ship's service lighting and powerplant and propulsion plant, except for the compressed air starting means allowed in § 112.50-7(c)(3)(i). A stop control for an emergency generator must be only in the space that has the emergency generator, except a remote mechanical reach rod is permitted for the fuel oil shut-off valve to an independent fuel oil tank located in the space.

(c) The complete emergency installation must function when the ship is inclined to the maximum angle of heel which results from the assumed damage required by Part 157 of Title 33 or by Parts 42, 74, 108, 153, and 154 of Title 46 of the Code of Federal Regulations for the specific vessel type or 22½ degrees, whichever is greater, and when the trim of the ship is 10 degrees.

(d) The emergency power source must be aft of the collision bulkhead, outside the machinery casing, and above the uppermost continuous deck.

(e) No compartment that has an emergency power source, or its vital components, may adjoin a Category A machinery space except when such an arrangement is not practicable. In such a case, the boundary between the compartment containing the emergency source and category A machinery space must have an A-60 fire classification as defined in Subpart 72.05 of this chapter.

(f) Except for a cable for connecting equipment in the engine room or boiler room, no cable supplied from the emergency switchboard may penetrate the boundaries of the engine room, boiler room, uptakes, or casings of these spaces. These cables must be kept clear

of the bulkheads and decks forming these boundaries. No emergency circuit in an engine room or a boiler room may supply equipment in any other space.

(g) The emergency switchboard must be as near as practicable to the emergency power source but not in the same space as a battery emergency power source.

(h) If the emergency power source is a generator, the emergency switchboard must be in the same space as the emergency power source.

(i) The prime mover of an emergency generator must be either a diesel engine or a gas turbine.

Subpart 112.15—Emergency Loads

§ 112.15-1 Temporary emergency loads.

On vessels required by § 112.05-5(a) to have a temporary emergency power source, the following emergency lighting and power loads must be arranged so that they can be energized from the temporary emergency power source:

- (a) Navigation lights.
- (b) Enough lights throughout machinery spaces to allow essential operations and observations under emergency conditions and to allow restoration of service.
- (c) Lighting for passageways, stairways, and escape trunks in passenger quarters, crew quarters, public spaces, machinery spaces, and work spaces sufficient to allow passengers and crew to find their way to open decks and to lifeboat and liferaft embarkation and assembly points with all watertight doors and fire-screen doors closed.

(d) Illuminated signs with the word "EXIT" in red letters throughout a

passenger vessel so the direction of escape to the open deck is obvious from any portion of the vessel usually accessible to the passengers or crew, except machinery spaces, and except stores and similar spaces where the crew are not normally employed. There must be sufficient signs so that the direction of escape is obvious, with all fire doors in stairway enclosures and main vertical zone bulkheads closed and all watertight doors closed. For the purpose of this paragraph, an individual stateroom or other similar small room is not required to have a sign, but the direction of escape must be obvious to a person emerging from the room.

(e) Illumination to allow safe operation of each power operated watertight door.

(f) At least one light in each space where a person may be maintaining, repairing, or operating equipment, stowing or drawing stores or equipment, or transiting, such as public spaces, work spaces, machinery spaces, workshops, galleys, emergency fire pump rooms, bow thruster rooms, storage areas for paint, rope, and other stores, underdeck passageways in cargo areas, steering gear rooms, windlass rooms, normally accessible duct keels with valve operators, cargo handling rooms, and holds of roll-on/roll-off vessels.

(g) Lighting for lifeboat and liferaft launching areas, embarkation decks and passenger assembly points. Lights must meet the requirements of §§ 111.75-16 and 112.43-11 of this chapter.

(h) Electric communication systems that are necessary under temporary emergency conditions and that do not have an independent storage battery source of power.

(i) Each power operated watertight door system.

(j) Each emergency loudspeaker system.

(k) Each fire screen door holding and release system.

(l) Supply to motor generator or other conversion equipment if a temporary emergency power source of alternating current is necessary for essential communication systems or emergency equipment.

(m) Each daylight signaling light.

(n) Each smoke detector system.

(o) Each electrically controlled or powered ship's whistle.

(p) Each fire detection system.

§ 112.15-5 Final emergency loads.

On vessels required to have a final emergency power source by § 112.05-5(a) of this chapter, the following emergency lighting and power loads

must be arranged so that they can be energized from the final emergency power source:

- (a) Each load under § 112.15-1.
- (b) Each elevator in a passenger vessel.
- (c) Each charging panel for—
 - (1) Temporary emergency batteries;
 - (2) Starting batteries for diesel engines or gas turbines that drive emergency generators; and
- (3) General alarm batteries.
- (d) One of the bilge pumps, if the emergency power source is its source of power to meet Part 56 of this chapter.
- (e) One of the fire pumps, if the emergency power source is its source of power to meet Part 34 of Subchapter D (Tank Vessels), Part 76 of Subchapter H (Passenger Vessels), Part 95 of Subchapter I (Cargo and Miscellaneous Vessels), or Part 108 of Subchapter IA (Mobile Offshore Drilling Units) of this chapter.
- (f) A sprinkler system pump or water spray extinguishing system pump, if the emergency power source is its source of power to meet Part 76 of Subchapter H (Passenger Vessels) of this chapter.
- (g) If necessary, the lube oil pump for each propulsion turbine and ship's service generator turbine that needs external lubrication.
- (h) Each rudder angle indicator.
- (i) Each radio installation.
- (j) Each radio direction finder.
- (k) Each loran.
- (l) Each radar.
- (m) Each gyrocompass.
- (n) Each depth sounder.
- (o) A steering gear feeder if required by Subpart 111.93 of this chapter.
- (p) General alarm flashing lights required by § 113.25-10.
- (q) Each electric blow-out preventer control system on a mobile offshore drilling unit.
- (r) Any permanently installed diving system that is dependent upon the vessel's or drilling unit's electrical power.
- (s) An emergency generator starting air compressor as allowed by § 112.50-7(c)(3)(ii) of this part.
- (t) Each steering gear failure alarm required by Subpart 113.43 of this chapter.

§ 112.15-10 Loads on systems without a temporary emergency power source.

If there is no temporary emergency power source, the loads under § 112.15-1 must be arranged so that they can be energized from the final emergency power source.

Subpart 112.20—Emergency Systems Having a Temporary and a Final Emergency Power Source

§ 112.20-1 General.

This subpart contains requirements applicable to emergency power installations having both a temporary and a final emergency power source.

§ 112.20-3 Normal source for emergency loads.

(a) The normal source for emergency loads must be the ship's service generating plant.

(b) The power from the ship's service generating plant for the emergency loads must be supplied to the emergency switchboard through automatic transfer switches.

§ 112.20-5 Failure of power from the normal source or final emergency power source.

(a) If there is a reduction of potential of the normal source by 15 to 40 percent, the loads under § 112.15-1 must be automatically supplied from the temporary emergency power source.

(b) For systems in which a reduction of frequency of the normal source or final emergency power source adversely affects the emergency system and emergency loads, there must be means to transfer the loads under § 112.15-1 to the temporary emergency power source upon a reduction in the frequency of the normal source or final emergency power source.

§ 112.20-10 Diesel or gas turbine driven emergency power source.

Simultaneously with the operation of the transfer means under § 112.20-5, the diesel engine or gas turbine driving the final emergency power source must start automatically with no load on the final emergency power source.

§ 112.20-15 Transfer of emergency loads.

(a) When the potential of the final emergency power source reaches 85 to 95 percent of normal value, the emergency loads under § 112.15-5 must transfer automatically to the final emergency power source and, on a passenger vessel, this transfer must be accomplished in no more than 45 seconds after failure of the normal source of power.

(b) When the potential from the normal source has been restored, the emergency loads must be manually or automatically transferred to the normal source, and the final emergency power source must be manually or automatically stopped.

(c) If the potential of the final emergency power source is less than 75 to 85 percent of normal value while

supplying the emergency loads, the temporary emergency loads under § 112.15-1 must transfer automatically to the temporary emergency power source.

Subpart 112.25—Emergency Systems Having an Automatic Starting Diesel Engine or Gas Turbine Driven Emergency Power Source as the Sole Emergency Power Source

§ 112.25-1 General.

This subpart contains requirements applicable to emergency power installations having an automatic starting diesel engine or gas turbine driven emergency power source as the sole emergency power source.

§ 112.25-3 Normal source for emergency loads.

(a) The normal source for emergency loads must be the ship's service generating plant.

(b) The power from the ship's service generating plant for the emergency loads must be supplied to the emergency switchboard by an automatic transfer switch located at the emergency switchboard.

§ 112.25-5 Failure of power from the normal source.

If there is a reduction of potential of the normal source by 15 to 40 percent, the diesel engine or gas turbine driving the final emergency power source must start automatically with no load on the emergency power source.

§ 112.25-10 Transfer of emergency loads.

(a) When the potential of the final emergency source reaches 85 to 95 percent of normal value, the emergency loads under § 112.15-5 must transfer automatically to the final emergency power source and this transfer must be accomplished in no more than 45 seconds after failure of the normal source of power.

(b) When the potential from the normal source has been restored, the emergency loads must be manually or automatically transferred to the normal source, and the final emergency power source must be manually or automatically stopped.

Subpart 112.30—Emergency Systems Having an Automatically Connected Storage Battery as the Sole Emergency Power Source

§ 112.30-1 General.

This subpart contains requirements applicable to emergency power installations having an automatically

connected storage battery as the sole emergency power source.

§ 112.30-3 Normal source for emergency loads.

(a) The normal source for emergency loads must be the ship's service generating plant.

(b) The power from the ship's service generating plant for the emergency loads must be supplied to the emergency loads through automatic transfer switches.

§ 112.30-5 Transfer of emergency loads.

If there is a reduction of potential of the normal source by 15 to 40 percent, the emergency loads under § 112.15-5 must transfer automatically from the normal source to the emergency power source.

§ 112.30-10 Restoration of normal source potential.

When the potential from the normal source is restored to 85 to 95 percent of its normal value, the emergency loads must transfer automatically to the normal source.

Subpart 112.35—Manually Controlled Emergency Systems Having a Storage Battery or a Diesel Engine or Gas Turbine Driven Generator as the Sole Emergency Power Source

§ 112.35-1 General.

This subpart contains requirements applicable to emergency power installations having a manually controlled storage battery, diesel engine, or gas turbine driven generator as the sole emergency power source.

§ 112.35-3 Normal source for emergency loads.

The normal source for emergency loads must be the ship's service generating plant.

§ 112.35-5 Manually started emergency systems.

Manually started emergency lighting and power systems must be activated by one manual operation, such as the manual operation of a switch from an "off" to an "on" position, to cause the emergency system to supply its connected loads.

§ 112.35-7 Activating means.

The activating means must be in the wheelhouse or in a location where the means can be controlled by the chief engineer.

Subpart 112.37—Temporary Emergency Power Source

§ 112.37-1 General.

Each temporary source of emergency power required by Table 112.05-5(a)

must consist of a storage battery of sufficient capacity to supply the temporary emergency loads for not less than one-half hour.

Subpart 112.39—Battery Operated Lanterns

§ 112.39-1 General.

(a) Each battery-operated, relay-controlled lantern used in accordance with Table 112.05-5(a) must—

- (1) Have rechargeable batteries;
- (2) Have an automatic battery charger that maintains the battery in a fully charged condition;
- (3) Not be readily portable; and
- (4) Meet UL 924.

§ 112.39-3 Operation.

(a) The lanterns must be capable of providing light at least 6 hours.

(b) The lantern must be relay-controlled so that the loss of normal power causes the lanterns to light.

Subpart 112.40—Alternating-Current Temporary Source of Supply

§ 112.40-1 General requirements.

Installations requiring alternating current for the operation of communication equipment or other apparatus essential under temporary emergency conditions must be provided with the necessary conversion equipment. If the conversion equipment operates both under normal conditions and under temporary emergency conditions, the conversion equipment must be provided in duplicate.

Subpart 112.43—Emergency Lighting Systems

§ 112.43-1 Switches.

An emergency lighting system must not have a switch, except—

- (a) In a distribution panel;
- (b) As required in § 112.43-3; or
- (c) In a circuit that serves a hazardous space such as a paint room or cargo handling room if the switch is located outside of the hazardous location.

§ 112.43-3 Controls; general.

(a) Except as allowed in paragraph (b) of this section and § 112.43-5, emergency lights for the following must be controlled by switches in the wheelhouse:

- (1) Lifeboat and liferaft launching operations.
- (2) Wheelhouse.
- (3) Chartroom.
- (4) Navigation equipment.
- (b) On a mobile offshore drilling unit, the switches required in paragraph (a) of this section must be in the control room.

§ 112.43-5 Controls on island type vessels.

On an island type vessel, such as a containership, emergency lights for illumination of lifeboat and liferaft launching operations must be controlled from a central location within the island nearest the launching operations or from the wheelhouse.

§ 112.43-7 Wheelhouse distribution panel.

(a) Except as allowed in paragraph (b) of this section, the following emergency lights must be supplied from a distribution panel in the wheelhouse:

- (1) Navigation lights not supplied by the navigation light indicator panel.
- (2) Floodlights for lifeboat and liferaft launching operations, except as allowed in § 112.43-5 of this part.
- (3) Signaling lights.
- (4) Emergency lights—
 - (i) On open decks;
 - (ii) In the wheelhouse;
 - (iii) In the chartroom; and
 - (iv) In the fire control room.

(b) On a mobile offshore drilling unit, the distribution panels required in paragraph (a) must be in the control room.

(c) Each distribution panel required in paragraphs (a) and (b) of this section must have a fused switch or circuit breaker for each branch circuit.

§ 112.43-9 Signaling lights.

Each signaling light must be supplied by a branch circuit that supplies no other equipment.

§ 112.43-11 Illumination for launching operations.

Branch circuits for floodlights for lifeboat and liferaft launching operations must—

- (a) Supply no other equipment; and
- (b) Be arranged so that floodlights for adjacent lifeboats and liferafts are supplied from different branch circuits.

§ 112.43-13 Navigation light indicator panel supply.

Each navigation light indicator panel must be supplied—

- (a) Directly from the emergency switchboard; or
- (b) Be a through feed, without switch or overcurrent protection, from the feeder supply the wheelhouse emergency lighting panel.

§ 112.43-15 Emergency lighting feeders.

For a vessel with firescreen bulkheads forming fire zones, at least one emergency lighting feeder must supply only the emergency lights between two adjacent main vertical fire zone bulkheads. The emergency lighting feeder must be separated as widely as

practicable from any general lighting feeder supplying the same space.

§ 112.43-17 Emergency light marking.

Each emergency light must be marked with the letter "E" that is at least 1/2 inch (12.7 mm) high.

Subpart 112.45—Visible Indicators and Test Switch

§ 112.45-1 Visible indicators.

There must be visible indicators in the machinery space to show:

- (a) When an emergency battery is discharging; and
- (b) When the automatically controlled emergency power source is supplying the emergency loads.

§ 112.45-5 Test switch.

There must be a test switch at the emergency switchboard to simulate a failure of potential from the normal source and cause the emergency loads to be supplied from the emergency power source.

Subpart 112.50—Emergency Diesel and Gas Turbine Engine Driven Generator Sets

§ 112.50-1 General.

(a) The prime mover of a generator set must have—

- (1) All accessories necessary for operation and protection of the prime mover; and

(2) A self-contained cooling system of a size that ensures continuous operation with 100 degrees F (37 degrees C) air.

(b) The fuel used must have a flashpoint of not less than 110 degrees F (43 degrees C).

(c) The room that has the generator set must have intake and exhaust ducts to supply adequate cooling air.

(d) The prime mover must not have a starting aid, except that a thermostatically controlled electric water jacket heater connected to the final emergency bus is permitted.

(e) The generator set must be capable of carrying its full rated load within 20 seconds after cranking is started with the intake air, room ambient temperature, and starting equipment at 32 degrees F (0 degrees C).

(f) The generator set must start by hydraulic, compressed air, or electrical means.

(g) The generator set must lubricate and operate when inclined to the angles specified § 112.05-5(c), and must be arranged so that it does not spill oil under a vessel roll of 30 degrees each side of the vertical.

(h) The generator set must shut down automatically upon loss of lubricating oil pressure, overspeed, or operation of

a fixed fire extinguishing system in the emergency generator room (see § 111.12-1(b) for detailed overspeed trip requirements).

(i) If the prime mover is a diesel engine, there must be an audible alarm that sounds on low oil pressure and high cooling water temperature.

(j) If the prime mover is a gas turbine, it must meet the shutdown and alarm requirements in § 58.10-15(g) of this chapter.

(k) An independent fuel supply must be provided for the prime mover.

§ 112.50-3 Hydraulic starting.

A hydraulic starting system must meet the following:

(a) The hydraulic starting system must be a self-contained system that provides the cranking torque and engine starting RPM recommended by the engine manufacturer.

(b) The stored hydraulic pressure must be automatically maintained within the predetermined pressure limits.

(c) The means of automatically maintaining the hydraulic system within the predetermined pressure limits must be electrically energized from the final emergency bus.

(d) There must be a means to manually recharge the hydraulic system.

(e) Charging of the hydraulic starting system must not cause insufficient hydraulic pressure for engine starting.

(f) The hydraulic starting system must have capacity for at least six cranking cycles including the reserve capacity under paragraph (g) of this section.

(g) Capacity for three of the cranking cycles under paragraph (f) of this section must be held in reserve. The system must be arranged so that the operation of one control by one person isolates the discharged or initially used part of the system and allows the reserve capacity to be used.

§ 112.50-5 Electric starting.

An electric starting system must meet the following:

(a) The starting battery must have sufficient capacity for at least six cranking cycles. Each cycle must include at least one-half minute of battery rest.

(b) At the end of the sixth cranking cycle the battery voltage, while cranking the engine, must be at least 50 percent of nominal battery voltage.

(c) Capacity for three of the cranking cycles under paragraph (a) of this section must be held in reserve. The system must be arranged so that the operation of one control by one person allows the reserve capacity to be used.

§ 112.50-7 Compressed air starting.

A compressed air starting system must meet the following:

(a) The starting, charging, and energy storing devices must be in the emergency generator room, except for the main or auxiliary air compressors addressed in paragraph (c)(3)(i) of this section.

(b) The compressed air starting system must provide the cranking torque and engine starting RPM recommended by the engine manufacturer.

(c) The compressed air starting system must have an air receiver that meets the following:

(1) Has capacity for at least six cranking cycles;

(2) supplies no other system; and

(3) is supplied from one of the following:

(i) The main or auxiliary compressed air receivers with a nonreturn valve in the emergency generator room and a handcranked, diesel-powered air compressor for recharging the air receiver.

(ii) An electrically driven air compressor that is automatically operated and is powered from the emergency power source. If this compressor supplies other auxiliaries, there must be a non-return valve at the inlet of the starting air receiver and there must be a handcranked, diesel-powered air compressor for recharging the air receiver.

(d) Capacity for three of the cranking cycles under paragraph (c)(1) of this section must be held in reserve. The system must be arranged so that the operation of one control by one person isolates the discharged or initially used part of the system and allows the reserve capacity to be used.

Subpart 112.55—Storage Battery Installation

§ 112.55-1 General.

Each storage battery installation must meet Subpart 111.15 of this chapter.

§ 112.55-5 Emergency lighting loads.

When supplying emergency lighting loads, the storage battery initial voltage must not exceed the standard system voltage by more than 5 percent.

§ 112.55-10 Storage battery charging.

(a) Each storage battery installation for emergency lighting and power, and starting batteries for an emergency diesel or gas turbine driven generator set, must have apparatus to automatically maintain the battery fully charged.

(b) When the ship's service generating plant is available, the battery must have a continuous trickle charge, except that after discharge the battery must be charged automatically at a higher rate.

(c) Charging operations must not cause an absence of battery power.

(d) There must be instruments to show the rate of charge.

§ 112.55-15 Capacity of storage batteries.

(a) A storage battery for an emergency lighting and power system must have capacity—

(1) To close all watertight doors three times;

(2) To open all watertight doors two times; and

(3) To carry the remaining emergency loads continuously for the time prescribed in Table 112.05-5(a).

(b) At the end of the time specified in paragraph (a) of this section, the potential of the storage battery must be at least 88 percent of the standard voltage.

PART 113—COMMUNICATION AND ALARM SYSTEMS AND EQUIPMENT

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Subpart 113.65—Whistle Operations

113.65-5 General requirements.

Subpart 113.70—Smoke Detector Systems

113.70-5 General requirements.

Authority: 46 U.S.C. 170, 367, 369, 375, 390b, 391a, 392, 405, 416, 445, 489, 526p, 49, U.S.C. 1655(b); 49 CFR 1.46.

Subpart 113.05—General Provisions

§ 113.05-5 Approved equipment.

If approved equipment is required in this part, that equipment must be specifically approved by the Commandant.

Note.—Many specifications for equipment that must be approved are in Subchapter Q for this chapter.

Subpart 113.10—Fire Detecting and Alarm Systems and Manual Fire Alarm Systems

§ 113.10-1 Approved equipment.

Each alarm annunciator, fire detector, test station, manual station, and vibrating bell must be approved under Subpart 161.002 of this chapter and meet the requirements of this subpart.

§ 113.10-3 Cable runs.

Cable runs between the fire alarm annunciator and fire detecting or fire alarm zones must be as direct as practicable and, where practicable, must not be in staterooms, lockers, or other enclosed spaces in order to reduce the risk of damage by a localized fire or other cause.

§ 113.10-5 Common return.

A conductor must not be used as a common return from more than one zone.

§ 113.10-7 Connection boxes.

Each connection box that has conductors for more than one zone must be watertight.

§ 113.10-9 Power supply.

(a) *General.* There must be at least two sources of power for the electrical equipment of each fire detecting and alarm system. The normal source must be the main power source. The other source must be the emergency power source or an automatically charged battery. Upon loss of power to the system from the normal source, the system must be automatically supplied from the other source.

(b) *Batteries.* Each battery used in a fire detecting and alarm system must meet Subpart 111.15 of this chapter.

(c) *Capacity of storage battery.* The capacity of each system's storage battery must be sufficient to supply the fire detecting and alarm system for a period of not less than one week without recharging. At the end of the one-week discharge period, the battery potential must not be less than 80 percent of nominal potential under design load.

(d) *Capacity of power supply branch circuit.* The capacity of each branch circuit providing power to a fire detection or alarm system must not be

less than 125 percent of the maximum load.

Subpart 113.20—Automatic Sprinkler Systems

§ 113.20-1 Sprinkler alarm system.

Each sprinkler alarm system, including annunciator, power supply, alarm switches, and bells, must meet Subpart 76.25 of this chapter.

§ 113.20-3 Watertight equipment.

Each connection box and each switch in an automatic sprinkler system must be watertight.

Subpart 113.25—General Alarm Systems

§ 113.25-1 Applicability.

(a) This subpart, except §§ 113.25-25 and 113.25-30, applies to each manned vessel of over 100 gross tons, except barges, scows, and similar vessels.

(b) Section 113.25-25 applies to each manned ocean and coastwise barge of over 100 gross tons if the crew is divided into watches for the purpose of steering.

(c) Section 113.25-30 applies to each barge of 300 or more gross tons that has sleeping accommodations for more than six persons.

§ 113.25-3 Requirements.

Each vessel must have a general alarm system that meets the requirements of this subpart.

§ 113.25-5 Location of contact makers.

(a) *Passenger vessels and cargo and miscellaneous vessels.* Each passenger vessel, cargo vessel, and miscellaneous vessel must have a manually operated contact maker for the general alarm system—

(1) In the wheelhouse; and
(2) At the feeder distribution panel if the general alarm power supply is not in or next to the wheelhouse.

(b) *Tank vessels.* Each tank vessel must have a manually operated contact maker for the general alarm system—

(1) In the wheelhouse;
(2) At the deck officers' quarters farthest from the engineroom;
(3) In the engineroom;
(4) At the location of the emergency means of stopping cargo transfer required under 33 CFR 155.780; and
(5) At the feeder distribution panel if the general alarm power supply is not in or next to the wheelhouse.

(c) *Mobile offshore drilling units.*

Each mobile offshore drilling unit must have a manually operated contact maker for the general alarm system—

(1) In the main control room;
(2) At the drilling console;
(3) At the feeder distribution panel;

(4) In the wheelhouse, if a wheelhouse is installed; and

(5) In a routinely occupied space that is as far as practicable from all other contact makers.

(d) *Additional contact maker.* A vessel must not have more than one other contact maker that operates the general alarm system in addition to those required under paragraph (a), (b), or (c) of this section unless the installation of other contact makers has been accepted by the Commandant.

(e) *Special system.* If a vessel has an emergency squad when operating, has a manual fire alarm system, or is an ocean-going passenger vessel, it must have—

(1) An independent manually operated contact maker in the wheelhouse that is connected to operate only the general alarm bells in crew's quarters and machinery spaces; or

(2) A separate alarm system that sounds in the crew's quarters and machinery spaces.

§ 113.25-6 Power supply.

The power supply for the general alarm system must—

(a) Be above the uppermost continuous deck;

(b) Be outside the machinery casing;

(c) Not be in the weather;

(d) Have a nominal potential of not less than 6 volts and not more than 120 volts;

(e) Be—

(i) One storage battery that—

(1) Powers only the general alarm system and the engineers' emergency alarm required by Subpart 113.27 of this chapter;

(2) Has an automatic charging panel that maintains the battery fully charged, except immediately following a discharge; and

(3) Has the capacity to supply the general alarm system continuously for at least eight hours without being recharged;

(2) Duplicate storage batteries—

(i) With a manual two-position transfer switch that has no "off" position, connected so that one battery is charging while the other battery is available to power the system; and

(ii) Each having the capacity to supply without recharge—

(A) The general alarm system continuously for at least four hours; and

(B) All other connected loads at the normal demand for at least one week and at the maximum demand for at least eight hours;

(3) A circuit connected to the temporary emergency bus of an emergency switchboard, if the temporary emergency power source has

the capacity to supply all connected loads for one half hour and the general alarm system for eight hours without being recharged; or

(4) A circuit from an interior communication switchboard that is supplied by duplicate storage batteries—

(i) With a manual two-position transfer switch that has no "off" position connected so that one battery is charging while the other battery is available to power the switchboard; and

(ii) Each having the capacity to supply without recharge—

(A) The general alarm system continuously for a period of four hours;

(B) All other connected loads at the normal demand for at least one week and at the maximum demand for at least eight hours; and

(f) Have a potential at the end of the discharge period described in paragraph (e) of at least 80 percent of the potential under design load.

§ 113.25-7 Power supply overcurrent protection.

(a) If the general alarm system is the only load supplied by the general alarm system battery or batteries, the battery or batteries must have an enclosed fused switch or circuit breaker that has a means of locking. The fused switch or circuit breaker must be outside of, and next to, the battery room or battery locker, and the capacity of the fuses or circuit breaker must be at least 200 percent of the connected load.

(b) If the general alarm system is supplied from an emergency or interior communication switchboard, or if duplicate general alarm batteries supply other loads as allowed under § 113.25-6(e)(2), there must be a fused switch or circuit breaker supplying the general alarm system that has a means of locking.

§ 113.25-8 Distribution of general alarm system feeders and branch circuits.

(a) Each system must have a feeder distribution panel to divide the system into the necessary number of zone, feeders, except where, because of the arrangement of the vessel, only one zone feeder is necessary; then a branch circuit distribution panel or feeder distribution panel must be used.

(b) The feeder distribution panel must have fuses for each zone feeder, but there must be no disconnect switches.

(c) The feeder distribution panel must be in an enclosed space next to the general alarm battery enclosure.

(d) Each system must have at least one feeder for each vertical fire zone that has general alarm bells.

(e) Each system must have one or more branch circuit distribution panels for each zone feeder, with at least one fused branch circuit for each deck level. The distribution panel must be above the uppermost continuous deck, in the zone served, and there must be no disconnect switches for the branch circuits.

(f) No more than five general alarm bells (with flashing lights as required) may be connected to one branch circuit. A branch circuit must not supply bells on more than one deck level, except for a single branch circuit supplying all levels of a single space containing more than one deck level if all other requirements of this section are met.

(g) On a vessel not divided into fire zones by main vertical fire bulkheads, the vessel must be divided into vertical zones not more than 150 feet (45.7 meters) long, and there must be a general alarm feeder for each of these zones that has general alarm bells.

(h) General alarm feeders and branch circuit cables must be in passageways and must not be in staterooms, lockers, galleys, machinery spaces, or other enclosed spaces, unless it is necessary to supply general alarm bells in those spaces.

§ 113.25-9 Location of general alarm bells.

General alarm bells must—

(a) Be located in passenger and crew quarters areas where they can alert persons in spaces where those persons may be maintaining, repairing, or operating equipment, stowing or drawing stores or equipment, or transiting, such as public spaces, work spaces, machinery spaces, workshops, galleys, emergency firepump room, bow thruster rooms, storage areas for paint, rope, and other stores, underdeck passageways in cargo areas, steering gear rooms, windless rooms, holds of roll-on/roll-off vessels, and, except those that are accessible only through bolted manhole covers, duct keels with valve operators; and

(b) Have the sound level in the spaces specified in paragraph (a) of this section, with the door closed, of at least—

- (1) 75 decibels relative to 0.0002 microbar at 1,000 hertz (zero db); and
- (2) 6 decibels above the background noise level existing when the vessel is underway in moderate weather unless flashing red lights are utilized in accordance with § 113.25-10 of this subpart.

§ 113.25-10 Location of flashing red lights.

In a space described in § 113.25-9(a), where the bells cannot be heard over the background noise, there must be a

flashing red light, in addition to the bell, that—

(a) Has sufficient intensity above the background lighting that would alert personnel in the space;

(b) Is activated whenever the general alarm bells in the space are activated; and

(c) Is supplied by the general alarm system power supply, except for a flashing red light in the main machinery space supplied from the emergency source of power through a relay that is operated by the general alarm system.

§ 113.25-11 Contact makers.

Each contact maker must—

(a) Be a normally open, spring-return-to-normal, enclosed, watertight switch;

(b) Close its contacts when the operating handle is rotated in a clockwise direction through an arc of approximately 60 degrees;

(c) Have a switch handle that has a spring-loaded locking pin to automatically lock the contact maker in the "on" position;

(d) Have the "off" and "on" positions of the operating handle marked by raised letters;

(e) Have mechanical stops to limit the rotation of the operating handle;

(f) Have an inductive load rating not less than the connected load, or, on large vessels, auxiliary devices to interrupt the load current.

§ 113.25-12 Vibrating bells.

Each vibrating bell must produce a signal or a tone distinct from any other audible signal on the vessel.

§ 113.25-14 Electric cable and distribution fittings.

Each cable entrance to a bell or distribution fitting must be made watertight by a terminal or stuffing tube.

§ 113.25-15 Distribution panels.

Each distribution panel must—

(a) Be watertight;

(b) Need a tool to be opened.

§ 113.25-16 Fuses.

(a) Each fuse in a general alarm systems must—

(1) Be a 250-volt, nonrenewable, cartridge fuse approved by Underwriters Laboratories Inc. or other independent laboratory recognized by the Commandant; and

(2) Cause as wide a differential as possible between branch circuit fuses and feeder fuses.

(b) The capacity of a feeder fuse must be as near as practicable to 200 percent of the load supplied. The capacity of a branch circuit fuse must not be higher than 50 percent of the capacity of the feeder fuse.

§ 113.25-20 Marking of equipment.

(a) Each general alarm system fused switch and distribution panel must have a fixed nameplate on the outside of its cover that has a description of its function. The rating of fuses must also be shown on the outside of the cover of a fused switch.

(b) Each general alarm contact maker must be marked "GENERAL ALARM" in red letters on a corrosion-resistant plate or on a sign.

(c) A contact maker that operates only the general alarm bells in crew quarters, machinery spaces, and work spaces must be marked "CREW ALARM" by the method described in paragraph (b) of this section.

(d) Each general alarm bell must be marked "GENERAL ALARM—WHEN BELL RINGS GO TO YOUR STATION" in red letters at least ½ inch high.

(e) Each general alarm system distribution panel must have a directory attached to the inside of its cover giving the designation of each circuit, the area supplied by each circuit, and the rating of each circuit fuse.

§ 113.25-25 General alarm systems for manned ocean and coastwise barges.

A manned ocean or coastwise barge of more than 100 gross tons, if it is one that operates with the crew divided into watches for steering the vessel, must have an alarm bell installation. The system must—

(a) Have an automatically charged battery as the power source;

(b) Have a manually operated contact maker at the steering station and in the crew accommodation area; and

(c) Must meet the requirements of § 113.25.7 and §§ 113.25-9 through 113.25-20 of this subpart.

§ 113.25-30 General alarm systems for barges of 300 or more gross tons with sleeping accommodations for more than six persons.

The general alarm system for a barge of 300 or more gross tons with sleeping accommodations for more than six persons must meet the requirements of Subpart 113.25, except as follows:

(a) The number and location of contact makers must be determined by the design, service, and operation of the barge.

Note.—Contact makers in the primary work area, quarters area, galley and mess area, machinery spaces, and the bridge or control area should be considered.

(b) If a distribution panel cannot be above the uppermost continuous deck because of the design of the barge and is installed below the deck, it must be as near the deck as practicable.

Subpart 113.27—Engineers' Assistance-Needed Alarm**§ 113.27-1 Engineers' assistance-needed alarm.**

Each self-propelled ocean, Great Lakes, or coastwise vessel must have a manually-operated engineers' assistance-needed alarm that is—

- (a) Operated from—
 - (1) The engine control room, if the vessel has an engine control room; or
 - (2) The maneuvering platform, if the vessel has no engine control room;
- (b) Audible in the engineers' accommodation spaces; and
- (c) Powered from the general alarm power source.

Subpart 113.30—Sound-Powered Telephone and Voice Tube Systems**§ 113.30-1 Applicability.**

This subpart applies to each self-propelled vessel.

§ 113.30-3 Means of communications.

The means of communication required by this subpart must be a sound-powered telephone system or voice tube system, except a voice tube system must not be used if it is longer than 125 feet (38.1 meters) or if it is ineffective.

§ 113.30-5 Requirements.

(a) *Communication.* Each vessel must have a sound powered telephone system or a voice tube system among the following:

- (1) Wheelhouse.
- (2) Steering gear room, if outside the engineroom.
- (3) Alternative steering station if outside of the steering gear room.
- (4) Engine control room, if the vessel has an engine control room.
- (5) Maneuvering platform, if the vessel has no engine control room.
- (6) Control room, if the vessel is a mobile offshore drilling unit.

(b) *Gyrocompass.* Each vessel that has a master gyrocompass that is not in or next to the wheelhouse must have a means of communication between the master gyrocompass and the wheelhouse repeater compass.

(c) *Radar.* Each vessel that has a radar plan position indicator that is not in or next to the wheelhouse must have a means of communication between the wheelhouse and the radar plan position indicator.

(d) *Emergency squad.* If the emergency squad equipment lockers or spaces are not next to the wheelhouse, there must be a means of communication between the wheelhouse and the emergency squad equipment lockers or spaces.

(e) *Radio and radio direction finder.* Communication to the radio and radio direction finder must meet the following requirements:

(1) Each vessel that has a radio installation must have a means of communication between the radio room, the wheelhouse, or, if the vessel is a mobile offshore drilling unit, the control room, and any other place from which the vessel may be navigated under normal conditions, other than a place that is only for emergency functions, a place that is only for docking or maneuvering, or a place that is for navigating the vessel in close quarters. A location that has the apparatus that is necessary to steer the vessel, give engine orders, and control the whistle, is a place from which the vessel may be navigated.

(2) If the operating position of the emergency radio installation is not in the compartment normally used for operating the main radio installation, there must be means of communication between the emergency radio room, the wheelhouse, or, if the vessel is a mobile offshore drilling unit, the control room, and any other place from which the vessel may be navigated under normal conditions; other than a place that is only for emergency functions, a place that is only for docking or maneuvering, or a place that is for navigating the vessel in close quarters.

(3) Each vessel equipped with radio direction-finding apparatus that is not in or next to the wheelhouse must have a means of communication between the wheelhouse and the direction-finding apparatus.

(4) The communication system required by this paragraph must be independent of all other systems on the vessel. The location of the termination of these systems is subject to approval by the Federal Communication Commission.

(f) *Fire or smoke detecting systems.* Each vessel equipped with a fire or smoke detecting system, if control units are not in the wheelhouse, must have means of communication between the wheelhouse and the stations where the control units are located.

(g) *Lookout.* Each vessel must have a sound-powered telephone system or a voice tube system for communications between the wheelhouse and the bow or forward lookout station, unless direct voice communication is possible. If there is a sound-powered telephone, it must meet the requirements of § 113.30-20(b).

(h) *Engineroom local control station.* On a vessel equipped with pilothouse control, each local control station in the engineroom must have a sound powered telephone station for communication to

the engine control room or maneuvering platform, unless an engine order telegraph is installed in accordance with § 113.35-3(e) of this chapter. Each sound-powered telephone station at a local control station must—

- (i) Not be on the same circuit as any other station required by this section, and
- (ii) Must provide the capability of carrying on a conversation while the vessel is in operation.

§ 113.30-10 Voice tubes.

Each voice tube must meet Section 37.31 of IEEE Standard No. 45.

§ 113.30-20 Sound-powered telephone system: general requirements.

(a) The telephone stations listed in § 113.30-5 (a) through (d), (f), and (g) and other stations for the operation of the vessel, such as the captain's and chief engineer's offices and staterooms, emergency power room, carbon dioxide control room, and firepump room, must not be on the same circuit as telephone stations installed to meet §§ 113.30-5(e) and 113.30-5(h).

(b) If the bow or forward lookout telephone is in the weather and on the same circuit as other required stations, there must be a cut-out switch in the wheelhouse that can isolate this lookout telephone from the rest of the stations.

(c) Except as provided in paragraph (b) of this section, a telephone station not required by this subpart that is in the weather must not be on a telephone circuit that includes any required telephone stations.

(d) Jack boxes or headsets must not be on a telephone system that includes any station required by this subpart, except for a station installed to meet § 113.30-5(h) of this subpart.

§ 113.30-25 Sound-powered telephone system: detailed requirements.

(a) Each item of sound-powered telephone equipment on a circuit that includes any station required by this subpart, except a system installed to meet § 113.30-5(h) of this Subpart, must be approved by the Commandant.

(b) Each sound-powered telephone station in the weather must be watertight, and the audible signal device must be outside of the station enclosure.

(c) Each sound-powered telephone station in a wheelhouse or a machinery space must be at least dripproof.

(d) In a noisy location, such as a diesel engine room, there must be a telephone booth or other equipment to permit telephone conversation during vessel operation.

(e) In a location where the telephone station audible signal device cannot be

heard throughout the space, there must be an additional audible signal device or light that is energized from the vessel's electric system and that is magneto-actuated.

(f) If two or more telephone stations are near each other, there must be a means that indicates the station called.

(g) Each sound-powered telephone talking circuit must be electrically independent of each calling circuit. A short circuit, open circuit, or ground on either side of a calling circuit must not affect a talking circuit. Circuits must be insulated from ground.

(h) Each connection box must be watertight.

(i) Telephone cables must be run as close to the fore and aft centerline of the vessel as practicable. Cables must not run through such spaces as machinery rooms and galleys.

Subpart 113.35—Engine Order Telegraph Systems

§ 113.35-1 Definitions.

As used in this subpart—

(a) "Indicator" means an instrument in the engine room to receive and acknowledge engine orders; and

(b) "Transmitter" means an instrument to send engine orders to the engineroom and receive acknowledgement from the engineroom.

§ 113.35-3 General requirements.

(a) Each self-propelled vessel, except as provided in paragraph (d) of this section, must have an electric or mechanical engine order telegraph system from the wheelhouse to the engineroom.

(b) On a vessel with more than one propulsion engine, each engine must have this system.

(c) On a double-ended vessel that has two wheelhouses, this system must be between the engineroom and each wheelhouse.

(d) If a small vessel has no engine order telegraph system between the wheelhouse and the engineroom, the propulsion plant must be controlled entirely from the wheelhouse, with no means of normal engine control from the engineroom.

(e) On vessels equipped with pilothouse control, each local control station in the engineroom must have an indicator if—

(1) Manual operation from the local control station is an alternative means of control; and

(2) The local control station is not immediately adjacent to the engineroom control station; and

(3) Sound-powered telephone communication that meets the

requirements of § 113.30-5(h) of this chapter is not provided.

§ 113.35-5 Electric engine order telegraph systems; general requirements.

(a) Each electric engine order telegraph system must have transmitters and indicators that are electrically connected to each other.

(b) Each transmitter and indicator face must be divided into sections with engine orders permanently marked on it.

(c) Movement of the transmitter handle and its pointer must cause the indicator to show the order corresponding to the order on the transmitter.

(d) Each engineroom indicator must have a knob, handle, or pushbuttons that actuates the pointer on the transmitter for acknowledgement of orders.

(e) There must be an audible signal that is a vibrating bell at each instrument. The vibrating bell at both the transmitter and the indicator must ring continuously when the transmitter and the indicator do not show the same order.

(f) Each dial of a transmitter instrument must be illuminated in such a manner as not to interfere with the navigation of the vessel at night.

(g) Each transmitter operating handle must be large enough so that the engine order may be determined from a distance equal to one-half the width of the wheelhouse.

§ 113.35-7 Electric engine order telegraph systems; detailed requirements.

(a) Each telegraph instrument must have a watertight enclosure for the electric components, except that an instrument under § 113.35-17 that is not in the weather must be watertight or drip-proof.

(b) Each material for a telegraph instrument must be corrosion-resistant.

(c) Each transmitter dial must be arranged with the "STOP" order at the top vertical position of the operating handle. For "AHEAD" orders, the operating handle must move toward the bow of the vessel, and for "ASTERN" orders, the operating handle must move toward the stern of the vessel.

(d) Each indicator face must have the "STOP" order—

(1) At the top on a pedestal or console-mounted instrument;

(2) At the bottom on a bulkhead-mounted instrument; and

(3) In the center on a pushbutton-operated instrument.

(e) Each indicator face on a double-ended vessel must be parallel to the centerline and must not be marked with the designations "AHEAD" and

"ASTERN". The reply handle and indicator arrow must point in the direction in which it is desired that the engine operate.

(f) Each connection box that is in an electric telegraph system must be watertight.

(g) Each system must have an alarm that—

(1) Automatically sounds and visually signals a loss of power to the system;

(2) Is in the wheelhouse; and

(3) Has a means to silence the audible signal.

(h) If the supervisory power supply is a dry cell battery or other low capacity source, there must be a means that precludes electric drain on the supervisory power supply after the audible signal has been silenced such as a means to extinguish the visible signal. Upon reestablishment of power to the telegraph system, the audible signal must sound again until the alarm circuit is returned to normal, unless restoration of this alarm circuit is automatic.

§ 113.35-9 Mechanical engine order telegraph systems; general requirements.

(a) Each mechanical engine order telegraph system must consist of transmitters and indicators mechanically connected to each other by means of chains and wires.

(b) Each transmitter and indicator must have dials divided into sectors or divisions with the engine orders permanently marked on it.

(c) Rotation of the transmitter handle and its associated pointer must drive the indicator pointer in synchronism. The indicator pointer must have the same angular position as the transmitter handle and its associated pointer, and must point to the order corresponding to the order on the transmitter.

(d) The engineroom indicator must have a reply handle and associated pointer that drives a reply pointer in the wheelhouse transmitter for acknowledgement of orders.

(e) Each transmitter and each indicator must have an audible signal device to indicate, in the case of an indicator, the receipt of an order and, in the case of a transmitter, the acknowledgement of an order. The audible signal device must not be dependent upon any source of power for operation other than that of the movement of the transmitter or indicator handle.

(f) The dial of each transmitter must be illuminated in such a manner as not to interfere with navigating the vessel at night.

(g) Each transmitter and indicator handle must be large enough so that the

engine order may be seen from a distance equal to one-half the width of the wheelhouse.

§ 113.35-11 Mechanical engine order telegraph systems; detailed requirements.

(a) A mechanical engine order telegraph system must use—

(1) Number 10 Stubs Gage (0.134 inch diameter) soft brass wire stretched approximately 20 percent prior to installation; or

(2) Corrosion-resistant aircraft-type cable of at least 1/8 inch diameter running over ball bearing sheaves.

(b) The following specific requirements are applicable to a soft brass wire installation;

(1) Pulleys must be provided whenever a bend in the run of the telegraph wire is made.

(2) A length of brass telegraph chain must be used in lieu of wire at each pulley sheave.

(3) Pulleys must be in line with the wire and chain.

(4) Each telegraph lead must have turnbuckles at—

(i) Each transmitter and indicator to adjust the handle and pointer to the central point of the order; and

(ii) Other locations where necessary to take up slack and to center the chains at the pulleys.

(5) Each long horizontal run of telegraph wire must be supported on roller bearers at approximately every five feet of run.

(6) Telegraph leads must be run through pipe where they are—

(i) Behind sheathing; or

(ii) Exposed to mechanical damage.

(c) Each telegraph lead must be in a stuffing tube where it passes through a watertight deck or bulkhead.

(d) Each transmitter dial must have the "STOP" order at the top vertical position of the operating handle. On ahead orders the handle must move toward the bow of the vessel, and on astern orders the operating handle must move toward the stern of the vessel.

(e) Each indicator dial must have the "STOP" order at either the bottom or top position of the reply handle to suit bulkhead or pedestal (console) mounting respectively.

(f) Indicator dials on double-ended vessels must not be marked with the designations "AHEAD" and "ASTERN." The reply handle and indicator arrow must point in the direction in which it is desired that the engine operate.

(g) All fittings used in telegraph systems must be brass, bronze, or other corrosion-resistant material.

(h) Each handle, pointers, and similar part must be attached to its shaft by a key or similar positive locking device to

ensure continuous operation of the shaft in response to movement of the handle.

§ 113.35-13 Mechanical engine order telegraph systems; operation.

If more than one transmitter operates a common indicator in the engineroom, all the transmitters must be mechanically interlocked and operate in synchronism. A failure of the transmission wire or chain at any transmitter must not interrupt or disable any other transmitter.

§ 113.35-15 Mechanical engine order telegraph systems; application.

If a mechanical engine order telegraph system is installed on any vessel to provide the communication required by this subpart, the length of cables or other mechanical limitations must not prevent the efficient operation of the system.

§ 113.35-17 Vessels with pilothouse control.

Each vessel with pilothouse throttle control must have a positive mechanical stop on each telegraph transmitter that prevents movement to the "Pilothouse Control" position without positive action by the operator.

§ 113.35-19 Electric engine order telegraphs systems; operation.

(a) Where two or more transmitters, located in the wheelhouse, the wings of the navigating bridge, or the top of the wheelhouse, operate a common indicator in the engineroom, the transmitters must—

(i) Operate in synchronism as required in paragraph (b) of this section; or

(ii) Operate under the control of a transmitter transfer control in accordance with paragraph (c) of this section.

(b) All transmitter handles and pointers must operate in synchronism. Where the transmitters are mechanically interlocked to effect synchronous operation, the requirements of § 113.35-13 must be met.

(c) Except for a transmitter in an unattended wheelhouse on a double-ended vessel, each transmitter must operate under the control of a transmitter transfer control so that movement of any one transmitter handle automatically connects that transmitter electrically to the engineroom indicator and simultaneously disconnects electrically all other transmitters. The reply pointers of all transmitters must operate in synchronism at all times.

(d) On a double-ended vessel that has two wheelhouses, a manually operated transfer switch which will disconnect the system in the unattended wheelhouse must be provided.

Subpart 113.37—Shaft Speed and Thrust Indicators

§ 113.37-1 Applicability.

This subpart applies to all self-propelled vessels.

§ 113.37-5 General requirements.

(a) A vessel equipped with fixed pitch propellers must have in the wheelhouse and at the engineroom control station a propeller speed and direction indicator for each shaft.

(b) A vessel equipped with controllable pitch propellers must have in the wheelhouse and at the engineroom control station a propeller speed and pitch position indicator for each shaft.

§ 113.37-10 Detailed requirements.

(a) Each indicator must be independent of the propulsion control system. A failure of the propulsion control system must not affect the operation of the indicators.

(b) Indicators in the wheelhouse must be installed prominently near the rudder angle indicator and must have illumination that does not interfere with the navigation of the vessel at night.

(c) Each electric component of indicators in the wheelhouse must be watertight or be in a watertight or dripproof enclosure.

(d) Each component material of indicators in the wheelhouse must be corrosion-resistant.

Subpart 113.40—Rudder Angle Indicator Systems

§ 113.40-1 Applicability.

This subpart applies to self-propelled vessels.

§ 113.40-5 General requirements.

The position of the rudder, if power-operated, must be shown at the principal steering station. If there is non-follow-up steering control at the alternative steering station, there must be a separate rudder angle indicator system for that station that is electrically independent from each other rudder angle indicator system.

§ 113.40-10 Detailed requirements.

(a) Each rudder angle indicator system must have a transmitter at the rudder head that is actuated by movement of the rudder with the angular movements of the rudder transmitted to a remote indicator or indicators. This system must be independent of the steering gear control system.

(b) Each indicator must have a fixed dial that shows the angular position of

the rudder right and left of amidships. Indications of rudder angle must be made by a moving pointer.

(c) The movement of the indicator pointer must match the movement of the steering wheel or control.

(d) Each indicator must be—

(1) In the direct line of vision of the helmsman; and

(2) Have dial illumination that does not interfere with the navigation of the vessel at night.

(e) Each electric component of the system must be watertight or be in a watertight enclosure.

(f) Each component material must be corrosion-resistant.

Subpart 113.43—Steering Failure Alarm Systems

§ 113.43-1 Applicability.

This subpart applies to each vessel of 1600 gross tons and over that has power driven main or auxiliary steering gear.

§ 113.43-3 Alarm system.

(a) Each vessel must have a steering failure alarm system that actuates an audible and visible alarm in the pilothouse when the actual position of the rudder differs by more than 5 degrees from the rudder position ordered by the followup control systems, required by §§ 58.25-45 and 111.93-9 of this chapter, for more than—

(1) 30 seconds for ordered rudder position changes of 70 degrees;

(2) 6.5 seconds for ordered rudder position changes of 5 degrees; and

(3) The time period calculated by the following formula for ordered rudder positions changes between 5 degrees and 70 degrees:

$$t = (R/2.76) + 4.64$$

Where

t = maximum time delay in seconds

R = ordered rudder change in degrees

(b) The alarm system must be separate from, and independent of, each steering gear control system, except for input received from the steering wheel shaft.

§ 113.43-5 Power supply.

Each steering failure alarm system must be supplied by a circuit that—

(a) Is independent of other steering gear system and steering alarm circuits;

(b) Is fed from the final emergency power source through the emergency distribution panel in the wheelhouse, if installed; and

(c) Has no overcurrent protection except short-circuit protection by an instantaneous fuse or circuit breaker rated or set at 400 to 500 percent of—

(1) The current-carrying capacity of the smallest alarm system interconnecting conductors; or

(2) The normal load of the system.

Subpart 113.45—Refrigerated Spaces Alarm Systems.

§ 113.45-5 General requirements.

(a) Each refrigerated space that is accessible to the vessel's personnel and that can be locked from the outside so that it cannot be opened from the inside, must have an audible alarm system that can be operated from within the refrigerated space.

(b) The alarm activator must be in the refrigerated space at its exit.

(c) The audible signal must sound at a manned location.

(d) If there is a common audible signal for more than one lockable refrigerated space, there must be an annunciator for locating the space from which the signal was initiated.

Subpart 113.50—Emergency Loudspeaker Systems

§ 113.50-1 Applicability.

This subpart applies to each ocean and coastwise passenger vessel certificated to carry 500 or more persons, including officers and crew, and each passenger vessel that has lifeboats stowed more than 100 feet (30.5 meters) from the navigating bridge.

§ 113.50-5 General requirements.

(a) Each vessel must have an approved emergency loudspeaker system that enables an officer on the bridge to broadcast separately or collectively to the following stations:

(1) Lifeboat stations, port.

(2) Lifeboat stations, starboard.

(3) Lifeboat embarkation stations, port.

(4) Lifeboat embarkation stations, starboard.

(5) Public spaces used for passenger assembly stations.

(6) Crew quarters.

(7) Accommodation spaces and service spaces.

(b) The system must be controlled from one location on the navigating bridge.

(c) Each loudspeaker at a lifeboat or embarkation station must allow two-way conversation with the navigating bridge.

(d) Each emergency loudspeaker system must be approved by the Commandant, and must meet the requirements of Subpart 161.004 of this chapter.

(e) If a vessel has a public address or music distribution system, there must be a means to silence that system. This means must be next to the loudspeaker system control panel.

§ 113.50-15 Location of loudspeakers and amplifiers.

(a) *General.* (1) Loudspeakers must be located where there is no substantial feedback and other interference.

(2) Each loudspeaker on an open deck must be directed toward the after end of the vessel and outboard by an angle of approximately 15 degrees.

(b) *Boat deck loudspeakers.* A loudspeaker must be at each lifeboat-handling station. The axis of the loudspeaker must be directed aft and outboard so that the sound level at the lifeboat-handling station is not less than the level given in Table 113.50-15.

TABLE 113.50-15—MINIMUM SOUND LEVEL REQUIREMENTS FOR LOUDSPEAKER SYSTEMS

[All data given in decibels ¹]

Location	Minimum assumed background noise level ²	Signal level		Voice level	
		Above-background noise	Total (minimum)	Above-background noise	Total (minimum)
Lifeboat station.....	80	20	≥ 100	15	≥ 95
Embarkation deck or exterior passenger assembly point.....	80	20	≥ 100	15	≥ 95
Interior passenger assembly point.....	75	20	≥ 95	15	≥ 90
Crew quarters, accommodation space, or service space.....	60	18	≥ 78	12	≥ 72

¹ The zero decibel level is 0.0002 dyne per cm².

² Actual background noise level must be used but can be no less than the level in this table.

³ Measured at a distance of 10 ft (3 m) from the loudspeaker and on its axis.

⁴ Measured in rooms with the doors to the passageways closed.

(c) *Lifeboat embarkation and passenger assembly station loudspeakers.* There must be enough loudspeakers throughout the lifeboat embarkation stations and passenger assembly stations to provide a distribution of sound of at least the level in Table 113.50-15, and with a variation

that does not exceed plus or minus 3 decibels.

(d) *Loudspeakers in quarters, accommodation spaces, and service spaces.* There must be enough loudspeakers in passageways, throughout crew quarters, accommodation spaces, and service

spaces to provide at least the sound level in Table 113.50-15 in each room, with the doors closed.

(e) **Amplifiers.** An emergency loudspeaker amplifier that is not in the same enclosure as the control panel must be in the wheelhouse or in a compartment next to the wheelhouse.

§ 113.50-20 Distribution of Cable runs.

(a) Cable runs to the different loudspeaker groups must be as widely separated from each other as practicable. They must be distributed so that a casualty to the port or starboard supplies to loudspeakers on boat and embarkation decks will not render more than half of the loudspeakers in the group inoperative, such as by feeding the loudspeakers of a particular group alternatively from a port and starboard multi-conductor cable.

(b) Cables must be in passageways and must not run through staterooms, lockers, and other enclosed spaces.

§ 113.50-25 Equipment enclosures.

Each junction or connection box in the distribution system must be watertight.

Subpart 113.65—Whistle Operators

§ 113.65-5 General requirements.

Each whistle operator must meet Section 37.25 of IEEE Standard No. 45.

Note: The general requirements for whistles and fog horns are in Part 25 of Subchapter C (Uninspected Vessels), Part 32 of Subchapter D (Tank Vessels), Part 77 of Subchapter H (Passenger Vessels), Part 96 of Subchapter I (Cargo and Miscellaneous Vessels), Part 107 of Subchapter IA (Mobile Offshore Drilling Units), and Part 195 of Subchapter U (Oceanographic Vessels) of this chapter.

Subpart 113.70—Smoke Detector Systems

§ 113.70-5 General requirements.

(a) Each smoke detector control unit must be approved by the Commandant.

(b) Each smoke detector system must meet the requirements of Subpart 161.002 of this chapter.

(c) Cable runs between the smoke detector control unit and the supply switchboard must be as direct as practicable, and must not run through staterooms, lockers, or other enclosed spaces in order to reduce the risk of damage by a localized fire or other cause.

PARTS 114-139 [RESERVED]

PARTS 161-ELECTRICAL EQUIPMENT

40. By revising § 161.002-9 to read as follows:

§ 161.002-9 Automatic fire detecting system, power supply.

The power supply for an automatic fire detecting system must meet the requirements of § 113.10-9 of Subchapter J (Electrical Engineering Regulations) of this chapter.

PART 190-CONSTRUCTION AND ARRANGEMENT

§ 190.20-45 [Amended]

41. By removing and reserving § 190.20-45(b).

PART 192-LIFESAVING EQUIPMENT

42. By removing in the last sentence in § 192.30-15(a) the words "of Subpart 111.65 of Part 111."

43. By revising § 192.50-10 to read as follows:

§ 192.50-10 Illumination of lifeboat launching operations.

Each vessel subject to this subchapter must have lights for the continuous illumination of lifeboats that are being launched and lifeboats that are in the water in the immediate vicinity of the vessel. For detailed requirements of the illumination, see Subchapter J (Electrical Engineering Regulations) of this chapter.

44. By revising the section heading and text of § 192.50-15 to read as follows:

§ 192.50-15 Illumination for inflatable liferaft launching operations.

Each vessel subject to this subchapter must have lights for the continuous illumination of the stowage position and launching area of liferafts. For detailed requirements of the illumination, see Subchapter J (Electrical Engineering Regulations) of this chapter.

PART 196-OPERATIONS

45. By revising the section heading and text of § 196.37-5 to read as follows:

§ 196.37-5 General alarm bell contact makers.

(a) Each general alarm contact maker must be marked in accordance with requirements in Subchapter J (Electrical Engineering Regulations) of this chapter.

(48 U.S.C. 170, 367, 369, 375, 390b, 391a, 392, 405, 416, 445, 489, 526p, 49 U.S.C. 1655(b); 49 CFR 1.46)

Dated: March 30, 1982.

L. N. Hein,

Captain, U.S. Coast Guard, Acting Chief, Office of Merchant Marine Safety.

BILLING CODE 4910-14-M

Editorial Note:

Material Approved for Incorporation by Reference (46 CFR Parts 110-139)

The Director of the Federal Register approves the following incorporations by reference effective April 8, 1982 (5 U.S.C. 552(a) and 1 CFR Part 51).

American Bureau of Shipping

65 Broadway, New York, NY 10006

Rules for Building and Classing Steel Vessels, 1981.....	111.12-3; 111.12-5(a); 111.12-7; 111.30-31; 111.33-11(a)(1); 111.35-1
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American National Standards Institute

1430 Broadway, New York, NY 10018

ANSI C37.04-1979—Rating Structure for AC High-Voltage Circuit Breakers Rated on a Symmetrical Current Basis.....	111.54-1(c)(3)(i)
ANSI C37.12-1969—High-Voltage Circuit Breakers Rated on a Symmetrical Current Basis and a Total Current Basis.....	111.54-1(c)(3)(iii)
ANSI C37.14-1979—Low-Voltage DC Power Circuit Breakers Used in Enclosures.....	111.54-1(c)(2)

American Society for Testing and Materials

1916 Race St., Philadelphia, PA 19103

ASTM B 117-73—Standard Method of Salt Spray (FOG) Testing.....	110.15-1(b)
ASTM D 789-78—Standard Specification for Nylon Injection Molding and Extrusion Materials.....	111.60-1(b)(4)

American Society of Mechanical Engineers

345 E. 47th St., New York, NY 10017

ANSI A17.1-1978 American National Standard Safety Code for Elevators, Dumbwaiters, Escalators, and Moving Walks .	111.91-1
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Institute of Electrical and Electronics Engineers

345 E. 47th St., New York, NY 10017

C 37.13-1981 Low-Voltage AC Power Circuit Breakers Used in Enclosures (ANSI/IEEE C 37.13-1981)	111.54-1(c)(1)(i); 111.57(c)(4)
No. 27-1974 Switchgear Assemblies Including Metal-Enclosed Bus (ANSI/IEEE C 37.20-69 and Supplements)	110.30-23
No. 45-1977 Recommended Practice for Electric Installations on Shipboard	110.30-19(b); 111.60-1; 111.60-3(a), (b); 111.60-5(a); 111.60-19(b)(3); 111.60-21; 111.107-1(b)(2); 113.30-10; 113.65-5
No. 320-1979 Application Guide for AC High-Voltage Circuit Breakers Rated on a Symmetrical Current Basis (ANSI/IEEE C37.010-1979).	111.54-1(c)(3)(ii)
No. 331-1972 Low-Voltage AC Non-Integrally Fused Power Circuit Breakers (Using Separately Mounted Current-Limiting Fuses) (ANSI C37.27-1972).	111.54-1(c)(1)(iii)
No. 538-1976 Low-Voltage AC Integrally Fused Power Circuit Breakers (ANSI C37.13a-1975).....	111.54-1(c)(1)(ii); 111.57-1 (Note)

Instrument Society of America

400 Stanwix St., Pittsburgh, PA 15222

RP 12.6-1976 Installation of Intrinsically Safe Instrument Systems in Class I Hazardous Locations	111.105-15(b)(2)
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National Electrical Manufacturers Association

2101 L St. NW, Washington, DC 20036

WC-3-1980 Rubber-Insulated Wire Cable for the Transmission and Distribution of Electrical Energy	111.60-13(a)(2), (c)
WC-8-1980 Ethylene-Propylene-Rubber-Insulated Wire and Cable for the Transmission and Distribution of Electrical Energy.	111.60-13(a)(3), (c)

National Fire Protection Association

470 Atlantic Ave., Boston, MA 02210

No. 56A-1973 Standard for the Use of Inhalation Anesthetics	111.105-37
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No. 70-1981 The National Fire Code	111.05-33; 111.20-15; 111.25-5(a); 111.30-19(d), (f)(1); 111.50- 3(c), (d), (f), (h); 111.50-7(a); 111.50-9; 111.53- 1(a); 111.54-1(a); 111.55-1(a); 111.59-1(a); 111.60-7; 111.60- 11(f); 111.60- 13(b)(1), (2), (c); 111.70-1; 111.79- 1(c); 111.81-5; 111.83-3(a); 111.89-1; 111.105-1; 111.105-5; 111.105-7; 111.105-39(b); 111.107-1(a)
No. 77-1977 Recommended Practice for Static Electricity	111.105-27
No. 496-1974 Standard for Purged and Pressurized Enclosures for Electrical Equipment in Hazardous Locations	111.105-7(b); 111.105-10
Naval Publications and Forms Center Customer Serv-Code 1052, 5801 Tabor Ave., Philadelphia, PA 19120	
Military Specifications:	
MIL-C-915E-1972 (with 1980 Amend) Cable and Cord, Electrical, for Shipboard Use.....	111.60-1(a); 111.60- 13(a)(4)
MIL-M-15562F-1977 Matting or Sheet, Floor Covering, Insulating for High Voltage Application	111.30-11
MIL-W-76B-1960 (with 1962 Amend) Wire and Cable, Hook-up, Electrical.....	111.60-11(e)(1)
MIL-W-16878D-1961 (with 1967 Amend) Wire Electrical (Insulated High Temperature)	111.60-11(e)(2)
Naval Sea Systems Command Naval Publications and Forms Center, Customer Serv-Code 1052, 5801 Tabor Ave., Philadelphia, PA 19120	
DDS 304-2-1974 Electrical Cables, Ratings, and Characteristics	111.60-1(a)(3)
DDS 9620-3-1962 AC Fault Current Calculations	111.52-5(b)
Underwriters Laboratories, Inc. 21333 Pfingsten Rd., Northbrook, IL 60062	
UL 20-1979 General Use Snap Switches	111.55-7
UL 44-1977 (revised through Nov. 1980) Rubber-Insulated Wires and Cables.....	111.60-11(e)(3), (f)
UL 50-1980 (revised through July 1980) Electrical Cabinets and Boxes.....	111.81-13
UL 62-1979 Flexible Cord and Fixture Wire.....	111.13(a)(1)
UL 67-1979 (revisions and MSs through Nov. 1979) Panelboards.....	111.40-1
UL 73-1981 Motor Operated Appliances.....	111.77-5(a)
UL 83-1980 Thermoplastic-Insulated Wires	111.30-19(f)(4); 111.60-1(b)(1), (3); 111.60- 11(e)(4); 111.60- 11(f)
UL 98-1974 (revisions and MSs through July 1980) Enclosed Switches	111.55-9
UL 104-1973 Elevator Door Locking Devices and Contacts	111.91-3
UL 197-1978 (revisions and MSs through Nov. 1979) Commercial Electric Cooking Appliances.....	111.77-3(a)
UL 250-1979 (revisions through Apr. 1979) Household Refrigerators and Freezers	111.77-9
UL 347-1979 High-Voltage Industrial Control Equipment.....	111.70-3(d)
UL 363-1980 Knife Switches	111.55-5
UL 399-1978 (revisions thorough Apr. 1980) Drinking Water Coolers.....	111.77-11
UL 471-78 (revisions through Apr. 1980) Commercial Refrigerators and Freezers.....	111.77-9
UL 486A-1978 Electric Wire Connectors and Soldering Lugs for Use With Copper Conductors.....	111.60-17(d); 111.60-19(b)(1)
UL 489-1980 (revisions and MSs through Dec. 1980) Molded Case Circuit Breakers and Circuit Breakers Enclosures.....	111.54-(b); 111.57- 1(c)(3), (Note)
UL 498-1979 (revisions through Jan. 1979) Electrical Attachment Plugs and Attachment Plugs and Receptacles	111.79-1(d)
UL 508-1977 (revisions and MSs through Jan. 1981) Electric Industrial Control Equipment	111.70-3(d)
UL 514-1979 (revisions and MSs through Apr. 1980) Electrical Outlet Boxes and Fittings	111.81-13

UL 595-1979 (revisions through Oct. 1980) Marine Type Electric Lighting Fixtures	111.60-11; 111.75-20(a)
UL 749-1978 (revisions through Dec. 1979) Household Electric Dishwashers	111.77-7
UL 845-1980 Electric Motor Control Centers	111.70-3(d)
UL 857-1980 Busways and Associated Fittings	111.59-1(b)
UL 921-1978 (revisions through Oct. 1980) Commercial Electric Dishwashers	111.77-7
UL 924-1979 (revisions through Feb. 1979) Emergency Lighting Equipment	112.39-1(a)(4)
UL 1025-1980 (revisions and MSs through Nov. 1980) Electric Air Heaters	111.87-3(a)
UL 1042-1979 Electric Baseboard Heating	111.87-3(a)(1)
UL 1096-1981 (revisions through Jan. 1981) Electric Central Air Heating Equipment	111.87-3(a)(2)
UL 1104-1981 Marine Navigation Lights	111.75-17(d)
UL 1236-1978 (revisions and MSs through Feb. 1980) Electric Battery Chargers	111.15-30

[FR Doc. 82-9111 Filed 4-7-82; 8:45 am]

BILLING CODE 1505-02-M

Federal Register

**Thursday
April 8, 1982**

Part III

Department of the Interior

Bureau of Land Management

**Rights-Of-Way, Principles and
Procedures; Amendment of Right-of-Way
Regulations; Rights-of-Way Under the
Mineral Leasing Act; Amendment to Oil
and Gas Rights-of-Way Regulations**

DEPARTMENT OF THE INTERIOR

Bureau of Land Management

43 CFR Part 2800

Rights-of-Way, Principles and Procedures; Amendment of Right-of-Way Regulations

AGENCY: Bureau of Land Management, Interior.

ACTION: Proposed rulemaking.

SUMMARY: This proposed rulemaking would further eliminate needless, burdensome and counterproductive provisions contained in the existing right-of-way regulations for grants made under the provisions of Title V of the Federal Land Policy and Management Act of 1976. This proposed rulemaking is the result of further study of the existing regulations made in an effort to reduce the paperwork burden on the using public and from analysis of the comments received from the public suggesting changes in the regulations.

DATE: Comments should be received by June 7, 1982.

ADDRESS: Comments should be sent to: Director (140), Bureau of Land Management, 1800 C Street NW., Washington, D.C. 20240. Comments will be available for public review in Room 5555 of the above address during regular business hours (7:45 a.m. to 4:15 p.m.), Monday through Friday.

FOR FURTHER INFORMATION CONTACT:

Leon Kabat (202) 653-8842; or Robert C. Bruce (202) 343-8735

SUPPLEMENTARY INFORMATION: After the publication of the proposed rulemaking on 43 CFR Part 2800, Rights-of-Way, Principles and Procedures, in the Federal Register of August 5, 1981 (46 FR 39968), the Department of the Interior, in keeping with the policy of the Administration to identify needless, burdensome and counterproductive regulations, continued to study the right-of-way regulations in an effort to identify additional changes that might be made that would reduce the needless, burdensome and counterproductive provisions of the regulations. The study also encompassed comments made by the public on the publication of August 5, 1981. The study resulted in the identification of additional changes that could be made that would lessen the regulatory burden on the using public. This proposed rulemaking contains those changes.

Section 2800.0-5(1), definition of the term "Right-of-way corridor" would be amended to make it clear that a right-of-way corridor, when designated, is the preferred location for right-of-way

grants issued in that area. The existing provision has led to some confusion and the amendment should clarify the section.

An additional change to the definitions section would eliminate some confusion surrounding corridor designation by adding "transportation and utility corridor" which defines that term.

Section 2801.1-1(h), Nature of right-of-way interest, would be amended to remove unnecessary language dealing with reasons for limiting the term of a right-of-way grant. The amendment will clarify and simplify the section.

Paragraph (d) of § 2801.1, Preapplication activity, would be amended to remove language dealing with what constitutes casual use.

Section 2802.4(g), Application processing, would be amended to remove the requirement that an applicant accept, in writing, the terms and conditions of the grant. The amendment would give the authorized officer issuing the grant authority to issue a right-of-way grant or temporary use permit after completion of the application processing which would become effective 30 days after issuance unless rejected or appealed by the applicant. The applicant can give written consent to accelerate the effective date of the grant or permit. This provision has been the subject of criticism and the change should shorten the application approval process.

Section 2802.5, Special application procedures, would be amended to exempt all unauthorized rights-of-way that were in existence before October 21, 1976, the date of the enactment of the Federal Land Policy and Management Act, for which the application is now made, from application processing costs presently required of right-of-way applicants. This change is being made only as an incentive to assist in resolving questions of unauthorized use for rights-of-way in existence on the effective date of the Federal Land Policy and Management Act.

Section 2803.1-2, Rental fees, would be amended by adding a new paragraph (f) which would allow the holder of a right-of-way grant to make rental payments for several years in advance, regardless of the amount, if a written request to do so was submitted. The amendment expressly reserves the right of the authorized officer to adjust and collect additional rentals when an increase in fair market value requires it. This amendment will allow right-of-way grant holders to pay several years' rental in advance so they do not have to worry about it on a year-to-year basis while also allowing the Bureau of Land

Management to retain the authority it needs to adjust the rentals to keep up with changes in a fair market value.

Section 2803.4(b), Suspension and termination of right-of-way authorizations, would be amended to remove subjective language relating to the holder's failure to comply with the requirements for a right-of-way grant and would make a determination based on factual conditions, the basis for suspension or termination. This amendment will remove language that has been the focus of complaints by the using public.

Section 2803.6-1, Amendments, would be amended by deleting language in paragraph (b) which would authorize the authorized officer to require the holder of a right-of-way grant issued prior to October 21, 1976, to amend the right-of-way grant. This authority has been questioned and its removal will resolve these questions. However, this change does not in any way lessen the authority of the Bureau of Land Management to take action it deems necessary to bring about compliance with the terms and conditions of a right-of-way grant or temporary use permit.

Section 2803.6-5, Renewals of right-of-way grants and temporary use permits, would be amended by deleting the last sentence of paragraph (a) because it is not needed. The language of § 2801.1-1(j) which requires that the grant contain provisions as to its renewability and the terms and conditions of any such renewal would be controlling on this subject.

Paragraph (b) of § 2806.1, Corridor designation, would be amended by inserting language that clarifies the meaning of the section. The new language makes clear the original intent of Title V of the Federal Land Policy and Management Act and the regulations that a right-of-way corridor can be designated, without further review, only where there is an existing transportation and utility right-of-way corridor, as that term would be defined by this proposed rulemaking.

A further amendment to § 2806.1 would be the deletion of paragraph (c) in its entirety. The Bureau of Land Management's experience with the regulations has shown that the requirement to publish the designation of a right-of-way corridor in the Federal Register does not really serve to give the public notice of the designation of a corridor.

Finally, § 2806.2-1, Procedures for designation, would be amended by revising paragraph (a) to shorten the language and make the intent clearer. The extensive language for coordination

is not needed at this point in the regulations because the coordination has already taken place as part of the land use planning process. Even though the requirement for additional coordination is being removed, it does not preclude the authorized officer from taking any steps deemed appropriate to obtain any coordination felt necessary and would delete the words "utility transportation" from the first sentence of paragraph (b) because they are no longer needed.

The principal author of this proposed rulemaking is Leon Kabat, Division of Rights-of-Way, assisted by the staff of the Office of Legislation and Regulatory Management, Bureau of Land Management.

It is hereby determined that this rulemaking does not constitute a major Federal action significantly affecting the quality of the human environment and that no detailed statement pursuant to section 102(2)(C) of the national Environmental Policy Act of 1969 (42 U.S.C. 4332(2)(C)) is required.

The Department of the Interior has determined that this document is not a major rule under Executive Order 12291 and will not have a significant economic impact on a substantial number of small entities under the Regulatory Flexibility Act (5 U.S.C. 601 et seq.).

The information collection requirements contained in 43 CFR Part 2800 have been submitted to the Office of Management and Budget for approval as required by 44 U.S.C. 3507. The collection of this information will not be required until it has been approved by the Office of Management and Budget.

List of Subjects in 43 CFR Part 2800

Administrative practice and procedure, communications, electric power, highways and roads, Pipelines, Public lands—rights-of-way.

PART 2800—RIGHTS-OF-WAY, PRINCIPLES AND PROCEDURES

Under the authority of Title V of the Federal Land Policy and Management Act of 1976 (43 U.S.C. 1761-1771), it is proposed to amend Part 2800, Group 2800, Subchapter B, Chapter II of Title 43 of the Code of Federal Regulations as set forth below:

§ 2800.0-5 [Amended]

1. Section 2800.0-5 is amended by:

- (a) Revising paragraph (l) to read:
- (l) 'Designated right-of-way corridor' means a parcel of land either linear or areal in character that has been identified by law, by Secretarial Order, through the land use planning process or by other management decision as being

a preferred location for existing and future right-of-way grants and suitable to accommodate more than 1 type of right-of-way or 1 of more rights-of-way which are similar, identical or compatible; and

(b) Adding a new paragraph (n) to read:

(n) 'Transportation and utility corridor' means a parcel or strip of land that is being used as the location for more than 1 transportation or utility right-of-way.

§ 2801.1-1 [Amended]

2. Section 2801.1-1(h) is amended by:

(a) Removing from the fifth sentence the phrase "no longer than is";

(b) Removing paragraph (h)(1) in its entirety;

(c) Renumbering paragraph (h)(2) as paragraph (h)(1) and revising it to read:

(h) * * *

(1) Public purpose served;

(d) Renumbering paragraph (h)(3) as paragraph (h)(2) and amending it by adding at the end the word "and";

(e) Removing paragraph (h)(4) in its entirety;

(f) Renumbering paragraph (h)(5) as paragraph (h)(3) and amending it by removing the word "and" at the end and adding a period; and

(g) Removing paragraph (h)(6) in its entirety.

§ 2802.1 [Amended]

3. Section 2802.2.1(d) is amended by removing the second sentence in its entirety.

§ 2802.4 [Amended]

4. Section 2802.4(g) is revised to read:

(g) The authorized officer shall, upon completion of the processing of an application for a right-of-way grant or temporary use permit, issue a grant or permit which shall become effective 30 days from the date of issuance unless rejected or appealed in writing by the applicant. The applicant may accelerate the effective date by submitting a written acceptance of the grant or permit within the 30 day period. If an applicant allows a grant or permit to become effective or gives written consent, that shall constitute an agreement between the applicant and the United States that, in consideration of the right to use the public lands, the applicant shall comply with all terms and conditions contained in the

authorization and the provisions of applicable laws and regulations.

§ 2802.5 [Amended]

5. Section 2802.5 is amended by:

- (a) Revising paragraph (a) to read:
- (a) Required to reimburse the United States for the processing, monitoring or other costs provided for in § 2803.1-1 of this title

(b) Removing paragraph (b) in its entirety; and

(c) Renumbering paragraph (c) as paragraph (b).

§ 2803.1-2 [Amended]

6. Section 2803.1-2 is amended by adding a new paragraph (f) to read:

(f) Upon the holder's written request, annual rentals, regardless of the amount, may be paid in advance. Such advance payments shall be made subject to the right of the authorized officer to adjust and collect additional rentals when warranted by changes in fair market value.

§ 2803.4 [Amended]

7. Section 2803.4(b) is amended by removing the phrase "is unwilling, unable or".

§ 2803.6-1 [Amended]

8. Section 2803.6-1(b) is amended by removing from the first sentence the phrase "or are directed by the authorized officer".

§ 2803.6-5 [Amended]

9. Section 2803.6-5(a) is amended by removing the last sentence in its entirety.

§ 2806.1 [Amended]

10. Section 2806.1 is amended by:

(a) Amending paragraph (b) by revising the first sentence to read:

(b) Any existing transportation and utility corridor that is capable of accommodating an additional compatible right-of-way may be designated as a right-of-way corridor by the authorized officer without further review as required in § 2806.2 of this title and * * *

(b) Removing paragraph (c) in its entirety.

§ 2806.2 [Amended]

11. Section 2806.2 is amended by removing the phrase "designations of" and replacing it with the phrase "of designated".

§ 2806.2-1 [Amended]

12. Section 2806.2-1 is amended by:

(a) Revising paragraph (a) to read:
 (a) The designation of a right-of-way corridor shall be by decision of the authorized officer. A land use plan or plan amendment which contains the designation of a right-of-way corridor(s) meets the notification requirements of this section.; and

(b) Amending paragraph (b) by removing from the first sentence the phrase "utility transportation".

Garrey E. Carruthers

Assistant Secretary of the Interior.

January 27, 1982.

[FR Doc. 82-9484 Filed 4-7-82; 8:45 am]

BILLING CODE 4310-84-M

43 CFR Part 2880

Rights-of-Way Under the Mineral Leasing Act; Amendment to Oil and Gas Rights-of-Way Regulations

AGENCY: Bureau of Land Management, Interior.

ACTION: Proposed rulemaking.

SUMMARY: This proposed rulemaking would further eliminate needless, burdensome and counterproductive provisions contained in the existing right-of-way regulations for grants issued under the Mineral Leasing Act of 1920, as amended.

DATE: Comments should be received by June 7, 1982.

ADDRESS: Comments should be sent to: Director (140), Bureau of Land Management, 1800 C Street, NW., Washington, D.C. 20240. Comments will be available for public review in Room 5555 of the above address during regular business hours (7:45 a.m. to 4:15 p.m.), Monday through Friday.

FOR FURTHER INFORMATION CONTACT: Leon Kabat (202) 653-8842; or Robert C. Bruce (202) 343-8735

SUPPLEMENTARY INFORMATION: After the publication of the proposed rulemaking on 43 CFR 2880, Rights-of-Way Under the Mineral Leasing Act, in the *Federal Register* of August 5, 1981 (46 FR 39964), the Department of the Interior, in keeping with the policy of the Administration to identify needless, burdensome and counterproductive regulations, continued to study the oil and gas right-of-way regulations in an effort to identify additional changes that might be made that would reduce the needless, burdensome and counterproductive provisions of the regulations. The study also encompassed comments made by the public on the publication of August 5, 1981. The study resulted in the

identification of additional changes that could be made that would lessen the regulatory burden on the using public. This proposed rulemaking contains those changes.

Paragraph (c) of § 2882.1, Pre-application activity, would be revised to remove language that has been construed by some of the public as a hindrance to complete cooperation during the preapplication consultation period.

Section 2882.3(1), Application processing, would be amended to remove the requirement that an applicant accept, in writing, the terms and conditions of the grant. The amendment would give the authorized officer issuing the grant authority to issue a right-of-way grant or temporary use permit after completion of the application processing which would become effective 30 days after issuance unless rejected or appealed by the applicant. The applicant can give written consent to accelerate the effective date of the grant or permit.

Section 2883.1-2, Rental payments, would be revised to remove the precise language covering rental payments and provide that the rental payments be made in accordance with the provisions of § 2803.1-2, except that the reduced rental provisions of paragraph (c) of that section would not be applicable. Among other changes, it would incorporate in this part authority for the authorized officer to collect several years' annual rental in advance if requested by the holder. The authorized officer would have express authority to adjust and collect additional rentals when an increase in fair market value requires it. This revision will standardize the rental requirements for all rights-of-way and will reduce the burden imposed on the using public by allowing them to pay several years' rental so they do not have to worry about it on a year-to-year basis, while allowing the Bureau of Land Management to take necessary action to obtain fair market value for the lands used for a right-of-way.

Section 2882.6-1, Suspension and termination of right-of-way grants, would be amended by removing subjective language relating to the holder's failure to comply with the requirements for a right-of-way grant in paragraph (a)(1) and would make a determination based on factual conditions the basis for suspension or termination. This amendment will remove language that has been the focus of complaints by the using public.

Section 2883.7, Change in Federal jurisdiction or disposal of lands, would be revised to substitute language similar

to that in § 2803.6 of the existing regulations. The revised language is shorter, provides needed flexibility in this area and continues to provide equal protection for the holder and the United States.

Finally, § 2883.8, Restoration, would be revised to substitute language from § 2803.4-1 that is shorter, provides needed flexibility on this point and continues to provide equal protection for the holder and the United States.

The principal author of this proposed rulemaking is Leon Kabat, Division of Rights-of-Way, assisted by the staff of the Office of Legislation and Regulation Management, Bureau of Land Management.

It is hereby determined that this rulemaking does not constitute a major Federal action significantly affecting the quality of the human environment and that no detailed statement pursuant to section 102(2)(C) of the National Environmental Policy Act of 1969 (42 U.S.C. 4332(2)(C)) is required.

The Department of the Interior has determined that this document is not a major rule under Executive Order 12291 and will not have a significant economic impact on a substantial number of small entities under the Regulatory Flexibility Act (5 U.S.C. 601 et seq.).

The information collection requirements contained in 43 CFR Part 2880 have been submitted to the Office of Management and Budget for approval as required by 44 U.S.C. 3507. The collection of this information will not be required until it has been approved by the Office of Management and Budget.

List of Subjects in 43 CFR Part 2880

Administrative practice and procedure, common carriers, oil and gas industry, pipelines, public lands—rights-of-way.

PART 2880—RIGHTS-OF-WAY UNDER THE MINERAL LEASING ACT

Under the authority of section 28 of the Mineral Leasing Act of 1920, as amended (30 U.S.C. 185), it is proposed to amend Part 2880, Group 2800, Subchapter B, Chapter II of Title 43 of the Code of Federal Regulations as set forth below:

§ 2882.1 [Amended]

(c) No right-of-way applications processing work, other than that incurred in the processing of applications for permits for temporary use of public lands in furtherance of the filing of an application and pre-application guidance under paragraph (b) of this section, shall be undertaken