

DEPARTMENT OF TRANSPORTATION**Coast Guard****46 CFR Parts 108, 110, 111, 112, 113, and 161****[CGD 94-108]****RIN 2115-AF24****Electrical Engineering Requirements for Merchant Vessels****AGENCY:** Coast Guard, DOT.**ACTION:** Final rule.

SUMMARY: As part of the President's Regulatory Reinvention Initiative, the Coast Guard is amending its electrical engineering regulations to reduce the regulatory burden on the marine industry, purge obsolete and out-of-date regulations, and eliminate requirements that create an unwarranted differential between domestic rules and international standards. This rulemaking harmonizes, where possible, the electrical engineering regulations with recent amendments to the International Convention for the Safety of Life at Sea, 1974, as amended.

Additionally, this rulemaking dramatically revises certain prescriptive electrical equipment design, specification, and approval requirements and replaces them with performance-based requirements that incorporate international standards.

DATES: This final rule is effective June 16, 1997. The incorporation by reference of certain publications listed in the rule is approved by the Director of the Federal Register on June 16, 1997.

ADDRESSES: Documents as indicated in this preamble are available for inspection or copying at the office of the Executive Secretary, Marine Safety Council (G-LRA/3406), U.S. Coast Guard Headquarters, 2100 Second Street SW., room 3406, Washington, DC 20593-0001, between 9:30 a.m. and 2 p.m., Monday through Friday, except Federal holidays. The telephone number is 202-267-1477.

FOR FURTHER INFORMATION CONTACT: Ms. Laura Hamman, Project Manager, Office of Design and Engineering Standards (G-MSE), 202-267-2206.

SUPPLEMENTARY INFORMATION:**Regulatory History**

On February 2, 1996, the Coast Guard published a notice of proposed rulemaking (NPRM) entitled "Electrical Engineering Requirements for Merchant Vessels" in the **Federal Register** (61 FR 4132). There were two correction notices published for the NPRM on February 23, 1996 (61 FR 7050), and

March 5, 1996 (61 FR 8539). The Coast Guard received 45 letters commenting on the proposal. As a result of requests from a national trade association, a notice was published on February 26, 1996 (61 FR 7090), extending the comment period from March 18, 1996, to April 2, 1996, and announcing a public meeting on March 25, 1996. Over 20 persons attended the meeting and 9 commented on the NPRM. A recording and summary of the meeting are in the rulemaking docket. On June 4, 1996, the Coast Guard published an interim rule in the **Federal Register** (61 FR 28260).

Correction notices were published on June 26, 1996 (61 FR 33045), July 3, 1996 (61 FR 34927), July 11, 1996 (61 FR 36608), July 12, 1996 (61 FR 36786), July 30, 1996 (61 FR 39695), and September 23, 1996 (61 FR 49691), in the **Federal Register**. Also, the Coast Guard published a notice of policy on October 4, 1996 (61 FR 51789), in the **Federal Register**. The Coast Guard received 30 letters commenting on the interim rule. No public meeting was requested, and none was held.

Drafting Information

The principal persons involved in drafting this document are Mr. Gerald P. Miante, Office of Design and Engineering (G-MSE-3), and Mr. Stephen H. Barber, Project Counsel, Office of Chief Counsel.

Purpose

Under the authorities cited in the "Authority" section for each part amended, the Coast Guard is amending its electrical engineering and equipment regulations for certain Coast Guard-inspected vessels in 46 CFR chapter I, subchapters I-A, J, and Q to accomplish the following:

(1) To reduce the regulatory burden on the marine industry by eliminating obsolete and unnecessary regulations and by clarifying the remaining ones. This objective is consistent with the President's Regulatory Reinvention Initiative and the Coast Guard's regulatory reform program.

(2) To replace, where appropriate, requirements that are prescriptive in nature with performance-based requirements that incorporate national or international standards and allow increased flexibility for small businesses.

(3) To eliminate requirements that create an unwarranted differential between domestic rules and international standards. This rulemaking harmonizes, where possible, the electrical engineering regulations with amendments to the International Convention for the Safety of Life at Sea,

1974, (SOLAS 74) since the electrical engineering regulations were last revised in 1982.

(4) To address comments received from the marine industry and from Coast Guard field and inspection offices.

This rulemaking is intended to serve the needs of industry while maintaining a comparable level of safety.

Discussion of Comments and Changes

The following is a summary of the comments received and the changes made to the regulatory text since the interim rule was published. The items are grouped first by those that address a general issue, then by those that relate to a specific provision in the text.

I. General Comments.

(1) Several comments congratulated the Coast Guard for its revision of subchapter J which offers the manufacturers more flexibility, increases clarity of the regulations and enhances safety of U.S. flag vessels. It was observed that the revision process reflects a lot of "hard work and good common sense."

(2) As in response to the NPRM, a number of comments recommended changes that may require further consideration by the Coast Guard. Several comments recommended that certain other standards be referenced in the regulations as replacements for, or options to, those cited in the interim rule. However, not all changes could be incorporated at this final rule stage, due to the complexity of the requests or the necessity to allow the public an opportunity to comment on new requirements. Several additional standards for incorporation by reference are included in this final rule.

The Coast Guard has a long-range plan to broaden the use of acceptable standards. Until those standards are incorporated into the regulations, any vessel owner or operator who desires to employ a fitting, material, apparatus, equipment, or arrangement other than that required by this subchapter may submit a request using the equivalency provision in § 110.20-1.

Items the Coast Guard may consider for a subsequent rulemaking include—

(a) Incorporation of the new Institute of Electronic and Electrical Engineers (IEEE) Std 45, when approved by the IEEE standards board and published;

(b) Addition of a requirement that all manufacturer's conducting self-certification should be International Organization for Standardization (ISO) 9001 registered;

(c) Incorporation of performance-based inclination criteria into § 111.01-19;

(d) Consideration of requirements for high impedance grounding systems to be added to § 111.05-19;

(e) Establishing a new subpart that would address the necessary supply of clean, uninterrupted power for modern AC-powered, solid-state equipment, which would complement the requirements of §§ 111.15-3 and 111.20-1;

(f) Addition of a ventilation alarm requirement to § 111.35-1.

(g) Prohibition of screw-in, porcelain or glass-cap fuses in subpart 111.53;

(h) Incorporation of new standards that provide guidance for high voltage cable in § 111.60-1(e);

(i) Incorporation of the Canadian Standards Association

(CSA) flame test CSA FT-4 either as another option or in place of American National Standards Institute/Underwriters Laboratories (ANSI/UL) 1581 test VW-1 in §§ 111.60-2 and 111.30-19(b)(4);

(j) Incorporation of Underwriters Laboratories (UL) 2225 into § 111.60-23(h) to provide guidance on the use of metal-clad (Type MC) cable in hazardous (classified) locations;

(k) Incorporation of Illuminating Engineers Society

(IES) Recommended Practice (RP) 12 for marine lighting in § 111.75-15(c);

(l) Permission of third-party testing for lighting, appliances, oil immersion heaters, and electric heaters in §§ 111.75-20, 111.85-1, and 111.87-3;

(m) Incorporation of International Electrotechnical Commission (IEC) 1892 in § 111.105-5 for electrical installations aboard mobile offshore drilling units (MODU's) and floating platforms;

(n) Incorporation of pump room ventilation and monitoring requirements of American Bureau of Shipping (ABS), Rules for Building and Classing Steel Vessels, section 4/5.151.6 into § 111.105-31;

(o) Replacing IEC 332-3, Category A flame test with IEC 332-3, Category A/F in § 111.107-1;

(p) Restricting the color red for general emergency or fire alarms only in § 113.25-10;

(q) Application of the cable routing and fire testing requirement of § 113.30-25(i) to all safety related circuits in part 113;

(r) Incorporation of additional requirements in § 113.50-20 to align the regulations with the International Maritime Organization (IMO) Code of Alarms and Indicators; nd

(s) Establishing a new subpart 113.70 for gas detection systems.

(3) A number of comments commended the Coast Guard's effort to streamline its electrical regulations and incorporate industry standards, both domestic and international.

Consistent with the President's Regulatory Reinvention Initiative, the Coast Guard is taking this approach in all its rulemaking projects.

(4) Two comments voiced several specific concerns and requested extending the effective date of the interim rule by six months to allow the U.S. shipbuilding community an opportunity to compile detailed comments and suggestions regarding the change. Additionally, the comment specified major concerns relating to degree of protection requirements for enclosures, ambient temperatures for equipment, ground detection regulation, and marine battery installations.

In response, the Coast Guard, after a detailed analysis of these concerns, determined that the extension of the comment period was unnecessary. In response to the comment's specific concerns and until this final rule could be finalized, the Coast Guard published a notice of policy for interim rule (61 FR 51789; October 4, 1996). This policy notice pointed out that persons wishing to apply a provision from the 1996 draft of IEEE Std 45 or the 1996 ABS Rules for Building and Classing Steel Vessels instead of a provision in the interim rule could submit, for approval on a case-by-case basis, a request under the equivalency provisions in the interim rule.

(5) One comment requested clarification on what standards are approved for incorporation by reference and who determines if a standard is approved.

The Coast Guard determines which standards are acceptable for incorporation by reference. In order to use a system arrangement or individual piece of equipment that does not meet the standards incorporated by reference or the specific requirements in this subchapter, a request may be submitted under the equivalency provision of § 110.20-1. Requests under the equivalency provision will be considered at the time a specific system design is submitted to the Coast Guard for plan review and may be accepted as part of the system plan approval.

(6) Several comments indicated that, contrary to the Coast Guard's intentions, the interim rule significantly increases the cost of doing business internationally for U.S. shipyards. They expressed concern that equipment protection, temperature, and operational

characteristic requirements have been increased beyond conventional practice. Due to this perceived increase in requirements, the comments stated that electrical equipment might require extensive additional testing to demonstrate operability. These comments also noted that the requirements for alarm, indicating and internal communications systems have been greatly expanded. Finally, the comments pointed out that the interim rule invokes requirements that did not previously exist and are not found in trade literature. The comments' specific concerns are addressed in the discussion of comments for the relative section.

Generally, however, the perceived increases and changes to the requirements in the final rule are actually a harmonization of the Coast Guard's electrical engineering requirements with classification society (ABS) and international (IEC) performance-based standards.

(7) One comment expressed concern that the Coast Guard is heavily reliant on ABS Rules when the ABS Rules may not be aligned with the requirements of the International Association of Classification Societies (IACS) Member Societies. Also, the comment expressed concern that the regulations unfairly forced Member Societies to follow ABS requirements for vessels operating in U.S. waters.

The Coast Guard has traditionally incorporated by reference various sections of ABS Rules into its electrical engineering regulations. This rule expands on the use of ABS Rules as an option or alternative to prescriptive requirements. However, the incorporation by reference of specific ABS rules does not preclude the use of other rules approved for specific applications under the equivalency provisions in § 110.20-1.

Additionally, port state control inspections are performed mainly to determine compliance with SOLAS 74 and some related Coast Guard regulations. The requirements of subchapter J and its referenced material apply to Coast Guard-certificated, U.S.-flag vessels only and are not generally applicable to foreign vessels, unless specified elsewhere in Coast Guard regulations.

(8) One comment recommended incorporating more performance-based standards and more Coast Guard policies to reduce the number of requests seeking equivalency determinations under these regulations. The comment expressed belief that adherence to performance standards

will foster greater innovation and improved overall safety.

Throughout the regulation, the Coast Guard has incorporated, wherever possible, a significant number of additional industry standards, both domestic and international. Time and resource limitations prevent the inclusion of every applicable standard. The allowance of equivalencies would permit the inclusion of appropriate standards that the Coast Guard has yet to review. This practice does foster innovation and is consistent with the Coast Guard's intention to serve the needs of industry while maintaining a comparable level of safety.

(9) Several comments pointed out that, at the time of the publication of the interim rule, which incorporated the 1995 ABS Rules for Building and Classing Steel Vessels, ABS had already published the 1996 edition of these rules.

The text of this final rule incorporates the ABS Rules for Building and Classing Steel Vessels, 1996 edition. ABS updated section 4/5 of the ABS Rules for Building and Classing Steel Vessels by incorporating international requirements and, at the same time, reorganized the section into a more user-friendly format by dividing it into parts and renumbering the paragraphs.

II. Comments to Specific Sections

Section 110.01-3. (1) Now that the rule is finalized, the option of complying with regulations in effect at the time the alterations or modifications are made has been removed from paragraph (b). Compliance with this regulation is now mandatory.

(2) Paragraph (c) has been amended to better define the term "conversion."

Section 110.10-1. (1) One comment suggested incorporating by reference IEEE Recommended Practice on Surge Voltages in Low-Voltage AC Power Circuits (IEEE Std 62.41-1991); UL 1449, Standard for Transient Voltage Surge Suppressors; and UL 1778, Standard for Uninterruptable Power Supply Equipment.

These standards apply to uninterruptable power supplies (UPS) which are not presently addressed in these regulations. While the value of these standards are realized and their use is not prohibited by these regulations, the Coast Guard will not include specific provisions or requirements on this subject in this rule without allowing an opportunity for public comment.

(2) One comment suggested that American Petroleum Institute (API) Recommended Practices (RP) should not be incorporated into these regulations

because they set forth domestic practices for fixed platform and shoreside facilities and do not reflect international consensus for vessels. It was suggested to consider incorporation of IEC 1892, which is presently under development at an international level.

The Coast Guard agrees and is awaiting the publication of the IEC standard for review. The Coast Guard may consider IEC 1892 in a subsequent rulemaking where the public will have an opportunity to comment. Until its publication, subchapter I-A, subparts 111.105 and 111.107, of this chapter and Coast Guard policy provide guidance for MODU's and other Outer Continental Shelf (OCS) vessels.

Section 110.15-1. (1) One comment recommended that the definition of "independent laboratory" be changed to clarify that the certification may not be performed in the absence of listing.

The intent of the definition is to ensure that testing must always be performed but also recognizes that laboratories vary in the terminology of promulgating successful results. Certain laboratories "list" products; other laboratories "certify" that products meet certain standards.

(2) One comment suggested that the requirement for watertight enclosures of National Electrical Manufacturers Association (NEMA) Type 6 or 6P is excessive and suggested that NEMA Type 4 or 4X most closely matches the IEEE Std 45 definition of watertight and exceeds the definition of waterproof.

The Coast Guard agrees and the definitions of "watertight" and "waterproof" have been revised in accordance with IEEE 100. Examples of industry accepted minimum degrees of protection requirements are included.

(3) One comment stated that the increase in the degree of protection requirements for "drip-proof" to IEC ingress protection (IP) 32 will cause manufacturers to redesign electrical installations aboard vessels; and IEC IP 22 is acceptable as the current industry standard. Additionally, the comment recommended reinstating NEMA 250 Type 12 in this category.

The Coast Guard agrees with all the recommendations and the definition of "drip-proof" has been revised accordingly.

Section 110.25-1. (1) One comment recommended adding wording to paragraph (i)(6) to clarify that, when required by the standard, proof of listing and certification must also be submitted. This change would align the regulatory language with the note to the same section.

Paragraph (i)(6) has been revised accordingly.

(2) Several comments suggested that, in the note to paragraph (n), items required to meet an industry standard should only be certified by an independent laboratory approved by the Commandant, and not simply self-certified by the manufacturer. One comment pointed out that elimination of this requirement would result in inferior equipment severely jeopardizing shipboard safety. The comment suggests that at a bare minimum any manufacturer conducting self-certification should be ISO 9001 registered, which requires third-party evaluation of the manufacturer's quality program.

Before the recent revisions of subchapter J, the regulation in this area required proof of listing only for equipment required to meet UL standards; manufacturer's self-certification was allowed for other standards such as IEEE, NEMA, and ANSI. The interim rule modified this requirement by consolidating UL into the latter group. The Coast Guard may consider requiring manufacturers, who wish to self-certify, to be ISO 9001-registered in a subsequent rulemaking where the public will have an opportunity to comment.

(3) One comment recommended removing from paragraph (c) Marine Safety Center (MSC) review of components to expedite review and eliminate redundant review by the MSC and the Officer in Charge, Marine Inspection (OCMI). The comment states that the certificate of inspection is a better measure of safety.

The inspection for certification of a vessel cannot be conducted at the component level for most systems. The Coast Guard has a long-standing policy to allow plan review by third parties, such as professional engineers and ABS, with oversight functions distributed between the MSC and OCMI. The Coast Guard continues to find component verification by the MSC necessary for these essential systems.

Section 111.01-1. One comment suggested adding wording to prohibit the use of combustible materials in the construction of electrical equipment, for example, enclosures and foundations.

It is Coast Guard policy, which is congruent with SOLAS 74, Regulations II-2/34 and 49, to avoid the unnecessary use of combustible materials. Therefore, new paragraph (b) has been added to this section.

Section 111.01-9. (1) Several comments noted that, in paragraphs (a) and (c), IEC IP 32 is an unduly severe degree of protection instead of a NEMA 250 Type 2 enclosure and that IEC IP 22

is acceptable as the current industry standard.

The Coast Guard agrees and has revised paragraphs (a) and (c) accordingly.

(2) Several comments suggested that the Coast Guard incorporate by reference table 4/5B.1 of the 1996 ABS Rules for Building and Classing Steel Vessels as acceptable minimum degrees of protection.

This table has been added to paragraph (b) and to the note to this section.

(3) Several comments pointed out that the degree of protection requirements NEMA 250 Type 6 or 6P and IEC IP 67 are too severe to be designated as "watertight".

The Coast Guard agrees and has revised the requirement to be NEMA 250 Type 4 or 4X and IEC IP 56 in paragraph (b) of this section and wherever the watertight requirement appears in part 113 of this chapter.

(4) One comment suggested that an addition be made to these regulations to avoid the possibility that the National Electrical Code (NEC) requirements for land-based equipment near seashores might exceed requirements in this subchapter.

This subchapter addresses Coast Guard certificated vessels. Land-based electrical installations fall under different standards and are not subject to this subchapter. The Coast Guard is not responsible for the development of NEC requirements.

Section 111.01-15. (1) Several comments pointed out that, in paragraph (c), circuit breakers be allowed to be rated at 40 °C instead of 45 °C because this is in accordance with marine circuit breakers covered in UL 489, supplement SA incorporated into § 111.54-1(b) of this chapter. This would not preclude the option of using 50 °C Navy type circuit breakers.

Paragraph (c) has been revised accordingly.

(2) One comment suggested that requiring a 55 °C rating for all control and instrumentation equipment will cause manufacturers to recertify and redesign equipment.

The increase to 55 °C rating for these critical circuit elements is in harmony with ABS Rules for Building and Classing Steel Vessels, table 4/11.1, IEC 68, and IEC 92-101, table 4. Therefore, the requirement is retained.

(3) One comment noted that an ambient temperature of 40 °C differs with the generally accepted IACS and IEC temperature of 45 °C.

The Coast Guard has accepted 40 °C electrical equipment with specific

exceptions in areas of special concern as noted in this section.

Section 111.01-17. One comment noted that the regulations establish new requirements and vendor testing to demonstrate operability.

These requirements conform to the international standard IEC 92-101 and 1996 ABS Rules for Building and Classing Steel Vessels, table 4/5.1.

Section 111.01-19. (1) One comment suggested that if the Coast Guard were to provide a performance-based inclination criteria, the result would be the elimination of equivalency determinations applicable to any single class of vessel.

No performance criteria were submitted in response to the interim rule; however, the Coast Guard may consider any performance criteria submitted for incorporation into a subsequent rulemaking.

(2) One comment recommended changing the wording to exclude certain items, such as dishwashers, toasters, and coffee makers, that are not necessary to the maneuvering and safety of the vessel.

This section has been revised to apply these requirements to critical equipment and systems.

(3) One comment stated that the new requirements, which ensure that all electrical equipment is operable under certain extreme conditions of list, roll, and trim, will result in greater expense due to the installation of new equipment requiring additional tests.

Although this section has been revised to apply to critical systems, the inclination requirements are consistent with IEC 92-101, table 3.

Section 111.05-7. (1) One comment noted that this section is redundant to § 111.60-5.

This section is retained because of its specific reference to armored cable and grounding.

(2) One comment recommended removing the reference to IEC 92-3 because this standard does not address installation guidance for armor and sheathing.

The reference to IEC 92-3 is retained because several sections of Part 3 of the IEC publication, such as clauses 10.18 and 11.14, provide guidance for metallic armor and sheathing.

Section 111.05-9. One comment recommended incorporating the American Boat and Yacht Council (ABYC) Standard E4 on lightning protection.

The Coast Guard agrees that guidance is appropriate for lightning protection. The Coast Guard is incorporating the international standard IEC 92-401, Electrical Installations in Ships; Part

401: Installation and test of completed installation, section 10, Lightning Conductors.

Section 111.05-19. One comment recommended additions to the regulation for permitting high-impedance grounding schemes on all vessels with a distribution voltage greater than 1,000 volts a.c. as this method becomes an important tool for circuit protection, fault coordination, and the limitation of equipment damage.

While the value of this practice is realized and its use is not prohibited by these regulations, the Coast Guard will not include specific provisions or requirements on this subject in a final rule without allowing an opportunity for public comment. However, this final rule references this grounding method in §§ 111.05-19 and 111.05-27.

Section 111.05-23. (1) One comment suggested allowing either the ground detecting equipment or an alarm signal from the detecting equipment to be installed at the distribution switchboard via a control cable instead of bringing back a phase conductor to the main distribution switchboard. Also, the comment points out that allowing the detection equipment to remain near the transformer would also make it available for local troubleshooting.

While this is the intent of paragraph (d), a note has been added to the paragraph for clarification.

(2) One comment recommended that paragraph (d) should be revised to include only isolation devices greater than 10 kVA.

Paragraph (d) has been revised to specify "feeder" circuits, regardless of the load.

(3) One comment suggested that the increase in the required number of ground detector lights will have a great impact on the cost and space.

The revisions to paragraph (d) discussed previously should address the concern of this comment by reducing the number of circuits monitored and method of monitoring.

Section 111.05-27. One comment stated that the requirement to momentarily remove the indicating device is overly prescriptive and recommended a more performance-based requirement to permit new technology.

The section has been revised to clarify intent.

Section 111.05-33. (1) Several comments suggested revising this section to clarify safety grounds (bonding) versus system grounds so the language is technically accurate.

This section has been revised accordingly.

(2) Several comments noted that clarification is necessary in paragraph (b) to exclude "system" ground conductors which are required by Coast Guard policy to be equal in size to the current carrying conductors.

Paragraph (b) has been revised accordingly.

(3) One comment recommended revising the requirement to allow cable armor and Type MC cable sheath as a grounding conductor as long as the cable is third-party tested and listed (with its terminators) as approved for this application.

Coast Guard historically has prohibited the use of marine shipboard cable braided armor or metallic sheath as the grounding conductor. Type MC cable installation is required to be in accordance with the NEC as stated in § 111.60-23 of this chapter.

Section 111.10-1. One comment requested a definition for the term "auxiliary propulsion" since certain types of thrusters are designed for use as "take-home" propulsive devices and thrusters are specifically excluded from paragraph (a).

The term "auxiliary propulsion" is revised to read "propulsion auxiliary" to clarify that the intended machinery includes items such as fuel oil service pumps, lube oil service pumps, purifiers, engine sea water and fresh water cooling pumps, and air ejection equipment. Non-conventional systems must be reviewed on a case-by-case basis to consider such a thruster or "take-home" motor in a systems relationship with the power generating equipment capacity.

Section 111.10-9. One comment stated that propulsion and vessel control are the critical components of the specified loads. The comment noted that absent these systems, and given the ability of many safety systems to operate in the absence of distributed electric power, the additional redundancy and expense of two independent transformers is not justified.

Most vessels rely on distributed electric power for system operation. Plans for any non-conventional system which does not rely on power from the transformers may be submitted for review in accordance with § 110.20-1.

Section 111.12-1. (1) One comment suggested that the Coast Guard accept other major classification societies besides ABS to eliminate differential between domestic rules and international standards. According to the comment, ABS Rules create a burden on equipment manufacturers with additional "type-testing."

The Coast Guard has traditionally incorporated by reference various

sections of ABS Rules into its electrical engineering regulations. This rule expands on the use of ABS Rules as an option or alternative to Coast Guard prescriptive requirements. However, the incorporation by reference of specific ABS rules does not preclude the use of other rules approved for specific applications under the equivalency provisions in § 110.20-1, whereby the Coast Guard can consider alternative "type-testing."

Since ABS is a member of IACS and has recently revised its electrical section 4/5 (section 4/3 of the ABS Rules for Building and Classing Mobile Offshore Drilling Units) to incorporate many IEC practices, the Coast Guard considers prime movers meeting these sections to be aligned with international standards.

(2) One comment noted that neither Coast Guard regulations nor ABS Rules provide for automatic shutdown of a diesel generator's prime mover upon failure of that engine's pressure lubrication system.

The requirement in paragraph (c) of this section is retained because, in addition to being sound engineering practice, table 4/11.10 of the 1996 ABS Rules for Building and Classing Steel Vessels provides for automatic shutdown of diesel, steam, and gas turbine prime movers upon low lube oil inlet pressure to that engine as well as to the bearings of the electrical generator.

Section 111.12-11. One comment recommended adding a new item to paragraph (c) which would require the circuit breaker for a generator to open upon the shutting down of the prime mover. This is a safety feature required by ABS Rules for Building and Classing Steel Vessels, 1996, section 4/5A5.3.1.

The inclusion of a low-voltage trip element, activated upon the shutting down of the prime mover, has always been a feature on generator circuit breakers and in the provisions of ABS Rules; however, this requirement has been absent from Coast Guard regulations.

It is now added in new paragraph (c)(1).

Section 111.15-2. (1) One comment noted that the requirements of this section will cause the U.S. marine industry to use specialized, more expensive batteries. Also, the addition of a special nameplate will increase costs.

The Coast Guard utilizes regulations, incorporating Classification Society Rules and standards, to ensure that equipment aboard certificated vessels is suitable for the environment and the purpose for which it is installed. This is particularly applicable to equipment

used in cases of emergency. Labeling of the product by the manufacturer to attest to certain conditions is a cost effective method of presenting this information to shipowners, operators, crew, and inspectors.

(2) One comment recommended the use of a more performance-based standard instead of the specific requirements in paragraph (a). Performance standards would preclude the necessity for equivalency determinations for column stabilized units, surface effects vessels, etc.

The requirement of 40 degrees of inclination is consistent with IEC 92-101 and 92-305. Although a parameter for use of accumulator batteries in ships, a unit designed for the environmental conditions of marine installation should include this feature. The use of an accumulator battery that does not meet this parameter may be requested under the equivalency provision of § 110.20-1. Submissions under the equivalency provision will be considered at the time a specific system design is submitted to the Coast Guard for plan review and may be accepted as part of the system plan approval.

Section 111.15-3. One comment suggested the addition of a three pole disconnect switch located in the battery compartment of large battery installation with a nominal voltage of higher than 120 volts for use during servicing.

This comment applies mainly to a large amount of cells for use with uninterruptable power supply units and may be considered for inclusion into a subsequent rulemaking where the public will have an opportunity to comment.

Section 111.15-5. (1) One comment noted that, in paragraph (c), batteries are allowed in confined spaces if the batteries are sealed. The comment recommended that no batteries, sealed or otherwise, should be situated in confined areas because these units are only "sealed" if everything is normal and may vent as much as standard cells under abnormal conditions.

Paragraph (c) has been revised accordingly.

(2) One comment suggested that, in paragraph (e), it is sufficient for a battery to have indication of manufacturer and type number on the battery with documentation available to support the ampacity, construction, and specific gravity requirements.

Battery documentation is usually obscure and unavailable for service personnel and inspectors and labeling is considered necessary for maintenance and inspection.

Section 111.15-20. One comment recommended that, if the Coast Guard is going to specify ampacity considerations, then it should also specify a voltage drop in the criteria for cable sizing.

Paragraph (c) has been revised to include the words "while maintaining the proper voltage at the load end."

Section 111.15-30. One comment indicated that the purpose of this section is unclear and appears to be directed at a unique situation.

The purpose of this section is to ensure that, from a systems engineering perspective, battery installations and their chargers are compatible. It also cautions against the use of some portable battery chargers which may impose an unintentional ground on the vessel's power supply system. Section 111.15-30 is retained.

Section 111.20-1. (1) One comment suggested revising the requirement to allow only transformers rated at less than 500 VA to be installed in an enclosure as an alternative to the winding being inherently resistant to moisture, sea atmosphere, and oil vapor. It reasons that the long term integrity of enclosures for larger, permanently fixed transformers may not survive the life cycle of the vessel.

This section is retained because it offers alternatives for this equipment. Should the enclosure choice be selected, design, plan review, installation, and inspection must all show suitability for environmental conditions and applicability to the system in which it is used.

(2) One comment recommended revising the provision to allow an exception for inherently current limiting ferro-resonant transformers which are incorporated in a device meeting UL 1778.

The Coast Guard determined that this equipment is for specific use and uninterruptable power supplies. As stated previously, uninterruptable power supplies will be addressed in the next revision of the electrical engineering regulations. Until that time, use of uninterruptable power supply systems are not specifically prohibited by these regulations, and their usage is subject to the normal plan review and inspection process.

Section 111.30-5. (1) One comment noted that IEC 92-302 and 92-503 do not define low and medium voltages but refer to voltage ranges. Only IEEE defines the terms.

Paragraph (a) has been revised accordingly.

(2) One comment suggested moving paragraph (b) to § 111.01-9, Degrees of protection.

Paragraph (b) specifically addresses dripping and falling substances, whereas, § 111.01-9 addresses the universal enclosure requirements as outlined in the referenced standards.

Sections 111.30-9, 111.30-11, and 111.30-13. One comment recommended that the provisions of these sections be reinstated. The comment suggests that these operational safety standards should be set as clear Coast Guard standards. The comment expressed a concern that if a crew member were to remove an insulated floor matting or grating for cosmetic reasons, the potential threat to safety would not be in violation to any clear cut Coast Guard requirement; only a violation to an obscure reference in a secondary document which might not be aboard the vessel.

The features described in the previously removed §§ 111.30-9 (doors and non-conducting handrails) and 111.30-13 (grounding of switchboard instrumentation) are all construction features to be installed by the manufacturer in accordance with applicable standards. In reference to previously removed § 111.30-11 (mats or gratings), the Coast Guard agrees that this is an important operational safety concern and that specific guidance is warranted. The reinstated performance-based requirement reflects international standards.

Section 111.30-19. (1) One comment suggested adding punctuation to paragraph (b)(3) to clearly distinguish between switchboard wire and instrumentation wire.

Paragraph (b)(3) has been revised accordingly.

(2) Several comments indicated that paragraph (b)(6) and § 111.60-11, paragraph (d) cross-reference each other for switchboard wiring and leave the requirements for switchboard wiring undefined.

The requirements for switchboard wiring are found in paragraph (b) and its referenced standard. The cross-reference to § 111.60-11 was unnecessary and has been removed.

(3) One comment recommended changing the wire size in paragraph (b)(3) to #18 AWG to align with § 111.60-4.

The #14 AWG wire size requirement in this section is specific to switchboard wiring, whereas the #18 AWG allowance in § 111.60-4 is for general wiring such as lighting fixtures or other uses where appropriate.

Section 111.30-21. One comment recommended retaining this section with modifications to allow devices which operate at elevated temperatures,

but are self-cooling and do not adversely affect surrounding components.

The Coast Guard determined that the requirements removed from the regulations are sufficiently addressed in the relevant construction standards.

Section 111.30-24. One comment requested clarification on the word "floating."

As discussed in the preamble to the interim rule, on page 28264, a comment to the NPRM requested that exclusion for a non-self propelled MODU be expanded to include other OCS facilities. Since subchapter J is not universally applicable to fixed platforms, the Coast Guard accepted the comment's suggestion to specify "floating" units which are subject to the provisions of this subchapter such as tension leg platforms (TLP) and semi-submersible production platforms.

Section 111.30-25. Two comments noted that this section, which was not addressed in the NPRM or the interim rule, is highly prescriptive and limits the use of newer technologies.

The Coast Guard has determined that any new equipment resulting from advances in technology that performs the same function as those devices listed in § 111.30-25 can be considered for approval under § 110.20-1. The list in § 111.30-25 is retained because the Coast Guard determined it to be representative of those functions necessary for the safe operation of a vessel.

Section 111.33-11. One comment recommended specifying that "ABS Rules" refers to the ABS Rules for Building and Classing Steel Vessels.

The Coast Guard agrees and has changed the reference from "ABS Rules" to "ABS Rules for Building and Classing Steel Vessels." Additionally, the reference to "ABS MODU Rules" has been changed to "ABS Rules for Building and Classing Mobile Offshore Drilling Units."

Section 111.35-1. One comment requested a revision to this section that requires an alarm indicating the failure of system ventilation.

The Coast Guard may consider adding a requirement for an alarm indicating the failure of a ventilation system in a subsequent rulemaking where the public will have an opportunity to comment.

Section 111.40-1. One comment noted that the deletion of this section would result in the installation of panelboards never intended for the marine environment. The comment suggests incorporating IEEE Std 45 to provide guidance for the construction of panelboards.

The Coast Guard agrees and is adding the suggested reference because of its wide acceptance in the marine field.

Section 111.51-3. One comment pointed out that wording is missing from this section which would ensure proper protective device coordination in all cases and round out the coordination declaration made in § 111.51-1.

The Coast Guard agrees and the section is revised accordingly by the addition of new paragraph (a).

Section 111.53. One comment suggested adding specific wording that prohibits the use of any fuse holder constructed of porcelain or ceramic materials or any fuse that is of the screw-in type.

The Coast Guard is reviewing the safety implications of screw-in type fuses and may consider prohibiting those fuses in a subsequent rulemaking where the public will have an opportunity to comment.

Section 111.54-1. One comment suggested referencing IEC 56 for circuit breakers above 1000 volts in place of the reference in paragraph (c)(3)(ii) to IEC 947-2 for medium voltage circuit breakers.

The Coast Guard agrees that the appropriate standard for circuit breakers above 1000 volts is IEC 56. Paragraph (c)(3)(ii) is revised accordingly.

Section 111.60-1. (1) One comment noted that in paragraph (a) the word "cooper" should be changed to the word "copper."

Paragraph (a) has been revised accordingly.

(2) Several comments requested reinstatement of MIL-C-915F cable pointing out that this is a current Navy standard and another comment suggested further the addition of "amendment 2" to the MIL specification.

The Naval Sea Systems Command (NAVSEA) electrical office has informed the Coast Guard that MIL-C-915 cable is not being installed in new construction or major modifications. Additionally, its supply of MIL-C-915 cable has been cut-up and sold for scrap.

(3) One comment suggested that marine shipboard cable listed by a Nationally Recognized Testing Laboratory (NRTL) accepted by the Commandant is acceptable for use.

The term "NRTL" is most commonly used by Occupational Safety and Health Administration (OSHA) for safety-type testing, whereas cable testing includes physical testing as well as fire testing. The Coast Guard maintains a list of independent testing laboratories accepted by the Commandant for this

purpose. Present Coast Guard policy is consistent with the suggestion.

(4) One comment suggested deleting the terms "construction" and "identification" from paragraph (a) and recommended that all cable must meet the performance requirements in IEEE Std 45.

As stated in paragraph (d), all electrical cable must now meet the performance requirements of section 18 of IEEE Std 45.

(5) One comment recommended for inclusion in paragraph

(f) Type TC and Type ITC cables for industrial applications.

Section 111.107-1 contains the regulations for industrial systems and cables. Special purpose or ship-specific equipment can be accepted as equivalent under § 110.20-1 during plan review.

(6) One comment recommended that incorporating IEC 92-3, removing the words "and identification" from paragraph (a), and removing the words "and marking" from paragraph (d) would result in economical cables for shipbuilders. If this is not an option, the comment suggests that the Coast Guard accept the minimum markings instead of requiring the more extensive markings of IEEE Std 45.

The Coast Guard has determined that the minimum marking requirements are those in IEEE Std 45. The IEEE Std 45 markings constitute the five basic pieces of information necessary for minimum identification.

(7) One comment suggested deleting paragraph (d) because it unnecessarily adds additional performance requirements to material and finished products which have met its particular standard.

Paragraph (d) is retained because it ensures IEEE Std 45 performance standards are met and guarantees that minimum safety criteria are upheld.

(8) One comment suggested an editorial change in paragraph (f) to correctly reference the IADC standard as an application standard.

Paragraph (f) has been revised accordingly.

(9) One comment recommended that in paragraph (e) the regulation should specify a standard for high-voltage cable that is acceptable to the Coast Guard.

Presently, IEEE Std 45 and IEC 92-3 as well as several MIL specifications and UL 1072 form the acceptable standards. The Coast Guard may consider IEC 92-354 and IEC 502 in a subsequent rulemaking where the public will have an opportunity to comment.

Section 111.60-2. (1) One comment suggested deleting the reference to

ANSI/UL 1581 test VW-1 because it does not guarantee a degree of flame propagation resistance such as the other specifications mentioned in this section. It recommended replacing it with an alternate test CSA FT-4.

The flammability tests in this section are retained. The Coast Guard may consider test CSA FT-4 in a subsequent rulemaking where the public will have an opportunity to comment.

(2) One comment suggested that it is not necessary to physically separate specialty cable from other cable in all installations.

Paragraph (a) requires physical separation only if the flammability tests in the introductory text of this section cannot be met.

(3) One comment recommended paragraph (b) be applied only to cable runs installed in enclosed locations.

Cable that cannot meet minimum flammability requirements must comply with both paragraphs (a) and (b) to reduce the risk of flame spreading among cable runs and throughout the vessel.

Section 111.60-3. Several comments suggested revising paragraph (d) to encompass special applications referred to throughout section 19 of IEEE Std 45 and not limiting the focus on the particular application in 19.6.5 of the standard.

Paragraph (d) has been revised accordingly.

Section 111.60-4. One comment noted that the listed metric conversions of AWG sizes do not correspond to standard metric wire sizes. The comment suggests listing standard metric wire sizes that are acceptable in lieu of the AWG sizes.

The metric sizes that accompany AWG numbers are provided as approximate metric dimensions and are "soft" conversions from the AWG circular mil equivalents. Actual metric nominal size is found to differ between such standards as JIS and European. Also, other wire gauge systems exist such as British Standard and Birmingham whose nominal sizes and actual dimensions differ from AWG and metrics. Electrical plans are reviewed and approved by the Coast Guard usually with an AWG size listed and annotated with "or equivalent." It is up to the designer to choose a cable with conductors capable of equal or greater ampacity which will pass final inspection upon installation.

§ 111.60-11. (1) One comment suggested modifying the section title to read "Wire (other than ground conductors)."

The Coast Guard determined that this change is unnecessary because this

section is self-explanatory and grounding conductors are covered elsewhere.

(2) One comment recommended qualifying the word "enclosure" as "equipment enclosure."

The Coast Guard determined that the suggested clarification is unnecessary because wire is allowed in junction boxes, controllers, and switchboards as well as equipment enclosures, for example, lighting fixtures and motors.

(3) One comment suggested revising paragraph (c) to reference the appropriate standards for wire relative to IEEE Std 45.

Paragraph (c) has been revised accordingly.

§ 111.60-17. (1) One comment suggested including specific requirements for crimped ferrules or pin terminals to prevent loose strands of wire causing shorts when used with compression type terminals.

The Coast Guard determined that this is an installation quality control issue addressed under the general requirements in § 111.10-1 for electrical installations.

(2) Several comments recommended prohibiting twist-on type connectors, recommended including a referenced standard or method of securing them to prevent loosening, or recommended eliminating paragraph (b).

The Coast Guard determined that this, again, is an installation quality control issue addressed under the general requirements in § 111.10-1 for electrical installations. Twist-on connectors must be installed in accordance with this entire section; safety is maintained with proper installation. Industry has requested, and Executive Order 12866 demands, that government agencies include more performance-based requirements rather than prescriptive regulation. Section 111.60-17 is an example of the inclusion of a performance-based standard and presents an allowance for other methods or new technology which meet the same criteria.

§ 111.60-19. One comment recommended revising paragraph (a) to allow temporary splices within an enclosure in hazardous locations for repair operations necessitated by damaged cable, where replacement of such damaged cable would shut down vessel operations. The spliced cable run could then be replaced at a later date while the vessel is in a shipyard.

The Coast Guard takes into consideration the economic conditions and mission of the vessels it regulates, but its primary concern is the safety of these vessels and their crews.

It is the responsibility of certain persons in charge of a vessel to notify the Coast Guard in the event of a marine casualty, accident, or serious marine incident. The cognizant OCMI will determine the course of action to be taken, notwithstanding temporary repairs of an emergency nature which might be deemed necessary by the master.

§ 111.60-23. (1) Several comments applauded the proposal to allow limited use of Type MC cable. One comment noted that Type MC cable had been used in the marine environment for more than 20 years. It states that Type MC cable meeting the standards as proposed provides an acceptable alternative while maintaining safety.

(2) One comment expressed concern that a disproportionate number of comments support the prohibition or restriction of Type MC cable in marine locations.

The Coast Guard determines regulatory policy based on the substance of comments, rather than the number of comments, on a subject.

(3) Several comments recommended that instrument tray cable (ITC) (300 volt insulation) with similar Type MC cable construction be allowed where allowed by NEC standards.

Article 90-2(b) of the NEC states that the code does not generally cover installations on vessels. NEC standards do not apply to Coast Guard certificated vessels, unless specifically incorporated by reference in this subchapter.

Alignment with NEC standards is not necessarily an objective of this rulemaking. ITC cable has not been evaluated for use aboard vessels.

(4) One comment noted that § 111.60-23(a) refers to "vessels" whereas paragraphs (c)(2) and (g) refer to "offshore floating drilling and production facilities."

The term "vessel" is broadly defined in section 3 of title 1 of the U.S. Code to include floating production units, mobile offshore drilling units, and ships. Paragraphs (c)(2) and (g) apply only to offshore floating, drilling and production facilities.

(5) Several comments suggested that the word "welded" as used in the term "continuously welded corrugated metal-clad (CWCMC) cable" be removed throughout § 111.60-23 to conform with commercial terminology. This will provide a continuous impervious corrugated metal sheath manufactured by either the extrusion or welded process.

The term "continuously welded corrugated metal-clad (CWCMC) cable" in paragraph (a) has been changed to "continuous corrugated metal-clad

cable" and paragraph b(1) and paragraph (h) have been changed accordingly.

(6) One comment questioned why only corrugated as opposed to non-corrugated Type MC cable is allowed.

Non-corrugated Type MC cable does not have the flexibility necessary for use on vessels or floating facilities. Corrugated cable would be less susceptible to cracking under these conditions.

(7) Several comments recommended that the requirement for the UBZV listing on Type MC cable be removed. One comment stated that the UBZV listing does not affect construction of the cable or its suitability for use on vessels, but does affect cable pricing and availability.

The Coast Guard agrees. The UBZV listing has been removed from paragraph (b). This removal is also consistent with the Coast Guard's position that metal-clad cable is a code product and not a marine shipboard cable.

(8) One comment recommended that the term "impervious" in reference to the sheath of the cable be changed to "gas/vaportight" because "gas/vaportight" is an NEC term.

The terms "gas-tight" and "vapor-tight" have been added for clarity.

(9) One comment suggested that the term "close-fitting" be removed as undefined.

The words "close-fitting around the conductors and fillers" have been added for clarity.

(10) One comment stated that paragraph (b) was unclear as to what an independent laboratory was to certify or list.

Paragraphs (b)(2) and (b)(3) have been combined to correct this discrepancy.

(11) Two comments recommended that the restrictions for

Type MC cable in paragraph (c)(1) should be moved to § 111.60-3 because they are applicable to all cables.

Type MC cable must be treated separately because it is not suitable for applications such as elevators. Marine shipboard cable, described in § 111.60-1, must be used for all the services in paragraph (c).

(12) Two comments suggested that Type MC cable should be allowed in drilling function areas as it is recognized by API RP 14F for use on fixed production facilities.

API RP 14F applies only to fixed facilities. This subchapter does not apply to fixed facilities.

(13) Several comments recommended removing paragraphs (c)(2) and (g). They contend that these paragraphs are prescriptive and are already covered

under the performance standard in paragraph (c)(1).

Paragraphs (c)(1) and (c)(2) have been combined for clarity and paragraph (g) is retained. The Coast Guard does not allow the use of Type MC cable in areas that are inherently subject to high vibration or the other conditions specified in paragraph (c).

(14) Several comments suggested that installation of Type MC cable not be limited to article 334 because other articles within the NEC are also applicable.

The other applicable articles are already referenced in article 334.

(15) Two comments recommended the acceptance of table A6 of IEEE Std 45 as well as the ampacity tables given in the NEC since both are based on the same method of calculation.

Type MC cable is a code product, to be installed in accordance with article 334 of the NEC and, therefore, the NEC's ampacity tables are to be used.

(16) Several comments suggested that the metallic sheath of Type MC cable be allowed for use as a grounding conductor.

The Coast Guard determined that there is insufficient historical data on the use of Type MC cable on vessels to allow the metallic sheath to be used as a grounding conductor. Even on shipboard cable, the Coast Guard has never allowed braided armor to be used as a grounding conductor. The Coast Guard maintains this policy with Type MC cable.

(17) Many comments suggested removing the prohibition of the use of Type MC cable as interconnection between drilling and production modules.

The Coast Guard has revised paragraph (g) to allow Type MC cable to be used as interconnection between drilling and production modules on the same platform. Type MC cable is still prohibited as interconnection between temporary drilling packages and platform production modules.

(18) The Coast Guard is aware of the recently published UL 2225, Metal-Clad Cables and Cable-Sealing Fittings For Use in Hazardous (Classified) Locations, and may consider it as a reference in paragraph (h) in a subsequent rulemaking where the public will have an opportunity to comment.

(19) One comment recommended that paragraph (h) be revised to avoid confusion between terminations and fittings for Type MC cable and those for similar cable, such as TECK.

Paragraph (h) has been revised to assure that fittings and terminations used must be compatible with the particular Type MC cable used.

Section 111.70-1. One comment stated that it is unsafe to allow one phase to remain connected in ungrounded three-phase alternating current systems.

Paragraph (b) of this section refers to the controller/motor overload relay and not the main disconnect device to isolate the controller/motor from the power source. Paragraph (a) includes a reference to ABS Rules for Building and Classing Steel Vessels addressing the main disconnect and its relationship to the motor-running protective devices. Additionally, language has been added to paragraph (b) to clarify that the opening of two phases refers to the controller/motor overload devices.

Section 111.70-3. (1) One comment suggested a revision to paragraph (d)(1), by replacing "and" with "or" to clarify that when both a controller and motor control center exist the identification information should only be required at one of the two.

Motor control centers group individual controllers into a central location instead of installing each controller locally near its motor. Normally, the use of one precludes the use of the other for a particular motor.

(2) One comment suggested eliminating items (v) and (vii) in paragraph (d)(1) and listing information sufficient to identify the motor controlled, its load, voltage and phase.

The requirements in paragraph (d)(1) are consistent with IEEE Std 45 and in keeping with standard engineering practice to provide important information necessary for the safe operation of the electrical system.

Section 111.70-7. One comment recommended an editorial change in paragraph (d)(2) concerning the requirements of the disconnect device.

Paragraph (d)(2) has been revised accordingly.

Section 111.75-5. One comment recommended that in paragraph (b) the term "lamp sizes" be changed to "fixture ratings", and retain the minimum 50 watt requirement for convenience receptacles or IEEE Std 45, paragraph 21.6 be referenced.

Paragraph (b) has been revised accordingly.

Section 111.75-15. One comment indicated that the text of paragraph (c) is vague, providing no firm guidance. The comment suggests incorporating IES RP 12, Recommended Practice for Marine Lighting.

The Coast Guard may consider IES RP 12 in a subsequent rulemaking where the public will have an opportunity to comment.

Section 111.75-17. (1) One comment suggested that the term "range light" in

paragraphs (b) and (c) either needs to be defined or replaced with the term "masthead light."

The Coast Guard agrees and is removing the term "range light" which is now referred to in the Convention on International Regulations for Preventing Collisions at Sea, 1972 (72 COLREGS) as "a second masthead light."

(2) One comment recommended the inclusion of specific photometric requirements for battery powered navigation lights.

The Navigation Safety Advisory Committee (NAVSAC) reviewed the adequacy of lighting on barges, which is generally powered by battery, and concluded that no lighting requirement changes were necessary.

Section 111.75-20. (1) One comment recommended revising paragraph (a) so that it is clear that the paragraph does not apply to lighting fixtures in hazardous locations.

The Coast Guard is revising paragraph (a) accordingly.

(2) Two comments suggested replacing the term "meet" with the term(s) "listed/certified" to provide a means of verifying compliance with any industry standard and requiring lighting fixtures to be tested by an independent third party.

It is Coast Guard policy that when a referenced standard requires testing then the procedure is part of the regulation. Since the Coast Guard maintains a process of independent laboratory acceptance by the Commandant for items such as fire detection systems, cable, and marine lighting fixtures, it is also part of our policy that such testing be certified at these laboratories. The Coast Guard may consider third party testing in a subsequent rulemaking where the public will have an opportunity to comment.

Section 111.85-1. One comment recommended that each oil immersion heater be tested by an independent third party testing institution.

An added requirement for compliance with a specific standard and subsequent testing by a third party cannot be placed in this final rule without opportunity for public comment. Recognizing the safety implications of the equipment, the Coast Guard may consider the inclusion of applicable safety standards and testing arrangements for a subsequent rulemaking where the public will have an opportunity to comment. Presently, guidance is afforded to both manufacturer and user in subpart 111.01 of this chapter which establishes general criteria for all electrical equipment so that it is appropriate for the

environment and purpose for which it is installed.

Section 111.87-3. One comment suggested that in paragraph (a) deleting the word "meet" and substituting the words "listed/certified."

It is Coast Guard policy that when a referenced standard requires testing then the procedure is part of the regulation. Since the Coast Guard maintains a process of independent laboratory acceptance by the Commandant for items such as fire detection systems, cable, and marine lighting fixtures, it is also part of our policy that such testing be certified at these laboratories. The Coast Guard may consider third party testing in a subsequent rulemaking where the public will have an opportunity to comment.

Section 111.105. Several comments indicated that the obsolete MI Type cable, referenced in § 111.105-17, paragraph (a), has been eliminated by the proposed IEEE Std 45 and should also be removed from these regulations. Additionally, with new technologies in cable jacket chemistry, these comments suggested that the armor requirements for hazardous location cables also be removed, as they have been for non-hazardous areas.

The Coast Guard agrees and subpart 111.105 has been revised accordingly.

Section 111.105-3. Several comments recommended revising this section as it allows unarmored cable in hazardous locations.

As indicated above in the discussion of comments for subpart 111.105, the general requirement for armored cable in all hazardous locations has been removed.

Section 111.105-5. One comment supports the inclusion of API RP 505 as a criteria for system integrity, while another comment stated that it would be imprudent to consider the adoption of any API RP's because they are superseded by IEC documents addressing both MODU's and fixed platforms in a single comprehensive document.

The API RP 505 is in draft form and as such is unavailable to the Coast Guard for review or to the public for purchase. When the document is published, the Coast Guard may consider API RP 505 for a subsequent rulemaking where the public will have an opportunity to comment.

The IEC, in which the U.S. participates, is in the final draft stages of IEC Publication 1892 (IEC 1892), "Mobile and Fixed Offshore Units—Electrical Installations." IEC 1892, part 3 addresses hazardous locations. This document reflects international

consensus and will be considered for inclusion in these regulations in a subsequent rulemaking.

Section 111.105-11. (1) One comment pointed out that the two standards referenced in paragraph (a) are not compatible because IEC 79-11 defines two types of IS systems (Ia and Ib), whereas UL 913 defines only one.

The Coast Guard accepts the UL 913 definition or IEC 79-11 (Ia) only. Paragraph (a) has been revised accordingly.

(2) Several comments recommended removing the option for shielded cable in paragraph (b)(1) because most shielding may be very thin and not suitable for safely providing sufficient isolation from non-IS circuits. Another comment recommended in paragraph (b)(1) removing the option for metallic armored cable since armoring is for mechanical protection and not to be substituted for an electromagnetic interference (EMI) shield.

The purpose of paragraph (b)(1) is to offer options to protect intrinsically safe circuit cables from induced voltages generated by magnetic fields of non-intrinsically safe circuit cables. The Coast Guard agrees that an armored covering is not meant to function as an EMI shield. However, properly installed and grounded braided armor does afford some degree of protection depending on intercircuit parameters. Additionally, if a shielded cable is installed for protection, it is assumed that its dimensions have passed plan review and that it is suitable for the service intended. Both options are retained.

Section 111.105-17. (1) One comment suggested clarifying the first sentence in paragraph (a) so that not all hazardous locations are required to have through runs of cable.

The intention of paragraph (a) is that all hazardous areas be fitted with through runs of cable, therefore the requirement remains.

(2) Several comments suggested that paragraph (a) be revised to require that cable in all hazardous locations be armored.

As indicated above in the discussion of comments for subpart 111.105, the general requirement for armored cable in all hazardous locations has been removed but the installation of armored cable remains as an option.

Section 111.105-31. One comment suggested adding a new paragraph (f)(5) harmonizing Coast Guard and ABS requirements for pump room ventilation and monitoring.

The Coast Guard recognizes the need for direction on this subject. However, new material must be presented to the public for comment before a final rule.

The Coast Guard may consider these provisions for a subsequent rulemaking where the public will have an opportunity to comment.

Section 111.107-1. One comment recommended removing the word "and" in paragraph (c)(1)(i) and adding the word "or" since either standard will provide a comparable level of safety.

This section has been revised accordingly.

Section 112.05-5. One comment recommended modifying paragraph (d) to allow equipment that supports the emergency power source (e.g., fans and CO₂ bottles).

Paragraph (d) has been revised accordingly.

Section 112.50-1. (1) One comment suggested adding a new paragraph (l) that requires the generator circuit breaker open upon the shutting down of the prime mover as required in ABS Rules for Building and Classing Steel Vessels section 4/5.119.1.

A similar comment was directed towards § 111.12-11, Generator protection, of this chapter. The requirement established in § 111.12-11 is applicable to all generators. The equipment described in § 112.50-1 are special features for emergency generators only. Therefore the restating of this requirement is unnecessary.

(2) One comment indicated that in paragraph (d) the 45 second response time is longer than the 30 second response of the standby ship service generator required for unattended machinery plants in 46 CFR 62.50-30(k)(2).

The 45 second requirement in this section is for emergency generator sets and is aligned with SOLAS 74, Regulation II-1/42.3.1.2 requirements. The 30 second requirement in 46 CFR part 62 is for a standby ship service generator in an unattended machinery space. If the standby ship service generator does not come on line within its allotted time, the emergency source would power its circuits shortly thereafter.

Section 112.50-7. One comment indicated that paragraph (c)(3) appears to have been deleted.

The five asterisks after paragraph (c)(2) indicates that the remainder of this section is retained. However, paragraph (d) is removed by the amendatory language of item 169 in the interim rule.

Part 113. One comment pointed out that the title of several sections of this part use the words "alarm system" as a general term for the "general emergency alarms and fire alarms." It suggested not using this terminology because it

typically describes "machinery alarm systems."

In this part, the terminology is used with consideration of the context of each subpart. Wherever in this part the regulations reference the general emergency alarm system, the words "general emergency alarm system" are used. The more generic term of "alarm system" is used in reference to machinery alarm systems and other specialized alarms such as engineers' assistance needed, steering failure, and refrigerated spaces where appropriate.

Section 113.05-7. (1) One comment noted that in paragraph (b) the reference to IEC 553 is a misprint and should read IEC 533 (entitled Electromagnetic Compatibility of Electrical and Electronic Installations in Ships) as stated in § 110.10-1, Incorporation by reference.

Paragraph (b) has been revised accordingly.

(2) One comment stated that the environmental test requirements of this section are burdensome if applied to each new piece of equipment due to advances in technology and the continual development of new components. The comment suggested creating a self-certification requirement similar to 46 CFR 62.20-5, Self-certification.

The Coast Guard does not deem self-certification as sufficient for this equipment. Testing of original and redesigned equipment required by subchapter Q to be Coast Guard "approved" is performed by independent laboratories accepted by the Commandant. The testing protocols and their results are strictly reviewed by the Coast Guard or designated third parties before an approval certificate is issued. Alarms that are allowed in 46 CFR part 62 to be self-certified must be designed to meet the environmental standards of 46 CFR 62.25-30, Environmental design standards, which reference ABS Rules for Building and Classing Steel Vessels. Subchapter J also references ABS (ABS Rules for Building and Classing Steel Vessels, table 4/11.1) for environmental testing requirements.

Section 113.10-7. One comment suggested that the requirement for connection boxes to meet IEC IP 67 is unnecessarily severe.

In all subparts where the interim rule required connection boxes to be NEMA 250 Type 6 or 6P or IEC IP 67, the requirement has changed to NEMA 250 Type 4 or 4X or IEC IP 56 to align the requirement with the definition of "watertight."

Section 113.25-10. One comment suggested that red flashing lights be used only in conjunction with the

general emergency alarm signal and for no other purpose. This is preferable to the IMO Code on Alarms and Indicators, which allows the color red to also be used when indicating the release of fire-extinguishing medium. A standardized color would allow quick identification and response by personnel.

While the value of this practice is realized, the Coast Guard will not include specific provisions or requirements on this subject in this rule without allowing an opportunity for public comment. The term "flashing red lights" has been changed to include rotating beacons as well.

Section 113.25-11. One comment suggested revising the introductory sentence in § 113.25-11 to read as follows, "Each contact maker, where installed, must—"

The Coast Guard determined that the requirements listed in this section apply to all contact makers, conventional or electronic type integrated in the public address system, and the addition of the words "where installed" does not add to the clarity of the sentence.

Section 113.25-12. One comment recommended in paragraph (a) the use of air operated alarm signals which may be actuated by a solenoid valve located outside the hazardous area.

This section does not preclude air operated alarm signals or other types compatible with the environment in which they are used. Any new or non-conventional alarm signal will be considered in the plan review process.

Section 113.30-3. One comment requested clarification of the phrase "must be independent of the ship's electrical system." The ship's electrical system may be interpreted to mean the ship's AC electrical system or the ship's DC system with a battery power source.

The power for the emergency means of communication required by this subpart must not be reliant upon the vessel's normal source or emergency source of AC or DC power. Acceptable methods of power include sound-powered phone, telephone systems which are powered by hand cranked generators which charge capacitor circuits, and individually battery powered devices.

Section 113.30-5. (1) One comment suggested that in paragraph (a) a cross-reference to 46 CFR 62.50-20(f)(2) be added.

The cross-reference to 46 CFR 62.50-20 has been added.

(2) One comment recommended editorial revision to paragraph (h)(1) for clarity.

Paragraph (h)(1) has been revised accordingly.

Section 113.30-25. (1) One comment indicated in paragraph (i) that cables for safety related circuits should only be permitted to be routed through high fire risk areas if it is technically impractical to route them otherwise or if they serve circuits within the high risk area. In either case, cables should be of the fire resistant type. The comment stated that decisions in these areas should not be affected by commercial considerations.

The Coast Guard develops its regulations with the primary consideration being safety. Any commercial consideration would be secondary and related to cost savings to the industry through harmonizing with domestic and international industry standards resulting in additional options.

Section 111.60-1 requires that accepted marine shipboard cable must meet the respective flammability tests contained in the referenced or companion standards. These tests are a validation that the cable is "flame retardant"; i.e., that the flame is not propagated. IEC 331, however, measures the "fire-resisting" characteristics as noted in the scope "as one which will continue to function normally during and after a prolonged fire."

As published in the interim rule, paragraph (i) states that cable runs through high fire risk areas, which includes servicing equipment within these areas, must meet IEC 331. It is the intent that such cables not only prevent the proliferation of flame but also maintain service to the equipment as well.

(2) One comment suggested modifying the last line of paragraph (e) to read "an emergency power source" instead of "the vessel's electric system."

The paragraph has been revised to clarify which vessel's electric source is intended.

Section 113.43-3. The reference to §§ 58.25-45 and 111.93-9 is out-of-date and has been corrected.

Section 113.50-15. One comment noted that, as written, this section appears to require explosionproof speakers in hazardous locations, for example, a cargo pump room on a tanker. The comment requests review of this requirement to determine whether it is excessive.

All systems and enclosures for hazardous locations must be certified for the particular Class and Division (Zone) in which they are installed. In the example given, if the speaker system were to be found intrinsically safe during plan review, then explosionproof speakers would not be required. Alternatively, if a study did not prove that the speakers were necessary in that

location, they would be disallowed under § 111.105-31(f) or, if proven necessary, they must be explosionproof.

Section 113.50-20. One comment suggested adding additional requirements applicable to public rooms, alleyways, and stairways to align the regulations with the IMO Code of Alarms and Indicators.

The Coast Guard may consider additional requirements to align § 113.50-20 with the IMO Code on Alarms and Indicators in a subsequent rulemaking where the public will have an opportunity to comment.

Section 113.70. One comment recommended adding a new subpart that addresses the installation and operation of gas detection systems. The comment suggests these systems meet the general requirements of the International Society for Measurement and Control (ISA) SP12.13 parts I and II.

The Coast Guard may consider additional requirements for gas detection systems in a subsequent rulemaking where the public will have an opportunity to comment.

Section 161.002-1. Components for automatic fire detection systems, EN54 parts 1 through 11, published by the European Committee for Standardization (CEN) remain absent from this section because several of the documents obtained by the Coast Guard were in draft form. The Coast Guard may consider the finalized documents for a subsequent rulemaking where the public will have an opportunity to comment.

Incorporation by Reference

The Director of the Federal Register has approved the material in §§ 110.10-1 and 161.002-1 for incorporation by reference under 5 U.S.C. 552 and 1 CFR part 51. Copies of the material are available from the source listed in those sections.

Regulatory Evaluation

This rule is not a significant regulatory action under section 3(f) of Executive Order 12866 and does not require an assessment of potential costs and benefits under section 6(a)(3) of that Order. It has not been reviewed by the Office of Management and Budget under that Order. It is not significant under the regulatory policies and procedures of the Department of Transportation (DOT) (44 FR 11040; February 26, 1979). A Regulatory Evaluation under paragraph 10e of the regulatory policies and procedures of DOT is available in the docket for inspection or copying where indicated under **ADDRESSES**. A summary of the Evaluation follows:

Most of the changes to the regulations are either editorial or update technical specifications to reflect the latest practices. Although some of these changes will cause minor cost increases for shipbuilders, others will result in substantial savings. The cost increases resulting from these rules will be more than offset by the cost savings, due to relaxations in the rules. The Coast Guard estimates that the cost of complying with the rule over the next 10 years will total \$33,753,392 (in present value); but, this cost will be more than offset by the estimated net benefits of \$73,538,213. This is a cost-benefit ratio of \$1.00 of costs to \$2.18 of benefits.

Many of the changes causing cost increases are already current marine industry practices, such as an increase in the protection of cable from bilge water.

There are several intangible benefits. Due to the increased use of national and international standards, certain items will now be more readily available "off the shelf" for marine use. A significant economic savings will result from the ability of equipment manufacturers, in many cases, to meet the new performance specifications instead of the old, prescriptive design standards. Also, the cost of submitting detailed plans and specifications to the Coast Guard for approval of certain equipment, such as sound powered telephones, emergency loudspeaker systems, and navigation lights, will be eliminated.

No comments were received to the Regulatory Evaluation or its summary in the preamble to the interim rule.

Small Entities

Under the Regulatory Flexibility Act (5 U.S.C. 601 *et seq.*), the Coast Guard considered whether this final rule will have a significant economic impact on a substantial number of small entities. "Small entities" include small businesses, not-for-profit organizations that are independently owned and operated and are not dominant in their fields, and governmental jurisdictions with populations of less than 50,000.

This rule will affect entities that come under Standard Industrial Code (SIC) categories of 4412 through 4489 (Water Transportation) and 1311 and 1381 (Oil and Gas Extraction), both groups of which are considered small entities if they have 500 or less employees, and under SIC category 3731 (Shipbuilding and Repair), which are considered small entities if they have 1,000 or less employees.

The Coast Guard has taken measures to accommodate the interests of small

entities during the development of this rule. The rule is limited to vessels that are constructed or undergo major modifications after September 30, 1996, thereby exempting the existing fleet from having to conform to these requirements. Furthermore, it is limited to Coast Guard-inspected commercial vessels, such as oil and chemical tankers, container ships, large passenger vessels, mobile offshore drilling units, research vessels, and school ships, which tend to be larger vessels. It does not apply to uninspected passenger vessels, commercial fishing vessels, or the overwhelming majority of inspected, small-passenger vessels.

To reduce the burden on small entities, this rule purges obsolete and out-of-date regulations and eliminates requirements that create an unwarranted differential between Coast Guard's regulations and industry standards. It enhances the flexibility of vessel owners, operators, manufacturers, and shipbuilders by incorporating, wherever possible, more options for compliance or by replacing prescriptive requirements with performance standards.

This rule reduces costs by increasing choices available during the new construction or major modification of a vessel. As discussed under the Regulatory Evaluation section in this preamble, this rule will reduce costs of shipbuilding for all entities, whether large or small. The Coast Guard estimates that the cost of complying with the rule over the next 10 years will total \$33,753,392 (in present value); but, this cost will be more than offset by the estimated net benefits of \$73,538,213. This is a cost-benefit ratio of \$1.00 of costs to \$2.18 of benefits.

Therefore, the Coast Guard certifies under section 605(b) of the Regulatory Flexibility Act (5 U.S.C. 601 *et seq.*) that this final rule will not have a significant economic impact on a substantial number of small entities.

Assistance for Small Entities

In accordance with section 213(a) of the Small Business Regulatory Enforcement Fairness Act of 1996 (Pub. L. 104-121), the Coast Guard offers to assist small entities in understanding this rule so that they can better evaluate its effects on them. If your small business or organization is affected by this rule and you have questions concerning its provisions or options for compliance, please contact Ms. Laura Hamman, Office of Design and Engineering Standards, 202-267-2206.

Collection of Information

This final rule provides for a collection of information under the Paperwork Reduction Act of 1995 (44 U.S.C. 3501 *et seq.*).

I. The following particulars apply to subpart 110.25:

DOT No.: 2115.

OMB Control No.: 2115-0115.

Administration: U.S. Coast Guard.

Title: Electrical Engineering Requirements for Merchant Vessels.

Need for information: Subpart 110.25 requires industry to complete electrical engineering plans to meet performance requirements on newly built vessels and modifications of current vessels.

Proposed Use of Information

This information is necessary to determine compliance with the electrical regulations before vessel construction or modification begins.

Frequency of Response: The information must be submitted when a vessel is built or modified.

Burden Estimate: 478 hours.

Respondents: 175 owners or operators.

Average Burden Hours per Respondent: 1 hour per submission.

II. The following particulars apply to subpart 161.002:

DOT No.: 2115.

OMB Control No.: 2115-0121.

Administration: U.S. Coast Guard.

Title: Electrical Engineering Requirements for Merchant Vessels.

Need for Information: Subpart 161.002 concerns application for type approval of fire protection systems.

Proposed use of Information: This information is necessary to ensure compliance with the electrical regulations.

Frequency of Response: A response is due each time initial approval is sought and each time a revision is requested.

Burden Estimate: 60 hours.

Respondents: 6 manufacturers.

Average Burden Hours per Respondent: 10 hours per respondent.

As required by 5 U.S.C. 3507(d), the Coast Guard submitted a copy of this rule to the Office of Management and Budget (OMB) for its review of the collection of information. OMB has approved the collection. The subpart numbers are 110.25 of subchapter J and 161.002 of subchapter Q. The corresponding OMB approval numbers are OMB Control Number 2115-0115 for subpart 110.25, which expires on August 3, 1999, and OMB Control Number 2115-0121 for subpart 161.002, which expires September 30, 1999.

Persons are not required to respond to a collection of information unless it

displays a currently valid OMB control number.

Federalism

The Coast Guard has analyzed this rule under the principles and criteria contained in Executive Order 12612 and has determined that this rule does not have sufficient federalism implications to warrant the preparation of a Federalism Assessment.

Environment

The Coast Guard considered the environmental impact of this rule and concluded that, under paragraph 2.B.2.e(34)(d) and (e) of Commandant Instruction M16475.1B, this rule is categorically excluded from further environmental documentation. This rule concerns only system arrangement and equipment approval. The approved system arrangement and equipment required by this rule should contribute to the enhancement of vessel safety and, thereby, help to minimize impacts on the marine environment. A "Categorical Exclusion Determination" is available in the docket for inspection or copying where indicated under ADDRESSES.

List of Subjects

46 CFR Part 108

Fire prevention, Marine safety, Occupational safety and health, Oil and gas exploration, Reporting and recordkeeping requirements, Vessels.

46 CFR Part 110

Incorporation by reference, Reporting and recordkeeping requirements, Vessels.

46 CFR Parts 111 and 112

Incorporation by reference, Vessels.

46 CFR Part 113

Communications equipment, Fire prevention, Incorporation by reference, Vessels.

46 CFR Part 161

Fire prevention, Incorporation by reference, Marine safety, Reporting and recordkeeping requirements.

Accordingly, the interim rule amending 46 CFR parts 108, 110, 111, 112, 113, and 161, which was published at 61 FR 28260 on June 4, 1996, is adopted as a final rule with the following changes and amendments:

PART 110—GENERAL PROVISIONS

1. The authority citation for part 110 continues to read as follows:

Authority: 33 U.S.C. 1509; 43 U.S.C. 1333; 46 U.S.C. 3306, 3703; E.O. 12234, 45 FR 58801, 3 CFR, 1980 Comp., p. 277; 49 CFR

1.45, 1.46; § 110.01-2 also issued under 44 U.S.C. 3507.

2. Revise § 110.01-3(b) and (c) to read as follows:

§ 110.01-3 Repairs and alterations.

* * * * *

(b) Alterations and modifications, such as re-engining, re-powering, upgrading of the main propulsion control system, or replacing extensive amounts of cabling, must comply with the regulations in this subchapter.

(c) Conversions specified in 46 U.S.C. 2101(14a), such as the addition of a midbody or a change in the service of the vessel, are handled on a case-by-case basis by the Commanding Officer, Marine Safety Center.

3. In § 110.10-1(b)—

a. In the entry for ABS Rules for Building and Classing Steel Vessels, remove "1995" and add, in its place, "1996" and add "111.01-9", in numerical order, to the list of sections affected;

b. In the entry for IEEE Std 45-1983, add "111.40-1;" and "111.75-5(b);", in numerical order, to the list of sections affected;

c. In the entry for the International Electrotechnical Commission, remove "1, Rue de Varembe," and add, in its place, "3, rue de Varembe," and add, in numerical order, new entries for IEC 56 and IEC 92-401 to read as follows;

d. In the entry for IEC 947-2, remove "111.54-1(c)" from the list of sections affected;

e. In the entry for NFPA 70, add "111.50-7;", in numerical order, to the list of sections affected;

f. Before the entry for Underwriters Laboratories Inc., add a new entry "NEC, see NFPA 70.;" and

g. In the entry for UL 489, add "111.01-15(c).", in numerical order, to the list of sections affected:

§ 110.10-1 Incorporation by reference.

* * * * *

(b) * * *

IEC 56, High-voltage alternating-current circuit-breakers, 1987, (Including Amendment 1, 1992, Amendment 2, 1995, and Amendment 3, 1996	111.54-1
* * * * *	
IEC 92-401, Electrical Installations in Ships, Part 401: Installation and test of completed installation, 1987	111.05-9
* * * * *	

4. In § 110.15-1, revise the definitions of "dripproof," "nonsparking fan," "waterproof," and "watertight" to read as follows:

§ 110.15-1 Definitions.

* * * * *

Dripproof means enclosed so that equipment meets at least a NEMA 250 Type 1 with dripshield, NEMA 250 Type 2, EMA 250 Type 12, or IEC IP 22 rating.

* * * * *

Nonsparking fan means nonsparking fan as defined in ABS Rules for Building and Classing Steel Vessels, section 4/5B7.7.

* * * * *

Waterproof means watertight; except that, moisture within or leakage into the enclosure is allowed if it does not interfere with the operation of the equipment enclosed. In the case of a generator or motor enclosure, *waterproof* means watertight; except that, leakage around the shaft may occur if the leakage is prevented from entering the oil reservoir and the enclosure provides for automatic drainage.

Watertight means enclosed so that equipment meets at least a NEMA 250 Type 4 or 4X or an IEC IP 56 rating.

5. Revise § 110.25-1(i)(6) to read as follows:

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

* * * * *

(i) * * *

(6) A certificate of testing, and listing or certification, by an independent laboratory, where required by the respective standard.

* * * * *

PART 111—ELECTRICAL SYSTEMS—GENERAL PROVISIONS

6. The authority citation for part 111 continues to read as follows:

Authority: 46 U.S.C. 3306, 3703; 49 CFR 1.46.

7. In § 111.01-1, redesignate the introductory text and paragraphs (a), (b), and (c) as paragraphs (a), (a)(1), (a)(2), and (a)(3), respectively; in newly redesignated paragraph (a)(1), remove the words “conditions; and” and add, in their place, the word “conditions.”; and add paragraph (b) to read as follows:

§ 111.01-1 General.

* * * * *

(b) Combustible material should be avoided in the construction of electrical equipment.

8. In § 111.01-9, in paragraphs (a) and (c), remove “32” and add, in its place, “22” and revise paragraph (b) and the note to this section to read as follows:

§ 111.01-9 Degrees of protection.

* * * * *

(b) Electrical equipment in locations requiring exceptional degrees of protection as defined in § 110.15-1 of this chapter must be enclosed to meet at least the minimum degrees of protection in ABS Rules for Building and Classing Steel Vessels, table 4/5B.1, or appropriate NEMA 250 Type for the service intended. Each enclosure must be designed in such a way that the total rated temperature of the equipment inside the enclosure is not exceeded.

* * * * *

Note to § 111.01-9: The degrees of protection specified in this section are described in NEMA Standards Publication No. 250 and IEC IP Code 529 and designated in ABS Rules for Building and Classing Steel Vessels, table 4/5B.1.

9. Revise § 111.01-15(c) to read as follows:

§ 111.01-15 Temperature ratings.

* * * * *

(c) A 45°C ambient temperature is assumed for cable and all other non-rotating electrical equipment in boiler rooms, in engine rooms, in auxiliary machinery rooms, and on weather decks. For installations using UL 489 SA marine type circuit breakers the ambient temperature for that component is assumed to be 40°C. For installations using Navy type circuit breakers the ambient temperature for that component is assumed to be 50°C.

* * * * *

10. In § 111.01-19, revise the introductory text of paragraph (a) to read as follows:

§ 111.01-19 Inclination of the vessel.

(a) All electrical equipment must be designed and installed to operate for the particular location and environment in which it is to be used. Additionally, electrical equipment necessary for the maneuvering, navigation, and safety of the vessel or its personnel must be designed and installed to operate under any combination of the following conditions:

* * * * *

11. Revise § 111.05-9 to read as follows:

§ 111.05-9 Masts.

Each nonmetallic mast and topmast must have a lightning ground conductor in accordance with section 10 of IEC 92-401.

12. Revise § 111.05-19(b) to read as follows:

§ 111.05-19 Tank vessels; grounded distribution systems.

* * * * *

(b) If the voltage of a distribution system on a tank vessel is 1,000 volts or

greater, line to line, and the distribution system is grounded (including high-impedance grounding), any resulting current must not flow through a hazardous (classified) location.

13. In § 111.05-23, in paragraph (d), remove the word “branch” and add, in its place, the word “feeder” and add a note to paragraph (d) to read as follows:

§ 111.05-23 Location of ground detection indicators.

* * * * *

Note to paragraph (d): An alarm contact or indicating device returned to the main switchboard via a control cable, that allows the detecting equipment to remain near the transformer or other isolating device for local troubleshooting, is allowed.

14. Revise § 111.05-27 to read as follows:

§ 111.05-27 Grounded neutral alternating current systems.

Grounded neutral and high-impedance grounded neutral alternating current systems must have a suitably sensitive ground detection system which indicates current in the ground connection, is able to withstand the maximum available fault current without damage, and provides continuous indication of circuit status to ground. A provision must be included to compare indications under fault conditions with those under normal conditions.

15. In § 111.05-33, revise the section heading and paragraph (b) to read as follows:

§ 111.05-33 Equipment safety grounding (bonding) conductors.

* * * * *

(b) Each equipment grounding conductor (other than a system grounding conductor) of a cable must be permanently identified as a grounding conductor in accordance with the requirements of article 310-12(b) of the NEC.

§ 111.10-1 [Amended]

16. In § 111.10-1(a), remove the words “auxiliary propulsion” and add, in their place, “propulsion auxiliary”.

§ 111.12-1 [Amended]

17. In § 111.12-1(a), remove the words “section 4/5.21 of the ABS Rules” and add, in their place, the words “sections 4/5C2.15 and 4/5C2.17 of the ABS Rules for Building and Classing Steel Vessels”; and remove the words “ABS MODU Rules” and add, in their place, “ABS Rules for Building and Classing Mobile Offshore Drilling Units”.

§ 111.12-3 [Amended]

18. In § 111.12-3, remove the words "section 4/5.23 of the ABS Rules" and add, in their place, the words "sections 4/5C2.19.1, 4/5D2.5.1, 4/5D2.5.2, and 4/5D2.17.6 of the ABS Rules for Building and Classing Steel Vessels"; and remove the words "ABS MODU Rules" and add, in their place, the words "ABS Rules for Building and Classing Mobile Offshore Drilling Units".

§ 111.12-5 [Amended]

19. In § 111.12-5, remove the words "ABS Rules" and add, in their place, the words "ABS Rules for Building and Classing Steel Vessels"; and remove the words "ABS MODU Rules" and add, in their place, the words "ABS Rules for Building and Classing Mobile Offshore Drilling Units".

§ 111.12-7 [Amended]

20. In § 111.12-7, remove the words "sections 4/5.31 and 4/5.33 of the ABS Rules" and add, in their place, the words "sections 4/5C2.19.2, 4/5C2.19.3, 4/5C2.21.2, and 4/5C2.21.3 of the ABS Rules for Building and Classing Steel Vessels"; and remove the words "ABS MODU Rules" and add, in their place, the words "ABS Rules for Building and Classing Mobile Offshore Drilling Units".

21. In § 111.12-11, redesignate paragraphs (c)(1) and (c)(2) as paragraphs (c)(2) and (c)(3), respectively, and add new paragraph (c)(1) to read as follows:

§ 111.12-11 Generator protection.

* * * * *

(c) * * *

(1) Open upon the shutting down of the prime mover;

* * * * *

22. Revise § 111.15-5(c) to read as follows:

§ 111.15-5 Battery installation.

* * * * *

(c) Small batteries. Small size battery installations must not be located in poorly-ventilated spaces, such as closets, or in living spaces, such as staterooms.

* * * * *

23. Revise § 111.15-20(c) to read as follows:

§ 111.15-20 Conductors.

* * * * *

(c) Each connecting cable must have sufficient capacity to carry the maximum charging current or maximum discharge current, whichever is greater, while maintaining the proper voltage at the load end.

§ 111.25-1 [Amended]

24. In § 111.25-1, remove "(a) and (b)".

25. In § 111.30-5(a), revise the introductory text to read as follows:

§ 111.30-5 Construction.

(a) All low voltage and medium voltage switchboards (as low and medium are determined within the standard used) must meet—

* * * * *

26. Add § 111.30-11 to read as follows:

§ 111.30-11 Deck coverings.

Non-conducting deck coverings, such as non-conducting mats or gratings, suitable for the specific switchboard voltage must be installed for personnel protection at the front and rear of the switchboard and must extend the entire length of, and be of sufficient width to suit, the operating space.

27. In § 111.30-19, revise paragraphs (b)(3), (b)(4), and (b)(5) to read as follows and remove paragraph (b)(6):

§ 111.30-19 Buses and wiring.

* * * * *

(b) * * *

(3) No. 14 AWG (2.10 mm²) or larger or must be ribbon cable or similar conductor size cable recommended for use in low-power instrumentation, monitoring, or control circuits by the equipment manufacturer;

(4) Flame retardant meeting ANSI/UL 1581 test VW-1 or IEC 332-1; and

(5) Extra flexible, if used on a hinged panel.

§ 111.33-11 [Amended]

28. In § 111.33-11, remove the words "section 4/5.84 of ABS Rules" and add, in their place, the words "sections 4/5D2.17.9 and 4/5D2.17.10 of ABS Rules for Building and Classing Steel Vessels"; remove the words "ABS MODU Rules" and add, in their place, the words "ABS Rules for Building and Classing Mobile Offshore Drilling Units".

§ 111.35-1 [Amended]

29. In § 111.35-1, remove the words "sections 4/5.79, 4/5.81, 4/5.83, and 4/5.84 ABS Rules" and add, in their place, the words "sections 4/5D2.5, 4/5D2.11, 4/5D2.13, 4/5D2.17.8e, 4/5D2.17.9, and 4/5D2.17.10 of ABS Rules for Building and Classing Steel Vessels"; and remove the words "ABS MODU Rules" and add, in their place, the words "ABS Rules for Building and Classing Steel Vessels".

30. Add § 111.40-1 to read as follows:

§ 111.40-1 Panelboard standard.

Each panelboard must meet section 23.1 of IEEE Std 45.

31. In § 111.51-3, redesignate the introductory text and paragraphs (a) and (b) as paragraphs (b), (b)(1), and (b)(2), respectively, and add paragraph (a) to read as follows:

§ 111.51-3 Protection of vital equipment.

(a) The coordination of overcurrent protective devices must be demonstrated for all potential plant configurations.

* * * * *

§ 111.54-1 [Amended]

32. In § 111.54-1(c)(3)(ii), remove "IEC 947-2, Part 2" and add, in its place, "IEC 56".

33. In § 111.60-1, in paragraph (a), remove the words "Each cable" and add, in their place, the words "Each marine shipboard cable" and remove the word "cooper" and add, in its place, the word "copper"; and revise paragraph (f) to read as follows:

§ 111.60-1 Cable construction and testing.

* * * * *

(f) Direct current electric cable, for industrial applications only, may be applied in accordance with IADC-DCCS-1/1991.

34. Revise § 111.60-3(d) to read as follows:

§ 111.60-3 Cable Application.

* * * * *

(d) Cables for special applications defined in section 19 of IEEE Std 45 must meet the provisions of that section.

35. Revise § 111.60-11(c) to read as follows:

§ 111.60-11 Wire.

* * * * *

(c) Wire, other than in switchboards, must meet the requirements in sections 19.6.4 and 19.8 of IEEE Std 45; IL-W-76D; MIL-W-16878F; UL 44; UL 83; or equivalent standard.

* * * * *

36. Revise § 111.60-23 to read as follows:

§ 111.60-23 Metal-clad (Type MC) cable.

(a) Metal-clad (Type MC) cable permitted on board a vessel must be continuous corrugated metal-clad cable.

(b) The cable must—

(1) Have a corrugated gas-tight, vapor-tight, and watertight sheath of aluminum or other suitable metal that is close-fitting around the conductors and fillers and that has an overall jacket of an impervious PVC or thermoset material; and

(2) Be certified or listed by an independent laboratory as meeting the requirements of UL 1569.

(c) The cable is not allowed in areas or applications exposed to high

vibration, festooning, repeated flexing, excessive movement, or twisting, such as in engine rooms, on elevators, or in the area of drill floors, draw works, shakers, and mud pits.

(d) The cable must be installed in accordance with article 334 of the NEC. The ampacity values found in table A6 of IEEE Std 45 may not be used.

(e) The side wall pressure on the cable must not exceed 1,000 pounds per foot of radius.

(f) Equipment grounding conductors in the cable must be sized in accordance with article 250-95 of the NEC. System grounding conductors must be of a cross-sectional area not less than that of the normal current carrying conductors of the cable. The metal sheath must be grounded but must not be used as a required grounding conductor.

(g) On an offshore floating drilling and production facility, the cable may be used as interconnect cable between production modules and between fixed distribution panels within the production modules, except that interconnection between production and temporary drilling packages is prohibited. Also, the cable may be used within columns, provided that the columns are not subject to the conditions described in paragraph (c) of this section.

(h) When the cable is used within a hazardous (classified) location, terminations or fittings must be listed, and must be appropriate, for the particular Type MC cable used and for the environment in which they are installed.

37. In § 111.70-1, revise paragraph (a) introductory text, and paragraph (b) to read as follows:

§ 111.70-1 General.

(a) Each motor circuit, controller, and protection must meet the requirements of ABS Rules for Building and Classing Steel Vessels, sections 4/5A5.13, 4/5B2.13, 4/5B2.15, and 4/5C4; ABS Rules for Building and Classing Mobile Offshore Drilling Units, sections 4/3.87 through 4/3.94 and 4/3.115.6; or IEC 92-301, as appropriate, except the following circuits:

* * * * *

(b) In ungrounded three-phase alternating current systems, only two motor-running protective devices (overload coil or heater type relay within the motor and controller) need be used in any two ungrounded conductors, except when a wye-delta or a delta-wye transformer is used.

* * * * *

§ 111.70-7 [Amended]

38. In § 111.70-7(d)(2), remove the words "not have any" and add, in their place, the words "have no".

39. Revise § 111.75-5(b) to read as follows:

§ 111.75-5 Lighting branch circuits.

* * * * *

(b) *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 fixture ratings and in accordance with IEEE Std 45, section 21.6.

* * * * *

§ 111.75-17 [Amended]

40. In § 111.75-17 (b) and (c), remove the words "stern, and range lights" and add, in their place, the words "and stern lights".

§ 111.75-20 [Amended]

41. In § 111.75-20(a), after the words "lighting fixture", add the words "for a non-hazardous location".

§ 111.105-11 [Amended]

42. In § 111.105-11(a), after "IEC 79-11", add "(I_a)".

43. Revise § 111.105-17(a) to read as follows:

§ 111.105-17 Wiring methods for hazardous locations.

(a) Through runs of marine shipboard cable meeting subpart 111.60 of this part are required for all hazardous locations. Armored cable may be used to enhance ground detection capabilities. Additionally, Type MC cable may be used subject to the restrictions in § 111.60-23.

* * * * *

44. In § 111.105-31, revise paragraphs (f)(4), (i)(1), (j), (k), (l) introductory text, and (n) to read as follows:

§ 111.105-31 Flammable or combustible cargo with a flashpoint below 60 degrees C (140 degrees F), liquid sulfur and inorganic acid carriers.

* * * * *

(f) * * *

(4) Marine shipboard cables that supply explosionproof lighting fixtures that are in the cargo handling room.

* * * * *

(i) * * *

(1) Through runs of marine shipboard cable; and

* * * * *

(j) *Cargo hose stowage space.* A cargo hose stowage space must not have any electrical equipment except explosionproof lighting fixtures and through runs of marine shipboard 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 marine shipboard cable.

(l) *Weather locations.* The following locations in the weather are Class I, Division 1 (Zone 1) locations (except the open deck area on an inorganic acid carrier which is considered a non-hazardous location) and may have only approved intrinsically safe, explosionproof, or purged and pressurized electrical equipment, and through runs of marine shipboard cable if the location is—

* * * * *

(n) *Duct keel ventilation or lighting.*

(1) The lighting and ventilation system for each pipe tunnel, double bottom, or duct keel must meet ABS Rules for Building and Classing Steel Vessels, section 4/5E1.15.

(2) If a fixed gas detection system is installed, it must meet the requirements of SOLAS 74 and ABS Rules for Building and Classing Steel Vessels, section 4/5.

45. Revise § 111.105-32(f)(1), (g)(1), (i)(2), and (j)(2) to read as follows:

§ 111.105-32 Bulk liquefied flammable gas and ammonia carriers.

* * * * *

(f) * * *

(1) Through runs of marine shipboard cable;

* * * * *

(g) * * *

(1) Through runs of marine shipboard cable;

* * * * *

(i) * * *

(2) Through runs of marine shipboard cable.

* * * * *

(j) * * *

(2) Through runs of marine shipboard cable.

* * * * *

§ 111.105-39 [Amended]

46. In § 111.105-39, in the introductory text and paragraph (a), remove "ABS Rule 4/5.157" and add, in its place, "ABS Rules for Building and Classing Steel Vessels, section 4/5E3".

§ 111.105-40 [Amended]

47. In § 111.105-40 (a) and (c) remove "ABS Rule 4/5.160" and add, in its place, "ABS Rules for Building and Classing Steel Vessels, section 4/5E4".

§ 111.105-43 [Amended]

48. In § 111.105-43(c), remove the words "armored or MI type" and add, in their place, "marine shipboard".

49. Revise § 111.107-1(c)(1) to read as follows:

§ 111.107-1 Industrial systems.

* * * * *

(c) * * *

(1) Be installed in accordance with § 111.60-5 and meet the flammability test requirements of IEEE Std 1202, section 18.13.5 of IEEE Std 45, or IEC 332-3, Category A; or

* * * * *

PART 112—EMERGENCY POWER AND LIGHTING SYSTEMS

50. The authority citation for part 112 continues to read as follows:

Authority: 46 U.S.C. 3306, 3703; 49 CFR 1.46.

51. Revise § 112.05-5(d) to read as follows:

§ 112.05-5 Emergency power source.

* * * * *

(d) The emergency power source, its associated transforming equipment, and the emergency switchboard must be located aft of the collision bulkhead, outside of the machinery casing, and above the uppermost continuous deck. Each compartment containing this equipment must be readily accessible from the open deck and must not contain machinery not associated with, or equipment not in support of, the normal operation of the emergency power source. Equipment in support of the normal operation of the emergency power source includes, but is not limited to, ventilation fans, CO2 bottles, space heaters, and internal communication devices, such as sound powered phones.

* * * * *

PART 113—COMMUNICATION AND ALARM SYSTEMS AND EQUIPMENT

52. The authority citation for part 113 continues to read as follows:

Authority: 46 U.S.C. 3306, 3703; 49 CFR 1.46.

§ 113.05-7 [Amended]

53. In § 113.05-7, in paragraph (a), remove the words "ABS Rules" and add, in their place, the words "ABS Rules for Building and Classing Steel

Vessels"; and, in paragraph (b), remove the number "553" and add, in its place, the number "533".

§ 113.10-7 [Amended]

54. In § 113.10-7, remove "Type 6 or 6P or IEC IP 67" and add, in its place, "Type 4 or 4X or IEC IP 56".

§ 113.20-3 [Amended]

55. In § 113.20-3, remove "Type 6 or 6P or IEC IP 67" and add, in its place, "Type 4 or 4X or IEC IP 56".

§ 113.25-10 [Amended]

56. In § 113.25-10—
a. Revise the section heading to read "Emergency red-flashing lights";
b. In paragraph (a) introductory text, add the word "general" before the word "emergency", wherever it appears, and remove the words "flashing red light" and add, in their place, "red-flashing light or rotating beacon"; and
c. In paragraph (b), remove the words "flashing red light" and add, in their place, the words "red-flashing light or rotating beacon".

§ 113.25-11 [Amended]

57. In § 113.25-11(a), remove "Type 6 or 6P or IEC IP 67" and add, in its place, "Type 4 or 4X or IEC IP 56".

58. In § 113.30-5, add paragraph (a)(7) and revise paragraph (h)(1) to read as follows:

§ 113.30-5 Requirements.

(a) * * *
(7) The engineering officers' accommodations, if the vessel is an automated, self-propelled vessel under § 62.50-20(f) of this chapter.

(h) * * *
(1) Be on a circuit separate from any other station required by this section; and

* * * * *

59. In § 113.30-25—
a. In paragraph (c), remove "IEC IP 32" and add, in its place, "IEC IP 22";
b. In paragraph (e), remove the words "vessel's electric system" and add, in their place, the words "final emergency bus";
c. In paragraph (h), remove "Type 6 or 6P or IEC IP 67" and add, in its place, "Type 4 or 4X or IEC IP 56"; and
d. Revise paragraph (i) to read as follows:

§ 113.30-25 Detailed requirements.

* * * * *

(i) Voice communication cables must run as close to the fore and aft centerline of the vessel as practicable. The cable must not run through high fire-risk spaces, such as machinery rooms and galleys, unless it is technically impractical to route them otherwise or they are required to serve circuits in the high-risk area. Cable running through or into these high-risk areas must meet the requirements of EC 331.

§ 113.40-10 [Amended]

60. In § 113.40-10(b), remove "Type 6 or 6P or IEC IP 67" and add, in its place, "Type 4 or 4X or IEC IP 56".

§ 113.43-3 [Amended]

61. In § 113.43-3, remove "§§ 58.25-45 and 111.93-9", and add, in its place, "part 58, subpart 58.25".

§ 113.50-5 [Amended]

62. In § 113.50-5(g), remove "Type 6 or 6P or IEC IP 67" and add, in its place, "Type 4 or 4X or IEC IP 56".

PART 161—ELECTRICAL EQUIPMENT

63. The authority citation for part 161 continues to read as follows:

Authority: 46 U.S.C. 3306, 3703, 4302; E.O. 12234, 45 FR 58801, 3 CFR, 1980 Comp., p. 277; 49 CFR 1.46.

§ 161.002-1 [Amended]

64. In § 161.002-1(b), in the entry for ABS Rules for Building and Classing Steel Vessels, remove "1995" and add, in its place, "1996".

§ 161.002-4 [Amended]

65. In § 161.002-4 (b)(3) and (b)(4), remove the words "ABS Rules" and add, in their place, the words "ABS Rules for Building and Classing Steel Vessels".

Dated: April 22, 1997.

J.C. Card,

Rear Admiral, U.S. Coast Guard, Assistant Commandant for Marine Safety and Environmental Protection.

[FR Doc. 97-11230 Filed 4-30-97; 8:45 am]

BILLING CODE 4910-14-P