row less each way than the arrangement of the top layer; the arrangement of the middle layer may be the same as the top layer, or may be one row less one way than the arrangement of the top layer. In the 3½—4x5 and 3½—4x4 packs the face of each half of the crate shall be packed as a unit, with no shim between the two baskets.

(2) The diameter of the smallest and largest plums in any individual pack or container shall not vary more than one-fourth (¼) inch, except that plums which are placed in volume-fill or tight-fill type containers and have a diameter of two and one-fourth (2¼) inches or larger shall not vary more than three-eights (⅜) inch. A total of not more than five (5) percent, by count, of the plums in any package or container may fail to meet this requirement.

* * * * *

(d) When used herein "diameter" shall have the same meaning as set forth in the U.S. Sandards for Grades of Fresh Plums and Prunes (7 CFR 51.1520 to 51.1538) and all other terms shall have the same meaning as when used in the amended marketing agreement and order. "No. 12B standard fruit box" measures 2⅜ to 7⅛x11½x16⅛ inches, "No. 22D standard lug box" measures 2⅞ to 7⅛x13½x16⅛ inches, "No. 22G standard lug box" measures 7⅜ to 7½x13¼x15⅞ inches. All dimensions are given in depth (inside dimensions) by width by length (outside dimensions).

3. Section 917.460 would be revised to read as follows:

Subpart—Grade and Size Regulation

§ 917.460 Plum Regulation 19.

(a) No handler shall ship any lot of packages or containers of any plums unless such plums grade at least U.S. No. 1, except that maturity shall be determined by the application of color standards by variety or such other tests as determined to be proper by the Federal-State Inspection Service. Internal discoloration not considered serious damage and healed growth cracks emanating from the step end which do not cause serious damage shall be permitted. In addition to the above, any lot of Tragedy or Kelsey plums shall be permitted and additional 10 percent tolerance for defects not considered serious damage.

(b) No handler shall ship any package or other container of any variety of plums listed in Column A of the following Table I unless such plums are of a size that an eight-pound sample, representative of the sizes of the plums in the package or container, contains not more than the number of plums listed for the variety in Column B of said table, and that a two pound subsample of the smallest plums in each eight pound sample contains not more than the number of plums listed for the variety in Column C of said table.

TABLE I

Col. A, variety	Col. B, plums per sample	Column C, plums per subsample
Amazon	64	17
Ambra	67	18
Andys Pride	69	18
Angeleno	67	18
Angee	67	18
Autumn Rosa	72	19
Bee Gee	65	17
Blackamber	56	15
Black Beaut	68	19
Black Diamond	59	16
Black Jewel	54	14
Black Knight	58	16
Carolyn Harris	61	17
Casselman	63	17
Catalina	59	16
Durado	74	20
Early Hawaiian Ann	60	16
Ebony	66	18
El Dorado	68	18
Empress	57	15
Freedom	56	15
Friar	56	15
Frontier	61	17
Gar-Rosa	71	19
Grand Rosa	54	14
July Red	64	17
July Santa Rosa	69	18
Kelsey	47	13
King David	50	14
King Richard	54	14
King's Black	58	16
Laroda	58	16
Late Santa Rosa (including improved Late Santa Rosa and Swall Rosa)	64	17
Linda Rosa	63	17
Mariposa	61	17
Midsummer	63	17
Nubiana	56	15
President	57	15
Prima Black	69	13
Queen Ann	50	14
Queen Rosa	53	14
Red Beaut	74	20
Red Glow	60	16
Red Rosa	64	17
Redroy	58	16
Rich Red	74	20
Rosa Ann	69	18
Rosemary	50	14
Rose Ann	60	16
Royal Red	74	20
Roysum	74	20
Santa Rosa	69	19
Simka, Arrosa, New Yorker	50	14
Spring Beaut	74	20
Standard	83	21
Wickson	51	14

(c) No handler shall ship any package or container of any variety of plums not specifically named in paragraph (b) of this section, unless such plums are of a size that an eight pound sample representative of the sizes of the plums in the package or container contains not more than 139 plums, and that a two pound subsample of the smallest plums in each eight-pound sample contains not more than 38 plums.

(d) As used herein, "U.S. No. 1" and "serious damage" mean the same as defined in the United States Standards for Grades of Fresh Plums and Prunes (7 CFR 51.1520 through 51.1538).

Dated: March 14, 1986.

Thomas R. Clark,
Deputy Director, Fruit and Vegetable Division.

[FR Doc. 86-6141 Filed 3-20-86; 8:45 am]

BILLING CODE 3410-02-M

NUCLEAR REGULATORY COMMISSION

10 CFR Part 50

Station Blackout

AGENCY: Nuclear Regulatory Commission.

ACTION: Proposed rule.

SUMMARY: The Nuclear Regulatory Commission is proposing to amend its regulations to require that light-water-cooled nuclear power plants be capable of withstanding a total loss of alternating current (AC) electric power (called "station blackout") for a specified duration and maintaining reactor core cooling during that period. This proposed requirement is based on information developed under the Commission's study of Unresolved Safety Issue A-44, "Station Blackout." The proposed change is intended to provide further assurance that a station blackout (loss of both offsité power and onsite emergency AC power systems) will not adversely affect the public health and safety.

DATE: The comment period expires on June 19, 1986. Comments received after this date will be considered if it is practical to do so, but assurance of consideration cannot be given except as to comments received before this date.

ADDRESSES: Send comments to: The Secretary of the Commission, U.S. Nuclear Regulatory Commission, Washington, DC 20555, Attention: Docketing and Service Branch. Copies of comments received may be examined and copied for a fee at the NRC Public Document Room, 1717 H Street, NW., Washington, DC.

FOR FURTHER INFORMATION CONTACT: Alan Rubin, Division of Safety Review and Oversight, Office of Nuclear Reactor Regulation, U.S. Nuclear Regulatory Commission, Washington, DC 20555, Telephone: (301) 492-8303.

SUPPLEMENTARY INFORMATION: The alternating current (AC) electric power for essential and nonessential service in a nuclear power plant is supplied primarily by offsite power. Redundant onsite emergency AC power systems are also provided in the event that all offsite power sources are lost. These systems

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provide power for various safety systems including reactor core decay heat removal and containment heat removal which are essential for preserving the integrity of the reactor core and the containment building, respectively. The reactor core decay heat can also be removed for a limited time period by safety systems that are independent of AC power.

The term "station blackout" means the loss of offsite AC power to the essential and nonessential electrical buses concurrent with turbine trip and the unavailability of the redundant onsite emergency AC power systems (e.g., as a result of units out of service for maintenance or repair, failure to start on demand, or failure to continue to run after start). If a station blackout persists for a sufficient time during which the capability of the AC-independent systems to remove decay heat is exceeded, core melt and containment failure could result.

The Commission's existing regulations establish requirements for the design and testing of onsite and offsite electric power systems that are intended to reduce the probability of losing all AC power to an acceptable level. (See General Design Criteria 17 and 18, 10 CFR Part 50, Appendix A.) The existing regulations do not require explicitly that nuclear power plants be designed to assure that the core can be cooled and the integrity of the reactor coolant pressure boundary can be maintained for any specified period of loss of all AC power.

As operating experience has accumulated, the concern has arisen that the reliability of both the onsite and offsite emergency AC power systems might be less than originally anticipated, even for designs that meet the requirements of General Design Criteria 17 and 18. Many operating plants have experienced a total loss of offsite power, and more occurrences can be expected in the future. Also, operating experience with onsite emergency power systems has included many instances when diesel generators failed to start. In a few cases, there has been a complete loss of both the offsite and the onsite AC power systems. During these events, AC power was restored in a short time without any serious consequences.

In 1975, the results of the Reactor Safety Study (WASH-1400) showed that station blackout could be an important contributor to the total risk from nuclear power plant accidents. Although this total risk was found to be small, the relative importance of the station blackout accident was established. Subsequently, the Commission designated the issue of station blackout as an Unresolved Safety Issue (USI); a Task Action Plan (TAP A-44) was issued in July 1980, and work was initiated to determine whether additional safety requirements were needed. Factors considered in the analysis of risk from station blackout included: (1) The likelihood and duration of the loss of offsite power; (2) the reliability of the onsite AC power system; and (3) the potential for severe accident sequences after a loss of all AC power, including consideration of the capability to remove core decay heat without AC power for a limited time period.

The technical findings of the staff's studies of the station blackout issue are presented in NUREG-1032, "Evaluation of Station Blackout Accidents at Nuclear Power Plants, Technical Findings Related to Unresolved Safety Issue A-44." [1] Additional information is provided in supporting contractor reports: NUREG/CR-3226, "Station Blackout Accident Analyses" published in May 1983; NUREG/CR-2989, "Reliability of Emergency AC Power System at Nuclear Power Plants"published in July 1983; and NUREG/CR-3992, "Collection and Evaluation of Complete and Partial Losses of Offsite Power at Nuclear Power Plants" published in February 1985.[2] The major results of these studies are given below.

- Losses of offsite power can be characterized as those resulting from plant-centered faults, utility grid blackout, and severe weather-induced failures of offsite power sources. Based on operating experience, the frequency of total losses of offsite power in operating nuclear power plants was found to be about one per 10 site-years. The median restoration time was about one-half hour, and 90 percent of the offsite power losses were restored in approximately 3 hours (NUREG/CR-3992).
- The review of a number of representative designs of onsite emergency AC power systems has indicated a variety of potentially important failure causes. However, no single improvement was identified that could result in a significant improvement in overall diesel generator reliability. Data obtained from operating experience show that the typical individual emergency diesel generator failure rate is about 2.5×10^{-2} per demand (i.e., one chance of failure in 40 demands), and that the emergency AC power system unavailability for a plant which has two emergency diesel generators, one of which is required for decay heat removal, is about 2×10^{-3} per demand (NUREG/CR-2989).
- Given the occurrence of a station blackout, the likelihood of resultant core damage or core melt is dependent on the reliability and capability of decay heat removal systems that are not dependent on AC power. If sufficient AC-independent capability exists, additional time will be available to restore AC power needed for long-term cooling (NUREG/CR-3226).
- It was determined by reviewing design, operational, and site-dependent factors that the expected frequency of core damage resulting from station blackout events could be maintained near or below 10^{-5} per reactor-year for any nuclear plant with readily achievable diesel generator reliabilities, provided that the plant is designed to cope with station blackout for a specified duration. The duration for a specific plant is based on a comparison of the plant's characteristics to those factors that have been identified as the main contributors to risk from station blackout (NUREG-1032).

As a result of the station blackout studies, improved guidance will be provided to licensees regarding maintaining minimum emergency diesel generator reliability to minimize the probability of losing all AC power. In addition, the Commission is proposing to amend its regulations by adding a new § 50.63 and by adding a new final paragraph to General Design Criterion 17, Appendix A of 10 CFR Part 50, to require that all nuclear power plants be capable of coping with a station blackout for some specified period of time. The period of time for specific plant would be determined based on the existing capability of the plant as well as a comparison of the individual plant design with factors that have been identified as the main contributors to risk of core melt resulting from station blackout.

These factors, which vary significantly from plant to plant because of considerable differences in design of plant electric power systems as well as

[1] Draft NUREG-1032 was issued for public comment on June 15, 1985. Copies of this report are available for public inspection and copying for a fee at the NRC Public Document Room at 1717 H Street, NW., Washington, DC 20555. Free single copies of Draft NUREG-1032 may be requested by writing to the Publication Services Section, Room P-130A, Division of Technical Information and Document Control, U.S. Nuclear Regulatory Commission, Washington, DC 20555.

[2] Copies of these documents are available for public inspection and copying for a fee at the NRC Public Document Room at 1717 H Street, NW., Washington, DC 20555. Copies may also be purchased by calling (202) 275-2171 or (202) 275-2060 or by writing to the Superintendent of Documents, U.S. Government Printing Office, P.O. Box 37082, Washington, DC 20013-7082.

site-specific considerations, include: (1) Redundancy of onsite emergency AC power sources (i.e., number of sources minus the number needed for decay heat removal (2) reliability of onsite emergency AC power sources (usually diesel generators), (3) frequency of loss of offsite power, and (4) probable time to restore offsite power. The frequency of loss of, and time to restore offsite power are related to grid and switchyard reliabilities, historical weather data for severe storms, and the availability of nearby alternate power sources (e.g., gas turbines). Experience has shown that long duration offsite power outages are caused primarily by severe storms (hurricanes, ice, snow, etc.).

The objective of the proposed rule is to reduce the risk of severe accidents resulting from station blackout by maintaining highly reliable AC electric power systems and, as additional defense-in-depth, assuring that plants can cope with a station blackout for some period of time. If the proposed rule is adopted, all licensees and applicants would be required to assess the capability of their plants to cope with a station blackout (i.e., determine the amount of time the plant can maintain core cooling and containment integrity with AC power unavailable), and to have procedures and training to cope with such an event. Plants would be required to be able to cope with a specified minimum duration station blackout selected on a plant-specific basis.

On the basis of station blackout studies conducted for USI A-44, and presented in the reports referenced above, the NRC staff has developed a draft regulatory guide entitled "Station Blackout,"[3] which presents guidance on (1) maintaining a high level of reliability for emergency diesel generators, (2) developing procedures and training to restore offsite and onsite emergency AC power should either one or both become unavailable, and (3) selecting a plant-specific minimum duration for station blackout capability to comply with the proposed amendment to General Design Criterion 17. Application of the methods in this guide would result in selection of a 4-hour or 8-hour station blackout duration, depending on the specific plant design and site-related characteristics. However, applicants and licensees could propose alternative methods to that specified in the regulatory guide in order to justify other minimum durations for station blackout capability.

If the proposed rule and regulatory guide are issued, those plants with an already low risk from station blackout would be required to withstand a station blackout for a relatively short period of time and probably would need few, if any, modifications as a result of the rule. Plants with currently higher risk from station blackout would be required to withstand somewhat longer duration blackouts. Depending on their existing capability, these plants might also need to make modifications (such as increasing station battery capacity or condensate storage tank capacity) in order to cope with the longer station blackout duration. The proposed rule would require licensees to develop, in consultation with the Office of Nuclear Reactor Regulation, proposed plant-specific schedules for implementation of any needed modifications.

Additional Comments by the Commission

The proposed rule does not require that a single failure be assumed concurrent with a station blackout because station blackout goes beyond the normal single failure criterion. That is, for a station blackout to occur, four AC power supplies must fail (two offsite sources and two safety-related onsite emergency AC sources). The staff's estimated probability of the concurrent failure of all four power supplies leads us to believe that the staff should give further consideration to upgrading to safety grade the plant modifications needed (if any) to meet the proposed rule. Upgrading to safety grade will further ensure appropriate licensee attention is paid to maintaining a high state of operability and reliability. The Commission believes that the question of quality classification of modifications should be addressed by interested parties in comments on the proposed rule.

In addition to comments on the merits of the proposed rule, the Commission specifically requests comments on whether the backfit analysis for this rule adequately implements the Backfit Rule, 10 CFR 50.109.

Additional Comments by Commissioners Roberts and Zech

We agree with soliciting public comments on the proposed rulemaking on station blackout. We will be interested in comments received and staff responses associated with analysis of cost benefit, value impact, and safety improvements and the station blackout standing on the overall risk (e.g., Is the reduction of risk only a small percentage of the overall risk or is it a major component of an already small risk?). This will be one of the first proposed rules to be evaluated by the NRC under its new backfitting requirements. We would be particularly interested in specific comments assessing whether or not this proposal meets the "substantial increase in the overall protection of the public health and safety . . ." threshold now required by the backfit rule.

Separate Views of Commissioner Asselstine

I support the proposed rulemaking but believe substantial additional safety improvements beyond those called for in this rulemaking are achievable and practicable. How to prevent and mitigate a station blackout event is one of the most significant unresolved safety issues associated with nuclear power plants. Extended station blackout can result in core meltdown and loss of containment integrity. Since existing mitigation features such as containment spray would be inoperable, a station blackout could result in a large release of radioactive material to the environment.

Countries abroad that have made a serious commitment to nuclear power and to nuclear safety have, or are planning, backfit features which markedly reduce station blackout risks. For example, the new French 1300 MWe nuclear power plants are designed with a goal of coping with a station blackout for at least 20 hours. According to the NRC staff, the design features that provide this capability (listed below) permit the plant to withstand a station blackout for three days.

- A steam-driven generator provides power for a small positive displacement pump that supplies cooling for reactor coolant pump (RCP) seals and also provides power for instrumentation and controls and control room lighting necessary to withstand a station blackout. This design feature, which is also being backfitted onto all operating 900 MWe nuclear plants in France, addresses two factors that impact the ability to cope with a station blackout—RCP seal cooling with AC power unavailable and battery depletion.
- Two turbine-driven auxiliary feedwater (AFW) pumps included in the 1300 MWE French design in addition to two motor-driven AFW pumps. Most

[3] A notice of availability and request for comments on the draft regulatory guide will be published within a few days of this Notice of Proposed Rulemaking. Copies of the draft regulatory guide are available for public inspection and copying for a fee at the NRC Public Document Room at 1717 H Street, NW., Washington, DC 20555, and will be distributed to those on the automatic distribution list for draft regulatory guides. Free single copies of the draft regulatory guide may be obtained by writing to the U.S. Nuclear Regulatory Commission, Washington, DC 20555, Attention: Director, Division of Technical Information and Document Control.

U.S. pressurized water reactors have one turbine-driven AFW pump in addition to two-motor-driven pumps. Therefore, the French design provides additional redundancy in the AC-independent trains of the AFW system.

• Gravity feed back-up water supply from onsite sources to the condensate storage tank provides additional water for decay heat removal via the AFW system for long-duration station blackout events, i.e., up to three days.

This three-day station blackout capability would permit sufficient time to connect a mobile gas turbine generator to provide power if AC power could not be restored from other, preferred sources. A mobile gas turbine genertor is located at, or in the vicinity of, every nuclear power plant site in France. These improvements in safety are being achieved at not unreasonable costs and are being driven by the French goal of achieving a probability of one in ten million (10^{-7}) per reactor-year for a major event such as station blackout. The Commission's rule proposes much less. It proposes an objective of one in one hundred thousand (10^{-5}) per reactor-year for station blackout caused core meltdown and an objective of only about four hours coping capability.

I would appreciate comments on whether the NRC should require substantial improvements in safety with respect to station blackout, like those being accomplished in other countries, which can be achieved at reasonable cost and which go beyond those proposed in this rulemaking.

Finding of No Significant Environmental Impact: Availability

The Commission has determine under the National Environmental Policy Act of 1969, as amended, and the Commission's regulations in Subpart A of 10 CFR Part 51, that this rule, if adopted, would not be a major Federal action significantly affecting the quality of the human environment, and therefore an environmental impact statement is not required. There would not be any adverse environmental impacts as a result of the proposed rule for the following reasons: (1) There would be no additional radiological exposure to the general public or plant employees, and (2) plant shutdown is not required so there would be no additional environmental impacts as a result of the need for replacement power. The environmental assessment and finding of no significant impact on which this determination is based are available for inspection and copying for a fee at the NRC Public Document Room, 1717 H Street, NW, Washington, DC. Single copies of the environmental assessment and the finding of no significant impact are available from Mr. Warren Minners, Office of Nuclear Reactor Regulation, U.S. Nuclear Regulatory Commission, Washington, DC 20555, Telephone: (301) 492-7827.

Paperwork Reduction Act Statement

This proposed rule amends information collection requirements that are subject to the Paperwork Reduction Act of 1980 (44 U.S.C. 3501 et seq.). This rule has been submitted to the Office of Management and Budget for review and approval of the paperwork requirements.

Regulatory Analysis

The Commission has prepared a regulatory analysis for this regulation. The analysis examines the costs and benefits of the rule as considered by the Commission. A copy of the regulatory analysis, NUREG-1109, For Comment, "Regulatory Analysis for the Resolution of Unresolved Safety Issue A-44, Station Blackout" (Published in January 1986), is available for inspection and copying for a fee at the NRC Public Document Room, 1717 H Street, NW, Washington, DC 20555. Free single copies of Draft NUREG-1109 may be obtained by writing to the Publication Services Section, Room P-130A, Division of Technical Information and Document Control, U.S. Nuclear Regulatory Commission, Washington, DC 20555.

The Commission requests public comment on the regulatory analysis. Comments on the draft analysis may be submitted to the NRC as indicated under the ADDRESSES heading.

Regulatory Flexibility Certification

In accordance with the Regulatory Flexibility Act of 1980, 5 U.S.C. 605(b), the Commission hereby certifies that this proposed rule, if promulgated, will not have a significant economic impact on a substantial number of small entities. This proposed rule specifies that nuclear power plants be able to withstand a total loss of AC power for a specified time duration and maintain reactor core cooling during that period. These facilities are licensed under the provisions of 10 CFR 50.21(b) and 10 CFR 50.22. The companies that own these facilities do not fall within the scope of "small entities" as set forth in the Regulatory Flexibility Act or the small business size standards set forth in regulations issued by the Small Business Administration in 13 CFR Part 121.

List of Subjects in 10 CFR Part 50

Antitrust, Classified information, Fire prevention, Incorporation by reference, Intergovernmental relations, Nuclear power plants and reactors, Penalty, Radiation protection, Reactor siting criteria, Reporting and recordkeeping requirements.

For the reasons set out in the preamble and under the authority of the Atomic Energy Act of 1954, as amended, the Energy Reorganization Act of 1974, as amended, and 5 U.S.C. 553, the NRC is proposing to adopt the following amendments to 10 CFR Part 50.

PART 50—DOMESTIC LICENSING OF PRODUCTION AND UTILIZATION FACILITIES

1. The authority citation for Part 50 continues to read as follows:

Authority: Secs. 103, 104, 161, 182, 183, 186, 189, 68 Stat. 936, 937, 948, 953, 954, 955, 956, as amended, sec 234, 83 Stat. 1244, as amended (42 U.S.C. 2133, 2134, 2201, 2232, 2233, 2236, 2239, 2282); secs. 201, 202, 206, 88 Stat. 1242, 1244, 1246, as amended (42 U.S.C. 5841, 5842, 5846), unless otherwise noted.

Section 50.7 also issued under Pub. L. 95-601, sec. 10, 92 Stat. 2951 (42 U.S.C. 5851). Sections 50.57(d), 50.58, 50.91, and 50.92 also issued under Pub. L. 97-415, 96 Stat. 2071, 2073 (42 U.S.C. 2133, 2239). Section 50.78 also issued under sec. 122, 68 Stat. 939 (42 U.S.C. 2152). Sections 50.80-50.81 also issued under sec. 184, 68 Stat. 954, as amended (42 U.S.C. 2234). Sections 50.100-50.102 also issued under sec. 186, 68 Stat. 955 (42 U.S.C. 2236).

For the purposes of sec. 223, 68 Stat. 958, as amended (42 U.S.C. 2273), §§ 50.10(a), (b), and (c), 50.44, 50.46, 50.48, 50.54, and 50.80(a) are issued under sec. 161b, 68 Stat. 948, as amended (42 U.S.C. 2201(b)); §§ 50.10(b) and (c) and 50.54 are issued under sec. 161i, 68 Stat. 949, as amended (42 U.S.C. 2201(i)); and §§ 50.55(e), 50.59(b), 50.70, 50.71, 50.72, 50.73, and 50.78 are issued under sec. 161o, 68 Stat. 950, as amended (42 U.S.C. 2201(o)).

2. In § 50.2, a definition of "station blackout" is added in the alphabetical sequence to read as follows:

§ 50.2 Definitions.

* * * * *

"Station blackout" means the complete loss of alternating current (AC) electric power to the essential and nonessential switchgear buses in a nuclear power plant (i.e., loss of the offsite electric power system concurrent with turbine trip and unavailability of the onsite emergency AC power system).

3. A new § 50.63 is added to read as follows:

§ 50.63 Loss of all alternating current power.

(a) *Requirements.* Each light-water-cooled nuclear power plant licensed to operate must be able to withstand and recover from a station blackout as defined in § 50.2 for a specified duration in accordance with the requirements in paragraph (e) of General Design Criterion 17 of Appendix A of this part.

(b) *Limitation of Scope.* Paragraphs (c) and (d) of this section do not apply to those plants licensed to operate prior to [insert the effective date of this amendment] if the capability to withstand station blackout was considered in the operating license proceeding and a specified duration was accepted as the licensing basis for the facility.

(c) *Implementation—Determination of Station Blackout Duration.* (1) For each light-water-cooled nuclear power plant licensed to operate on or before [insert the effective date of this amendment], the licensee shall submit to the Director of the Office of Nuclear Reactor Regulation by [insert a date 270 days after the effective date of this amendment]:

(i) A determination of the maximum duration for which the plant as currently designed is able to maintain core cooling and containment integrity in the event of a station blackout as defined in § 50.2;

(ii) A description of the procedures that have been established for station blackout events for the duration determined in paragraph (c)(1)(i) of this section and for recovery therefrom;

(iii) An identification of the factor(s) that limit the capability of the plant to cope with a station blackout for a longer time than that determined in paragraph (c)(1)(i) of this section;

(iv) A proposed station blackout duration to be used in determining compliance with paragraph (e) of General Design Criterion 17 of Appendix A of this part, including a justification for the selection based on—

(A) The redundancy of the onsite emergency AC power sources;

(B) The reliability of the onsite emergency AC power sources;

(C) The expected frequency of loss of offsite power; and

(D) The probable time needed to restore offsite power; and

(v) An identification of the factors, if any, that limit the capability of the plant to meet the requirements of Criterion 17 for the specified station blackout duration proposed in the response to paragraph (c)(1)(iv) of this section.

(2) After consideration of the information submitted in accordance with paragraph (c)(1) of this section, the Commission will notify the licensee of its determination of the specified station blackout duration to be used in determining compliance with General Design Criterion 17 of Appendix A of this part.

(d) *Implementation—Schedule for Implementing Equipment Modifications.* (1) For each light-water-cooled nuclear power plant licensed to operate on or before [insert the effective date of this amendment], the licensee shall, within 180 days of the notification provided in accordance with paragraph (c)(2) of this section, submit to the Director of the Office of Nuclear Reactor Regulation a schedule for implementing any equipment and procedure modifications necessary to meet the requirements of General Design Criterion 17 of Appendix A of this part. This submittal must include an explanation of the schedule and a justification if the schedule does not provide for completion of the modifications within two years of the notification provided in accordance with paragraph (c)(2) of this section.

(2) The licensee and the NRC staff shall mutually agree upon a final schedule for implementing modifications necessary to comply with the requirements of Criterion 17.

4. In Appendix A, General Design Criterion 17 is revised to read as follows.

Appendix A—General Design Criteria for Nuclear Power Plants

* * * * *

II. Protection by Multiple Fission Product Barriers

* * * * *

Criterion 17—Electric power systems. (a) An onsite electric power system and an offsite electric power system shall be provided to permit functioning of structures, systems, and components important to safety. The safety function for each system (assuming the other system is not functioning) shall be to provide sufficient capacity and capability to assure that (1) specified acceptable fuel design limits and design conditions of the reactor coolant pressure boundary are not exceeded as a result of anticipated operational occurrences and (2) the core is cooled and containment integrity and other vital functions are maintained in the event of postulated accidents.

(b) The onsite electric power supplies, including the batteries, and the onsite electric distribution system, shall have sufficient independence, redundancy, and testability to perform their safety functions assuming a single failure.

(c) Electric power from the transmission network to the onsite electric distribution system shall be supplied by two physically independent circuits (not necessarily on separate rights of way) designed and located so as to minimize to the extent practical the likelihood of their simultaneous failure under operating and postulated accident and environmental conditions. A switchyard common to both circuits is acceptable. Each of these circuits shall be designed to be available in sufficient time following a loss of all onsite alternating current power supplies and the other offsite electric power circuit, to assure that specified acceptable fuel design limits and design conditions of the reactor coolant pressure boundary are not exceeded. One of these circuits shall be designed to be available within a few seconds following a loss-of-coolant accident to assure that core cooling, containment integrity, and other vital safety functions are maintained.

(d) Provisions shall be included to minimize the probability of losing electric power from any of the remaining supplies as a result of, or coincident with, the loss of power generated by the nuclear power unit, the loss of power from the transmission network, or the loss of power from the onsite electric power supplies.

(e) The reactor core and associated coolant, control, and protection systems, including the station batteries, shall provide sufficient capacity and capability to assure that the core is cooled and containment integrity is maintained in the event of a station blackout (as defined in § 50.2) for a specified duration. The following factors shall be considered in specifying the station blackout duration: (1) the redundancy of the onsite emergency AC power sources, (2) the reliability of the onsite emergency AC power sources, (3) the expected frequency of loss of offsite power, and (4) the probable time needed to restore offsite power.

Dated at Washington, DC, this 17th day of March 1986.

For the Nuclear Regulatory Commission.

Samuel J. Chilk,

Secretary of the Commission.

Backfit Analysis

Analysis and Determination That the Proposed Rulemaking To Amend 10 CFR 50 Concerning Station Blackout Complies With the Backfit Rule 10 CFR 50.109

The Commission's existing regulations establish requirements for the design and testing of onsite and offsite electric power systems (10 CFR Part 50, Appendix A, General Design Criteria 17 and 18). However, as operating experience has accumulated, the concern has arisen regarding the reliability of both the offsite and onsite emergency AC power systems. These systems provide power for various safety systems including reactor core decay heat removal and containment heat removal which are essential for preserving the integrity of the reactor core and the containment building, respectively. In numerous instances emergency diesel generators have failed to start and run during tests conducted at operating plants. In addition, a number of operating plants have experienced a total loss of offsite electric power, and more such occurrences are expected. Existing regulations do not require explicitly that nuclear power plants be designed to withstand the loss of all AC power for any specified period.

This issue has been studied by the staff as part of Unresolved Safety Issue (USI) A–44, "Station Blackout." Both deterministic and probabilistic analyses were performed to determine the timing and consequences of various accident sequences and to identify the dominant factors affecting the likelihood of core melt accidents from station blackout. These studies indicate that station blackout can be a significant contributor to the overall plant risk. Consequently, the Commission is proposing to amend its regulations to require that plants be capable of withstanding a total loss of AC power for a specified duration and to maintain reactor core cooling during that period.

An analysis of the benefits and costs of implementing the proposed station blackout rule is presented in NUREG–1109, Draft Report For Comment, "Regulatory Analysis for the Resolution of Unresolved Safety Issue A–44, Station Blackout." [4] The benefit from implementing the proposed rule is a reduction in the frequency of core melt per reactor-year due to station blackout and the associated risk of offsite radioactive releases. The risk reduction for 67 operating reactors is estimated to be 80,000 person-rems.[5]

The cost for licensees to comply with the proposed backfit would vary depending on the existing capability of each plant to cope with a station blackout, as well as the specified station blackout duration for that plant. The costs would be primarily for licensees to develop procedures, to improve diesel generator reliability if the reliability falls below certain levels, and to retrofit plants with additional components or systems, as necessary, to meet the proposed requirements.

The estimated total cost for 67 operating reactors to comply with the proposed resolution of USI A–44 is about $40 million. The average cost per reactor would be around $600,000 ranging from $200,000 if only a station blackout assessment and procedures and training are necessary, to a maximum of about $4 million if substantial modifications are needed, including requalification of a diesel generator.

The overall value-impact ratio, not including accident avoidance costs, is about 2,000 person-rems averted per million dollars. If cost savings to industry from accident avoidance (i.e., cleanup and repair of onsite damages and replacement power) were included, the overall value-impact ratio would improve significantly to about 8,000 person-rems averted per million dollars.

This analysis supports a determination that a substantial increase in the protection of the public health and safety will be derived from the backfit in the proposed station blackout rule, and that the backfit is justified in view of the direct and indirect costs of implementing the proposed rule.

The quantitative value-impact analysis discussed above was one of the factors considered in evaluating the proposed rule, but other factors also played a part in the decision-making process. Probabilistic risk assessment (PRA) studies performed for this USI, as well as some plant-specific PRAs, have shown that station blackout can be a significant contributor to core melt frequency, and, with consideration of containment failure, station blackout events can represent an important contributor to reactor risk. In general, active containment systems required for heat removal, pressure suppression, and radioactivity removal from the containment atmosphere following an accident are unavailable during a station blackout. Therefore, the offsite risk is higher from a core melt resulting from station blackout than it is from many other accident scenarios.

Although there are licensing requirements for guidance directed at providing reliable offsite and onsite AC power, experience has shown that there are practical limitations in ensuring the reliability of offsite and onsite emergency AC power systems. Potential vulnerabilities to common cause failures associated with design, operational and environmental factors can affect AC power system reliability. For example, if potential common cause failures of emergency diesel generators exist (e.g., in service-water or DC power support systems), then the estimated core damage frequency from station blackout events can increase significantly.

The estimated frequency of core damage from station blackout events is directly proportional to the frequency of the initiating event. Estimates of station blackout frequencies for this USI were based on actual operational experience. This is assumed to be a realistic indicator of future performance. An argument can be made that the future performance will be better than the past. For example, when problems with the offsite power grid arise, they are fixed, and therefore, grid reliability should improve. On the other hand, grid power failures may become more frequent because fewer plants are being built, and more power is being transmitted between regions, thus placing greater stress on transmission lines.

A number of foreign countries, including France, Britain, Sweden, Germany and Belgium, have taken steps to reduce the risk from station blackout events. These steps include adding design features to enhance the capability of the plant to cope with a station blackout for a substantial period of time, and/or adding redundant and diverse emergency AC power sources.

The factors discussed above support the determination that additional defense in depth provided by the ability of a plant to cope with station blackout for a specific duration is warranted. The Commission has considered how this backfit should be prioritized and scheduled in light of other regulatory activities ongoing at operating nuclear power plants. Station blackout warrants a high priority ranking based on both its status as an "unresolved safety issue" and the results and conclusions reached in resolving this issue. As noted in the implementation section of the proposed rule (§ 50.63(d)), the schedule for equipment modification (if needed to meet the requirements of the proposed rule) shall be mutually agreed upon by the licensee and NRC. Modifications that cannot be scheduled for completion within two years after NRC accepts the licensee's specified station blackout duration must be justified by the licensee.

Analysis of 50.109(c) Factors

1. Statement of the specific objectives that the proposed backfit is designed to achieve.

The NRC staff has completed a review and evaluation of information developed over the past 5 years on Unresolved Safety Issue (USI) A–44, Station blackout. As a result of these efforts, the NRC is proposing to amend 10 CFR Part

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[4] Draft NUREG–1109 was issued for public comment in January 1986. Copies of this report are available for inspection and copying for a fee at the NRC Public Document Room, 1717 H Street, NW., Washington, DC 20555. Free single copies of Draft NUREG–1109 may be obtained by writing to the Publication Services Section, Room P–1030A, Division of Technical Information and Document Control, U.S. Nuclear Regulatory Commission, Washington, DC 20555.

[5] The value-impact analysis in NUREG–1109 was based on plant-specific information for a total of 67 reactors. Although there are currently about 100 operating reactors, the overall value-impact ratio in NUREG–1109 would not change significantly because of the increase in the number of operating plants.

50, by the introduction of new § 50.63, "Station Blackout," and an additional paragraph to General Design Criterion 17, "Electric Power Systems" in Appendix A.

The objective of the proposed rule is to reduce the risk of severe accidents associated with station blackout by making station blackout a relatively small contributor to total core melt frequency. Specifically, the proposed rule would require all light-water-cooled nuclear power plants to be able to cope with a station blackout for a specified duration, and to have procedures and training for such an event. A draft Regulatory Guide, to be issued along with the proposed rule, would provide an acceptable method to determine the station blackout duration for each plant. The duration would be determined for each plant based on a comparison of the individual plant design with factors that have been identified as the main contributors to risk of core melt resulting from station blackout. These factors are: (1) The redundancy of onsite emergency AC power sources, (2) the reliability of onsite emergency AC power sources, (3) the frequency of loss of offsite power and (4) the probable time needed to restore offsite power.

2. General description of the activity that would be required by the licensee or applicant in order to complete the backfit.

In order to assure that each nuclear power plant is able to withstand and recover from a station blackout for a specified minimum duration, licensees would be required to assess their plants' capability to withstand and recover from a station blackout. This evaluation would include:

• Verifying the adequacy of station battery power, condensate storage tank capacity, and plant/instrument air for the station blackout duration.

• Verifying adequate reactor coolant pump seal integrity for the station blackout duration so that seal leakage due to lack of seal cooling would not result in a sufficient primary system coolant inventory reduction to lose the ability to cool the core.

• Verifying operability of equipment needed to operate during a station blackout for environmental conditions associated with total loss of AC power (i.e., loss of heating, ventilation and air conditioning).

Depending on the plant's existing capability to cope with a station blackout, licensees may or may not need to backfit hardware modifications (e.g., adding battery capacity) to comply with the proposed rule. (See item 8 for additional discussion.) Licensees would be required to have procedures and training to cope with and recover from a station blackout.

3. Potential change in the risk to the public from the accidental off-site release of radioactive material.

Based on an analysis of potential consequences presented in Section 4 of NUREG–1109, if the proposed rule were implemented, the estimated total risk reduction to the public from 67 operating reactors is 80,000 person-rem.

4. Potential impact on radiological exposure of facility employees.

For 67 operating reactors, the estimated total reduction in occupational exposure resulting from reduced core melt frequencies and associated post-accident cleanup and repair activities is 2,000 person-rem (Table 8 in NUREG–1109). No increase in occupational exposure is expected from operation and maintenance or implementing the proposed rule. Equipment additions and modifications contemplated do not require work in and around the reactor coolant system and therefore would not be expected to result in significant radiation exposure (Table 8 in NUREG–1109).

5. Installation and continuing costs associated with the backfit, including the cost of facility downtime or the cost of construction delay.

For 67 operating reactors, the total estimated cost for assessing the station blackout coping capability, procedures and training, installation of hardware backfits (if necessary), plant downtime, and operation and maintenance is $40 million. (See Tables 6 and 8 in NUREG–1109).

6. The potential safety impact of changes in plant or operational complexity, including the relationship to proposed and existing regulatory requirements.

The proposed rule for plants to be able to cope with a station blackout should not add to plant or operational complexity. The relationship between the proposed station blackout rule and proposed and existing regulatory requirements is discussed in Section 4.2 of NUREG–1109. This discussion includes the following NRC generic programs:

• Generic Issue B–56 "Proposed Actions for Enhancing Reliability of Diesel Generators at Operating Plants,"

• Generic Issue 23, "Reactor Coolant Pump Seal Failures,"

• USI A–45, "Shutdown Decay Heat Removal Requirements,"

• Generic Issue A–30, "Adequacy of Safety-Related DC Power Supply."

7. The estimated resource burden on the NRC associated with the proposed backfit and the availability of such resources.

For 67 operating reactors, the estimated total cost for NRC review of industry submittals required by the proposed rule is $500,000 (based on an estimated average of 120 person-hours per reactor; see Table 8 in NUREG–1109).

8. The potential impact of differences in facility type, design or age on the relevancy and practicality of the proposed backfit.

The proposed rule applies to all pressurized water reactors and boiling water reactors. However, in determining the specific minimim station blackout coping capability for each plant, differences in plant design (e.g., number of emergency generators) and the reliability of the offsite and onsite emergency AC power systems could result in different coping capabilities. For example, plants with an already low risk from station blackout would be required to withstand a station blackout for a relatively short period of time; and few, if any, hardware backfits would be required as a result of the proposed rule. Plants with currently higher risk from station blackout would be required to withstand somewhat longer duration blackouts; and, depending on their existing capability, may need some modifications to achieve the longer station blackout capability.

9. Whether the proposed backfit is interim or final and, if interim, the justification for imposing the proposed backfit on an interim basis.

The proposed rule is a final resolution of USI A–44; it is not an interim measure.

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DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 71

[Airspace Docket No. 86–ASW–1]

Proposed Amendment of Transition Area; Dallas/Fort Worth, TX

Correction

In FR Doc. 86–4939, beginning on page 7950, in the issue of Friday, March 7, 1986, make the following corrections:

1. On page 7951, third column, thirty-first line, at the end insert "to latitude 33°13'00" N.,".

2. On same page, third column, thirty-fourth line, before "thence" insert "longitude 97°39'30" W.,".

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