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**ComEd**

'97 DEC 29 P2:53

December 22, 1997

OFFICE OF THE  
GENERAL COUNSEL  
ADJUDICATIONS STAFF

U. S. Nuclear Regulatory Commission  
ATTN: Rulemaking and Adjudications Staff  
Washington, DC 20555-0001

DOCKET NUMBER  
PROPOSED RULE **PR 50+70**  
(62FR63825)  
(62FR63911)

Subject: Comments on Direct Final Rulemaking  
**Criticality Accident Requirements, 10CFR Parts 50.68 and 70.24**

Reference: Federal Register (FR) Vol. 62, No. 232 dated December 3, 1997.

This letter provides the Commonwealth Edison Company (ComEd)'s comments on the subject Nuclear Regulatory Commission (NRC) proposed rulemaking. The comment period for this Direct Final Rule expires on January 2, 1988.

ComEd's comments are provided in the Attachment.

Please provide any questions you may to this office.

Thomas J. Kovach  
Vice President  
Nuclear Regulatory Services

Attachment

cc: G. Dick, Generic Issues Project Manager - NRR  
A. B. Beach, Regional Administrator - RIII  
Office of Nuclear Safety - IDNS

# ATTACHMENT

## Comments on Proposed Direct Final Rule Criticality Accident Requirements

### 10CFR70.24 - Criticality Accident Requirements

#### Proposed Change

*(d) The requirements in paragraph (a) through (c) of this section do not apply to holders of a construction permit or operating license for a nuclear power reactor issued pursuant to part 50 of this chapter, or combined licenses issued under part 52 of this chapter, if the holders comply with the requirements of paragraph (b) of 10 CFR 50.68 of this chapter.*

#### Comments:

*The current version of 10CFR70.24(d) contains provisions for applying for exemptions should "good cause" exist. ComEd is concerned that the proposed change impacts the ability to apply for such exemptions. This is of particular concern because ComEd has pending 10CFR70.24 exemptions with the Commission. The proposed rule should not prohibit licensees from applying for such exemptions under the guidelines of 10CFR70.14. In addition, the new rule should contain provisions to note that any existing approved exemptions remain valid.*

### 10CFR50.68(b) - Criticality Accident Requirements

#### Proposed Rule

*(b) Each licensee shall comply with the following requirements in lieu of maintaining a monitoring system capable of detecting a criticality as described in 10 CFR 70.24:*

*(1) Plant procedures may not permit handling and transportation at any one time of more fuel assemblies than have been determined to be safely subcritical under the most adverse moderation conditions feasible by unborated water.*

#### Comments:

ComEd has no comments on this section.



## ATTACHMENT

### Comments on Proposed Direct Final Rule Criticality Accident Requirements

*(5) The quantity of SNM, other than nuclear fuel stored on site, is less than the quantity necessary for a critical mass.*

Comments:

ComEd has no comments on this section.

*(6) Radiation monitors, as required by GDC 63, are provided in storage and associated handling areas when fuel is present to detect excessive radiation levels and to initiate appropriate safety actions.*

Comments:

ComEd operates several facilities that were licensed prior to formal adoption of the General Design Criteria in 10CFR50, Appendix A. Although the intent of GDC 63 is being maintained at these facilities, a literal read of this requirement may conclude that reactors licensed prior to the adoption of the GDCs could not meet this requirement. The Rule should eliminate the reference to GDC 63 and describe the underlying monitoring requirements.

ComEd has concerns over the wording "Radiation monitors...are provided in storage and associated handling areas...". Fuel storage areas for both new and used fuel are not normally occupied volumes. As such, not all ComEd fuel storage volumes (vaults or pools) have radiation monitoring inside of them. In some cases, monitoring is located outside of the storage volume to monitor conditions within the storage volume. Therefore, the Rule should be changed such that "in" is replaced with "in the vicinity of".

In addition, ComEd has concerns over the wording "...initiate appropriate **safety actions**". At some ComEd facilities, these detectors are not formally classified as safety related. The Rule should be changed such that "initiate appropriate safety actions" is replaced with "initiate appropriate warning."

## ATTACHMENT

### Comments on Proposed Direct Final Rule Criticality Accident Requirements

*(7) The maximum nominal U-235 enrichment of the fresh fuel assemblies is limited to no greater than five (5.0) percent by weight.*

Comments:

This requirement is unnecessary and precludes the development of advanced fuel designs. Any changes in enrichment above 5.0 percent by weight would be supported by an updated criticality analysis for both dry and spent fuel racks to ensure the appropriate margins to criticality are maintained. Placing a limit on enrichment provides no direct safety benefit and should not be included.

2

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'97 DEC 29 P3:19

CP&L Letter: PE&RAS-97-101  
December 24, 1997

OFFICE OF THE  
FULL-TIME  
ADJUDICATIVE STAFF

DOCKET NUMBER  
PROPOSED RULE **PR 50+70**  
(62FR63825)  
(62FR63911)

Secretary  
U.S. Nuclear Regulatory Commission  
Washington, DC 20555-0001

Attn: Rulemakings and Adjudications Staff

Subject: **Comments on NRC Proposed and Direct Final Rules on 10CFR50.68 and 10CFR70.24 Criticality Accident Requirements (62 FR 63825 and 62 FR 63911)**

Dear Sir or Madam:

Attached are the comments of Carolina Power & Light Company (CP&L) on the NRC Proposed and Direct Final Rules on 10CFR50.68 and 10CFR70.24 Criticality Accident Requirements. In general, CP&L supports this change as an efficient and effective improvement in the regulatory process.

Please contact me at (919) 546-6901 if you have questions.

Sincerely,

Original signed P.A. Opsal for D.B. Alexander  
[received on interactive rulemaking website  
on 12/24/97 - ATB]  
D.B. Alexander, Manager  
Performance Evaluation & Regulatory Affairs

HAS  
Attachment



**Comments on NRC Proposed and Direct Final Rules on 10CFR50.68 and 10CFR70.24 Criticality Accident Requirements (62 FR 63825 and 62 FR 63911)**

1. The proposed paragraph 10CFR50.68(b)(1) reads:

*"Plant procedures may not permit handling and transportation at any one time of more fuel assemblies than have been determined to be safely subcritical under the most adverse moderation conditions feasible by unborated water."*

- a) In order to express this as a clear requirement, CP&L suggests replacing the phrase "may not permit" with the phrase "shall prohibit the."
- b) CP&L suggests that the paragraph be revised to clarify that the determination is to be made by the license, in an engineering calculation for example, rather than by the NRC in a Safety Evaluation.
- c) In subsequent paragraphs 10CFR50.68(b)(2), 10CFR50.68(b)(3) and 10CFR50.68(b)(4), subcriticality is expressed as a maximum limit (either 0.95 or 0.98 or 1.0) on the estimated k-effective at a 95 percent probability and a 95 percent confidence level. Since the requirement is "to be safely subcritical," is 1.0 the correct maximum limit on k-effective? Or, does the absence of specific criteria imply the application of a different standard? CP&L suggests that more specific criteria be added to paragraph 10CFR50.68(b)(1).
- d) In subsequent paragraphs 10CFR50.68(b)(2) and 10CFR50.68(b)(4), the moderator is identified as "pure water" rather than "unborated water." If the moderators under consideration were intended to be the same, then CP&L suggests that these paragraphs be clarified to use the same words. Otherwise, some further explanation of the difference between "pure water" and "unborated water" might be necessary to avoid future misunderstandings.
- e) Paragraph 10CFR50.68(b)(3) discusses "optimum moderation" by a "low-density hydrogenous fluid." The phrases "most adverse moderation" and "optimum moderation" seem to express opposite relationships but are used to describe the same physical phenomenon. CP&L suggests some clarification is necessary. CP&L also suggests that some clarification is necessary to help understand why it is appropriate to use unborated water to determine the most adverse moderation for handling and transportation when an assumption of a low-density hydrogenous fluid is required for the optimum moderation for new fuel storage.

2. The proposed paragraph 10CFR50.68(b)(2) reads, in part:

*"The estimated ratio of neutron production to neutron absorption and leakage (k-effective) of the fresh fuel ...."*

Since all neutrons (that are produced) subsequently either leak or are absorbed, CP&L suggests that the paragraph be clarified to specify its applicability to an instant in time. Alternately, CP&L suggests that paragraph be revised to eliminate the words "ratio of neutron production to neutron absorption and leakage," since "k-effective" is a sufficiently understood term to permit its use without the need to define it.

**Comments on NRC Proposed and Direct Final Rules on 10CFR50.68 and 10CFR70.24 Criticality Accident Requirements (62 FR 63825 and 62 FR 63911)**

- ✓ 3. Paragraphs 10CFR50.68(b)(2) and 10CFR50.68(b)(3) address fresh fuel storage racks, but CP&L understands that at least one licensee has committed not to use such storage racks in order to avoid criticality accident concerns. For simplicity, CP&L suggests that these paragraphs be revised to be applicable unless the license institutes administrative controls to prohibit the use of fresh fuel storage racks.

- ✓ 4. The proposed paragraph 10CFR50.68(b)(6) reads:

*"Radiation monitors, as required by GDC 63, are provided in storage and associated handling areas when fuel is present to detect excessive radiation levels and to initiate appropriate safety actions."*

To be precise, GDC 63 requires that appropriate systems be provided to detect excessive radiation levels and to initiate appropriate safety actions. Logically, radiation monitors would be a necessary part of such systems, but GDC 63 does not require the radiation monitors to initiate safety actions. CP&L suggests that this paragraph be clarified.

5. The proposed paragraph 10CFR50.68(b)(7) reads:

*"The maximum nominal U-235 enrichment of the fresh fuel assemblies is limited to no greater than five (5.0) percent by weight."*

CP&L understands that at least one U.S. reactor is currently pursuing a license to operate with test assemblies containing mixed-oxide fuel. Until either more operating experience or more analysis is available for MOX fuel, CP&L suggests that this paragraph be revised to limit the fissionable material to U-235.

Lewis Sumner  
Vice President  
Hatch Project Support

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3

'98 JAN -5 P3:04



OFFICE OF GENERAL COUNSEL  
RULEMAKING AND ADJUDICATIONS  
STAFF

December 31, 1997

Docket Nos. 50-321 50-348 50-424  
50-366 50-364 50-425

HL-5546  
LCV-1145

Mr. John C. Hoyle  
Secretary of the Commission  
U.S. Nuclear Regulatory Commission  
Washington, DC 20555-0001

DOCKET NUMBER  
PROPOSED RULE PR 50+70  
(62 FR 63825)  
(62 FR 63911)

ATTENTION: Rulemaking and Adjudications Staff

Comments on Direct Final Rule  
"Criticality Accident Requirements"  
(62 Federal Register 63825 dated December 3, 1997)

Dear Mr. Hoyle:

On December 3, 1997, the Nuclear Regulatory Commission (NRC) published in the Federal Register concurrently as a proposed rule (62 FR 63911) and as a direct final rule (62 FR 63825) with opportunity to comment, changes to the regulations on criticality accident requirements contained in 10 CFR 50.68 and 10 CFR 70.24. In accordance with the request for comments, Southern Nuclear Operating Company is in total agreement with the Nuclear Energy Institute comments which are to be provided to the NRC regarding this issue.

Should you have any questions, please advise.

Respectfully submitted,

H. L. Sumner, Jr.

HLS/TMM

(distribution - see next page)

cc: Southern Nuclear Operating Company  
Mr. D. N. Morey, Vice President, Plant Farley  
Mr. C. K. McCoy, Vice President, Plant Vogtle  
Mr. J. B. Beasley, General Manager - Plant Vogtle  
Mr. R. D. Hill, General Manager - Plant Farley  
Mr. P. H. Wells, General Manager - Plant Hatch

U. S. Nuclear Regulatory Commission, Washington, DC  
Mr. J. I. Zimmerman, Licensing Project Manager - Farley  
Mr. N. B. Le, Licensing Project Manager - Hatch  
Mr. D. H. Jaffe, Senior Project Manager - Vogtle

U. S. Nuclear Regulatory Commission, Region II  
Mr. L. A. Reyes, Regional Administrator  
Mr. T. M. Ross, Senior Resident Inspector - Farley  
Mr. B. L. Holbrook, Senior Resident Inspector - Hatch  
Mr. J. Zeiler, Senior Resident Inspector - Vogtle



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4

NUCLEAR ENERGY INST JAN -5 P3:05

OFFICE OF SECRETARY  
RULEMAKING AND  
ADJUDICATION STAFF  
David J. Modeen  
DIRECTOR, ENGINEERING  
NUCLEAR GENERATION DIVISION

January 2, 1998

Secretary  
U.S. Nuclear Regulatory Commission  
Washington, DC 20555-0001

DOCKET NUMBER  
PROPOSED RULE **PR** 50+70  
(62FR63825)  
(62FR63911)

**SUBJECT:** Comments on the *Criticality Accident Requirements* Proposed and Direct Final Rulemaking (62 Fed. Reg. 63825 and 63911)

Enclosed are the Nuclear Energy Institute (NEI)<sup>1</sup> comments on the *Criticality Accident Requirements* proposed and direct final rulemaking (62 Fed. Reg. 63825 and 63911). The new §50.68 and the revised §70.24 are scheduled to become effective February 17, 1998, unless significant adverse comments are received by the NRC. Our review has identified several issues that represent significant adverse comments. NEI requests that the NRC not proceed with the direct final rule, but instead follow an expedited schedule to resolve comments on the proposed rule.

The rulemaking objective to eliminate the need for a significant number of exemption requests pursuant to §70.24 is appropriate and will be achieved if the rule is amended to address industry's comments. By contrast, the §50.68(b)(3) requirement, as written, will require a significant number of licensees to submit exemption requests. This paragraph establishes a new requirement for fresh fuel storage racks that might inadvertently be filled with *low-density hydrogenous fluid*, such as fog or sprays. Since 1976, BWR licensees have managed this concern with administrative controls consistent with those described in GE SIL 152, *Criticality Margins for Storage of New Fuel*. Paragraph (b)(3) should be revised to allow licensees an option to minimize the likelihood and impact of *low-density hydrogenous fluid* using administrative controls. An in-depth discussion of concern with §50.68(b)(3) is contained in Enclosure 1.

<sup>1</sup> NEI is the organization responsible for establishing unified nuclear industry policy on matters affecting the nuclear energy industry, including the regulatory aspects of generic operational and technical issues. NEI's members include all utilities licensed to operate commercial nuclear power plants in the United States, nuclear plant designers, major architect/engineering firms, fuel fabrication facilities, materials licensees, and other organizations and individuals involved in the nuclear energy industry.

Neither the rule nor its statement of consideration explicitly address the status of existing §70.24(d) exemptions. Nothing in the rule should invalidate exemptions previously granted by the NRC. The rule needs clarification on the status of existing exemptions otherwise licensees may re-submit exemptions previously approved by the NRC. The NRC staff should amend the rule to affirm the continuing validity of existing exemptions. This will assure that neither the NRC nor industry needlessly waste resources.

The rule should clarify the relationship of Part 71 shipping container handling requirements to §50.68 and §70.24. One could interpret these regulations to mean that when an inner metal shipping container is removed from its outer wood container that the provisions of Part 71 are not satisfied and that handling of the inner metal container alone will require management per the requirements of §50.68 or §70.24. It is the inner metal container that provides criticality protection. The outer wood box is not necessary to prevent criticality. An NRC letter to the Grand Gulf Nuclear Station dated October 31, 1997 states, "It is the inner metal container that ensures that a geometrically safe configuration of fuel is maintained during transport, handling, storage and accident conditions..." Sections 50.68 and 70.24 should be amended to clearly state that there is no need for criticality monitoring when handling the inner metal container without its wood over pack. This will eliminate the likelihood of licensees submitting exemption requests to continue use of their current fuel handling practices.

Enclosure 2 provides additional comments necessary to clarify the rule.

The proposed rule should be implemented only after these comments are addressed. Licensees are likely to submit numerous exemption requests to the NRC if the rule remains as written.

If you have questions concerning our comments, please contact Kurt Cozens at (202) 739-8085 or koc@nei.org.

Sincerely,



David J. Modeen

KOC/edb  
Enclosures

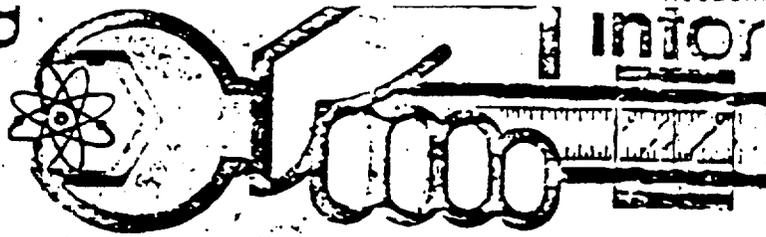
c: Stan Turel, NRC/NRR  
S. Singh Bajwa, NRC/NRR

SIGNIFICANT ADVERSE COMMENT ON 10 CFR 50.68(b)(3)

Current BWR fuel storage racks may not comply with the  $K_{eff} < 0.98$  requirement of §50.68(b)(3). These licensees would then need to submit an exemption request, unless the requirement is revised to permit administrative controls such as those identified in GE SIL-152, *Criticality Margins for Storage of New Fuel* (Attachment A). Presently licensees are managing the §50.68(b)(3) concern with administrative controls.

Licensees and GE concluded in 1976 that an extremely low probability exists for inadvertently establishing critical conditions with fresh fuel in the new fuel storage racks or in a dry spent fuel pool. SIL-152 states that criticality could not be achieved without the introduction of a low equivalent water density material to completely occupy the space around an array of fuel assemblies. GE fuel bundle arrays were analyzed, with and without gadolinia, to simulate reactivity conditions from initial core loads to the most reactive design basis reload fuel (as of 1976). In all cases, the optimum moderation occurred when the equivalent water density was approximately equal to 0.2 gram/cc. In the worst case loading configuration, equivalent water densities from 0.05 to 0.45 gram/cc, the BWR fuel storage arrangement may not comply with the proposed  $K_{eff} < 0.98$  requirement. Licensees believe that administrative controls recommended in the SIL are appropriate to manage the  $K_{eff}$  concern. The NRC staff was informed of the SIL recommendations at the time of its issuance and did not disagree. Licensees have been using the SIL guidance since 1976.

Criterion 50.68(b)(3) should be revised to include an exemption from the requirements if administrative controls preclude optimum moderation conditions.



March 31, 1976  
File Tab A

SIL No. 152  
Category 1

### CRITICALITY MARGINS FOR STORAGE OF NEW FUEL

Using optimum moderator conditions, calculations indicate that there is an extremely remote possibility for inadvertently establishing critical conditions in the new fuel storage racks, or in a dry spent fuel pool loaded with new fuel. Potential sources for an optimum moderator are fire extinguisher foam, water mist, steam or other hydrogenous materials. This Service Information Letter (SIL) recommends precautionary measures to BWR operators to further reduce the already very low probability of such an event occurring.

#### DISCUSSION

An analysis by General Electric indicated that it would require the introduction of a low equivalent water density material to completely occupy the space in and around an array of fuel assemblies in storage for the occurrence of a criticality. Both 10 x 25 and 20 x 25 bundle arrays were analyzed, with and without gadolinia, to simulate reactivity conditions from initial core loads to the most reactive design basis reload fuel. In all cases the optimum moderation occurred when the equivalent water density was = 0.2 gram/cc. In the worst case, a range of equivalent water densities from 0.05 to 0.45 grams/cc was undesirable in conforming to the design basis  $K_{eff}$  limits. This concern has been judged by General Electric not to be a reportable deficiency and the judgment has been supported by the NRC.

Results of BWR site surveys have indicated the presence of fire hose stations and sprinklers on the refueling floor at a significant number of plants. Also, a substantial number of hoses in these stations are provided with adjustable nozzles that are variable from a solid stream to a coarse spray. In the interest of assuring safety margins on the refueling floor, additional controls that further reduce the probability of a criticality occurrence should be implemented.

#### RECOMMENDED ACTION

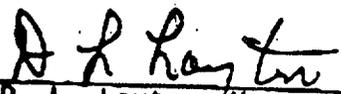
General Electric recommends that the procedural controls listed below be considered at the earliest convenient opportunity to reduce the remote probability for inadvertently establishing critical conditions for new fuel storage:

1. The new fuel storage vault should always be dry. For example, it should be impossible to block the drain, or in any way produce the equivalent water densities in the ranges noted above.
2. The spent fuel pool should be flooded or covered with a fireproof cover if new fuel is in storage when construction activities or construction debris are present. Flooding should provide at least enough water to cover the bundles. In taking these steps, the plant owner should be careful to assure that the fuel pool cooling system is either inoperative or properly vented prior to startup to preclude an air clearing event through the spargers. The dispersion of many small bubbles is a potential source of low equivalent water density.
3. Fuel should not be stored in the new fuel vault when there are construction activities on the refueling floor or construction debris in the vicinity of the new fuel vault unless a solid cover is placed over the vault. This solid cover would help to prevent the introduction of low density water such as a fog or spray should the operation of fire hoses become necessary on the refueling floor.
4. The attachment to this SIL entitled, "Procedural Recommendations for Normal Fuel Handling Operations" should be reviewed by BWR plant personnel to assure a complete understanding of all current procedural controls relevant to fuel handling operations. It should be noted that for reasons of emphasis items 5, 6 and 14 in the attachment are identical to the procedural control recommendations 1, 2 and 3 listed above.

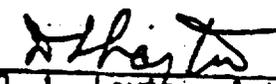
For additional information and assistance, consult your local General Electric service representative.

Prepared by: C. J. Paone/L. A. Gonzalez

Approved by:

  
D. L. Layton, Manager  
Product Service

Issued by:

  
D. L. Layton, Acting Manager  
Performance Analysis &  
Service Communications

Product Reference:

A71 - Plant Recommendations  
J11 - Fuel and Reloads

March 31, 1976

SIL No. 152  
Attachment

PROCEDURAL RECOMMENDATIONS FOR NORMAL FUEL HANDLING OPERATIONS

1. No more than one fuel bundle should be suspended above the fuel storage array and this at a height no greater than 24 inches to limit penetration displacement if the bundle was dropped.
2. Fuel handling in the fuel storage area should be limited to one fuel assembly or the weight equivalent per crane. An exception to this requirement is a properly designed fuel shipping container or an overload test weight. The shipping container or overload test weight should at no time be suspended above the fuel storage array.
3. A fuel array of up to three fuel bundles outside of a normal storage area or normal shipping container should be maintained with an edge-to-edge spacing of 12 inches or more from all other fuel.
4. A fuel array of four or more fuel bundles outside of the normal fuel storage areas or properly designed fuel shipping container should be prohibited.
5. The new fuel vault should always be dry.
6. The spent fuel pool should be maintained in a flooded condition if new fuel is in storage during construction activities or when construction debris are present. Flooding should provide at least enough water to cover the bundles. If the spent fuel pool is not flooded when new fuel is in storage, the fuel should be covered by a solid, fireproof material to prevent possible inundation by low density fire extinguisher foam or water mist.
7. New fuel should not be stored such that a fuel bundle could remain flooded without water existing between bundles.
8. Fuel movement in the new fuel vault should not be permitted if an abnormal condition of vault flooding occurs.
9. Fuel should not be placed in aisles or moved through aisles adjacent to and at the same level of the storage racks.
10. Defective fuel should always be stored in defective fuel storage containers and placed in the defective fuel storage rack or control rod storage rack.
11. If fuel is stored in temporary storage racks below the fuel pool work table, the work table should not be used to handle fuel; conversely, if the work table is used to handle fuel, fuel storage below the work table should be prohibited.

12. No more than two fuel bundles should be allowed in or around a fuel prep machine at any time. This fuel should be separated from the main body of stored fuel by at least 12 inches.
13. Fuel should not be stored outside of designated storage cells.
14. New fuel should not be stored in the new fuel vault when there are construction activities on the refueling floor or construction debris in the vicinity of the new fuel vault unless a solid, fireproof cover is placed over the vault which would preclude criticality due to inundation by low density water such as water fog or spray from a fire hose.

ADDITIONAL COMMENTS ON THE DIRECT FINAL RULE

COMMENT #	PARAGRAPH	COMMENT
1.	10CFR50.68(b)(1)	<p>The paragraph reads, "Plant procedures may not permit handling and transportation at any one time of more fuel assemblies than have been determined to be safely subcritical under the most adverse moderation conditions feasible by unborated water."</p> <ul style="list-style-type: none"> <li>a) Recommend replacing the phrase "may not permit" with the phrase "shall prohibit the" to express this as a clear requirement.</li> <li>b) The terms "handling and transportation" and "safely subcritical" should be explicitly defined to avoid misinterpretation.</li> <li>c) Revise the paragraph to clarify that the determination is to be made by the license, such as in an engineering calculation.</li> <li>d) In Paragraphs 10CFR50.68(b)(2) and 10CFR50.68(b)(4), the moderator is identified as "pure water" rather than "unborated water," as described in 10 CFR 50.68(b)(1). If the moderators were intended to be the same, then the paragraphs should be revised to use the same words. Otherwise, some explanation of the difference between "pure water" and "unborated water" might be necessary to avoid future misunderstandings.</li> <li>e) Paragraph 10CFR50.68(b)(3) discusses "optimum moderation" by a "low-density hydrogenous fluid." The phrases "most adverse moderation" and "optimum moderation" seem to express opposite relationships, but are used to describe the same physical phenomenon. When an assumption of low-density hydrogenous fluid is required for the optimum moderation for new fuel storage, clarification is necessary to understand the basis for using unborated water to determine the most adverse moderation for handling and transportation.</li> </ul>
2.	10CFR50.68(b)(2)	<p>The proposed paragraph reads, in part, "The estimated ratio of neutron production to neutron absorption and leakage (<i>k</i>-effective) of the fresh fuel ...."</p> <p>Since all neutrons (that are produced) subsequently either leak or are absorbed, the paragraph should be clarified to specify its applicability to an instant in time. Alternately, the paragraph may be revised to eliminate the words "ratio of neutron production to neutron absorption and leakage," since "<i>k</i>-effective" is a sufficiently understood term to permit its use without the need to define it.</p>
3.	10CFR50.68(b)(2) and 10CFR50.68(b)(3)	<p>These paragraphs address fresh fuel storage racks, but at least one licensee has committed not to use such storage racks in order to avoid criticality accident concerns. For simplicity, these paragraphs should be revised to be applicable unless the license institutes administrative controls to prohibit the use of fresh fuel storage racks.</p>
4.	10CFR50.68(b)(5)	<p>The paragraph reads, "The quantity of SNM, other than nuclear fuel stored on site, is less than the quantity necessary for a critical mass."</p> <p>There could be a situation where widely scattered sources on site would add up to a critical mass. If these widely scattered SNM sources are part of the fuel or handled like fuel, they should not be considered part of the total for the same reason that fuel is not. Plant procedures and controls for SNM are adequate to control accident criticality. The paragraph should be revised to reflect this situation.</p>

COMMENT #	PARAGRAPH	COMMENT
5.	10CFR50.68(b)(6)	<p>The paragraph reads, "Radiation monitors, as required by GDC 63, are provided in storage and associated handling areas when fuel is present to detect excessive radiation levels and to initiate appropriate safety actions."</p> <p>a) To be precise, GDC 63 requires that appropriate systems be provided to detect excessive radiation levels and to initiate appropriate safety actions. Logically, radiation monitors would be a necessary part of such systems, but GDC 63 does not require the radiation monitors to initiate safety actions. This paragraph should be clarified.</p> <p>b) Some plants were not licensed to the 1971 General Design criteria, but were licensed under other criteria. The paragraph should be revised to reflect the license conditions. Revise the paragraph to eliminate reference to GDC 63 and describe the underlying monitoring requirements or to require "Radiation monitors, as required by GDC 63 or other analogous licensee criteria, ..."</p> <p>c) The requirement that "Radiation monitors...are provided in storage and associated handling areas..." is inappropriate. Fuel storage areas for both new and used fuel are not normally occupied volumes. As such, not all fuel storage volumes (vaults or pools) have radiation monitoring inside of them. In some cases, monitoring is located outside of the storage volume to monitor conditions within the storage volume. The paragraph should be changed such that "in" is replaced with "in the vicinity of."</p> <p>d) Use of the wording "... initiate appropriate safety actions" is inappropriate. At some facilities, these detectors are not formally classified as safety related. The paragraph should be revised to replace "initiate appropriate safety actions" with "initiate appropriate warning."</p>
6.	10CFR50.68(b)(7)	<p>The paragraph reads, "The maximum nominal U-235 enrichment of the fresh fuel assemblies is limited to no greater than five (5.0) percent by weight."</p> <p>This requirement is unnecessary and precludes the development of advanced fuel designs. Any changes in enrichment above 5.0 percent by weight would be supported by an updated criticality analysis for both dry and spent fuel racks to ensure the appropriate margins to criticality are maintained. Placing a limit on enrichment provides no direct safety benefit and should not be included. The explicit numerical criteria should be eliminated from the rule.</p>

(5)

DOCKETED  
USARC

January 2, 1998

DOCKET NUMBER  
PROPOSED RULE PR 50+70  
(62 FR 63825)  
(62 FR 63911)

'98 JAN -6 A11

Secretary  
U. S. Nuclear Regulatory Commission  
Washington, DC 20555-0001

OFFICE OF  
RULEMAKING AND  
ADJUDICATION

Attn: Rulemaking and Adjudications Staff

The following comments are respectively submitted in response to the proposed changes to Criticality Accident Requirements, 10 CFR 50.68 and 70.24, published in Federal Register Volume 62, Number 232, Page 63825, December 3, 1997.

The phrase "as required by GDC 63" of proposed 10 CFR 50.68 (b) (6) should be removed for the following reasons. First, some plants were licensed before the General Design Criteria were promulgated and their licensing bases address the GDC on a case-by-case basis; the phrase in question infers that the General Design Criteria as stated in 10 CFR Part 50 Appendix A are part of every licensee's design basis. Second, the phrase does not add any substance since proposed 50.68 (b) (6) simply restates the relevant portion of GDC 63; omitting the reference would be consistent with proposed 50.68 (b) (1) through (5) which implement GDC 62 without specific reference to that GDC. Third, a person unfamiliar with 10 CFR 50 Appendix A would not recognize the reference to GDC 63 as stated.

Proposed 10 CFR 50.68 (b) (7), which places a five (5.0) weight percent limit on U-235 enrichment, should be eliminated and the phrase "maximum permissible U-235 enrichment" in proposed 50.68 (b) (2), (3), and (4) should be replaced by the phrase "maximum fuel assembly reactivity" for the following reasons. First, the discussion in the Federal Register announcement does not indicate that the enrichment limitation is the basis for a safety analysis; it is simply a statement of current practice. Second, the safety issue is fuel assembly reactivity of which enrichment is only one parameter; burnable poison, material selection, and geometry are major factors affecting reactivity that could compensate for higher enrichments. Third, by modifying 50.68 (b) (2), (3), and (4) as proposed, the reactivity limitation objective of fuel storage racks can be achieved without placing a limitation on fuel enrichment.

We appreciate the opportunity to comment on this proposed rule change.

Marcus H. Voth  
Project Manager - Licensing  
612-271-5116, marcus.h.voth@nspco

\* Letter received by electronic mail on January 2, 1998 --- ATB

Northern States Power Company  
Monticello Nuclear Generating Plant  
2807 West County Road 75  
Monticello, MN 55362

DOCKET NUMBER  
PROPOSED RULE PR 50+70  
(62 FR 63825)  
(62 FR 63911)

6

DOCKETED  
USMRC

From: "Dewhirst, Linda R." <lrdewhi@nppd.com>  
To: "CAG@nrc.gov" <CAG@nrc.gov>  
Date: 1/8/98 6:53pm  
Subject: Additional Comments on Final Rule 10 CFR 50.68

98 JAN -9 P4:25

Ms. Gallagher:

OFF

FILE

Recognizing the below comments are after the requested time but I added to share them anyway and ask for feedback if possible. I've heard that other utilities have similar issues. (I'm having trouble with my web browser recently so I thought I would take the email route). Thank you.

Comments on 10CFR50.68, 10CFR70.24 Direct Final Rulemaking:

50.68(b) is unclear. What is the definition of transportation? Does this mean as soon as the truck which is hauling the numerous bundles of new fuel enters the restricted (protected) area (fuel is in an approved transportation container at this point)? The regulation does not say. It would be ridiculous for us to perform a determination on this truck "under the most adverse moderation conditions feasible by unborated water" if the bundles are still in their transportation container. Has the GE container truly been analyzed under the most adverse conditions feasible up to the point the bundle is unloaded from the box? What does handling "at any one time" mean? Does this mean that I can't unload one box from the truck on one elevation while operators are inspecting a bundle in the inspection stand on the refuel floor because I don't have a "determination" covering the most adverse moderation conditions? How is the "most adverse moderation conditions feasible by unborated water defined." What is considered an acceptable "determination?"

50.58 (b) (2) and (3) are silent about storing the new fuel on the refueling floor rather than in the new fuel storage vault (we do not use ours and when ITS goes into effect, it's prohibited). How will we be affected?

50.68 (b) (5) is very vague. Under the right conditions (i.e., in a laboratory environment) very small quantities of SNM could be made critical. Laboratory conditions are not applicable in our case but yet we are limited to "less than the quantity necessary for a critical mass." Why didn't the NRC add the criteria from Reg Guide 10.3 which is very specific in its definition and is more applicable to power reactors (which are the intended audience for this regulation)?

50.68 (b) (7)--why are we limiting enrichment? Why not keep it to Keff being less than our limit?

The regulation is silent regarding licensees who already have an approved exemption request to 10CFR70.24 from the NRC. In addition, several utilities received an exemption before the seven criteria were published in IN 97-77 (CNS is not among them however, nor do we have an exemption at this time)

We are in the process of developing our exemption request; however if 50.68 is promulgated as planned, then is this necessary (providing we meet the requirements of the rule, see the issues above).

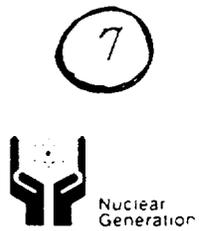
Happy New Year!

Linda R. Dewhirst  
Licensing Engineer  
Cooper Nuclear Station  
Tel: 402.825.5009  
Fax: 402.825.5827  
email: lrdewhi@nppd.com

**Detroit  
Edison**

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DOCKETED  
USNRC



98 JAN -9 P 4 :29

OFFICE OF SAFETY  
RULEMAKING AND  
ADJUDICATIONS

January 2, 1998  
NRC-98-0012

DOCKET NUMBER  
PROPOSED RULE **PR** 50+70

(62 FR 63825)

(62 FR 63911)

Secretary  
U. S. Nuclear Regulatory Commission  
Washington D. C. 20555-0001  
Attention: Rulemaking and Adjudications Staff

- References: 1) Fermi 2  
NRC Docket No. 50-341  
NRC License No. NPF-43
- 2) NRC Letter dated October 31, 1997 "Exemption From  
Criticality Accident Requirements In 10 CFR 70.24(a) - Grand  
Gulf Nuclear Station, Unit 1 (TAC NO. M96177)"

Subject: Detroit Edison Comments on the Proposed and Direct Final  
Rulemaking on Criticality Accident Requirements, 10CFR Parts  
50.68 and 70.24 (62 FR 63825 and 63911)

On December 3, 1997, the Nuclear Regulatory Commission (NRC) issued a proposed and direct final rule with opportunity to comment on Criticality Accident Requirements (62 FR 63825 and 63911). The purpose of this letter is to submit Detroit Edison's comments on the above rules.

The enclosure to this letter provides Detroit Edison's comments on the above subject rules. Detroit Edison is concerned that the proposed changes will not provide sufficient flexibility in meeting the regulations relating to criticality monitoring and will require Detroit Edison to request an exemption from the rules unless the comments are satisfactorily resolved and/or incorporated in the final rule prior to its proposed effective date of February 17, 1998.

USNRC  
NRC-98-0012  
Page 2

If you should have any questions concerning Detroit Edison's comments please contact Hari O. Arora, Principal Licensing Engineer, at (313 or 734) 586-4213.

Sincerely,

A handwritten signature in black ink, appearing to read 'NKP', written over a horizontal line.

Norman K. Peterson  
Director, Nuclear Licensing

Enclosure

cc: K. Cozens (NEI)  
D. J. Modeen (NEI)

**Comments on Final Rulemaking on Criticality Accident Requirements,  
10CFR 50.68 and 70.24**

**10 CFR 50.68(b)(3)**

The requirement for  $K_{eff} < 0.98$  with optimum moderation of fresh fuel of maximum permissible U-235 enrichment loaded in the new fuel storage racks filled with low-density hydrogenous fluid cannot be met at some Boiling Water Reactors (BWRs). General Electric (GE) dealt with this issue over 20 years ago, and concluded that there is an extremely remote possibility for inadvertently establishing critical conditions in the new fuel storage racks, or in a dry spent fuel pool loaded with new fuel.

An analysis by GE indicated that it would require the introduction of a low equivalent water density material to completely occupy the space in and around an array of fuel assemblies in storage for the occurrence of a criticality. Both 10x25 and 20x25 bundle arrays were analyzed, with and without gadolinia, to simulate reactivity conditions from initial core loads to the most reactive design basis reload fuel (as of 1976). In all cases, the optimum moderation occurred when the equivalent water density was approximately equal to 0.2 gram/cc. In the worst case, a range of equivalent water densities from 0.05 to 0.45 grams/cc was undesirable in conforming to the 0.98  $K_{eff}$  design basis limit.

In the interest of assuring safety margins in the areas where fuel is handled, additional controls that further reduce the probability of a criticality occurrence were recommended by GE to their customers in Service Information Letter (SIL) -152 "Criticality Margins for Storage of New Fuel," dated March 31, 1976. In summary, the SIL recommends actions for keeping the new fuel storage vault dry (drains open, no fire protection fogging nozzles in the area etc.).

Detroit Edison believes that criticality in the new fuel storage racks is not a credible event provided utilities followed the guidance given in SIL 152 and the criteria in 10 CFR 50.68(b)(3) should be revised to include exemption from the requirements if administrative controls preclude optimum moderation conditions.

**10 CFR 50.68(b)(6)**

The NRC needs to define "Fuel Handling," and "Storage and Associated Handling Areas." This section requires that General Design Criteria (GDC) 63 be met. However, GDC 63 only addresses monitoring of the fuel storage and associated handling areas in terms of being in reactor refueling areas, and does not address the case when the fuel is unloaded at another location. This needs to be clarified whether this is only a requirement during fuel assembly movement or if it applies to movement of inner metal containers without the outer container.

The proposed changes to 10 CFR 50.68 do not address the recent issue that the GE inner RA3 metal container by itself is not considered to be an approved shipping container per 10 CFR 71, and therefore, the handling of the inner metal container without the outer wooden overpack falls under the 10 CFR 70.24 requirements. The proposed (10CFR 50.68 (b) (6)) rule does not clearly address the concern whether an approved shipping container (per 10 CFR 71) is required to prevent a criticality event. It is Detroit Edison's understanding that the inner container provides sufficient criticality protection. This agrees with the NRC statement as stated in an NRC grant of exemption (Reference 2) for Grand Gulf's 10 CFR 70.24 exemption request. In this grant of exemption, the NRC stated, "It is the inner metal container that ensures that a geometrically safe configuration of the fuel is maintained during transport, handling, storage, and accident conditions, and that the introduction of any moderating agents to the fuel is precluded due to its leak-tight construction."

We suggest revising 10 CFR 50.68 (b)(6) to read, "...associated handling areas when fuel assemblies are removed from the approved metal containers per 10 CFR 71 to detect..."

January 13, 1998

Trojan Nuclear Plant  
Docket 50-344  
License NPF-1

Secretary, U. S. Nuclear Regulatory Commission  
Attention: Rulemakings and Adjudications Staff  
Washington, DC 20555-0001

Dear Sirs:

**Proposed Rule Change Issues**

The following are current rulemaking issues that may have an impact on the Trojan Nuclear Plant operations, procedures, and insurance requirements:

*RIN 3150-AF87 (FR 62, No. 232, page 63825, dated December 3, 1997)*

**"Criticality Accident Requirements"**

The final rule is stated to become effective February 17, 1997, if no significant adverse comments are received.

**Comment:** A surface reading of this rule change implies that the proposed rule would be applicable to Trojan. By letter dated, February 16, 1993, PGE, however, had requested an exemption to the requirements of Part 70.24(a) and by letter, dated March 24, 1993 the NRC Staff responded that an exemption was not required because the requirements of Part 70.24(a) did not apply to the Trojan Plant.

Since the previous actions by the NRC Staff relate to the applicability of the current rule to the Trojan facility, and the rule change is forward looking, to reduce the level of NRC Staff actions for plant specific exemptions to 10 CFR 70.24, the Trojan staff is of the opinion that the rule change is not intended to apply to plants similar to Trojan. It is recommended that the proposed rule be revised to clarify applicability for plants that have received NRC Staff actions (e.g., exemptions or other clarifying letters). Specifically, the final rule should have a provision that excludes from the scope of the rule any facility that has received NRC Staff action related to the application of 10 CFR 70.24(a).

It should be noted that the criteria for determining that the Part 70.24(a) requirements did not apply to Trojan in the March 24, 1993 NRC letter are slightly different than the new

requirements included in the proposed 10 CFR 50.68 that would form the basis for making Part 70.24(a) not applicable for shutdown and operating plants.

The new criteria are not particularly difficult to implement (if we understand them correctly to not relate to cask movement evolutions), but they would require some procedure revisions and implementation of additional controls that are not currently required (e.g., items b.1, b.5, and b.6 of the proposed 50.68). The 'backfit analysis' section of the proposed rule making does not reflect these addition costs. The Trojan facility is interested in minimizing cost for changes, particularly ones that have limited safety implications, since additional costs may impact the funds available for the decommissioning of the facility.

*RIN 3150-AF79 (FR Vol. 62, No. 210, Page 58690, dated October 30, 1997)*

**"Financial Protection Requirements for Permanently Shutdown Nuclear Power Reactors"**

**Comment:** The Trojan Nuclear Plant is in "Configuration 2" described in the proposed rule. Spent nuclear fuel is currently in storage in the spent fuel pool, and this fuel has decayed sufficient to preclude any potential clad oxidation events. PGE has received a site specific exemption to the financial protection requirements of the rule (10 CFR 140.11), by letter dated November 2, 1995 and an Amendment to Indemnity Agreement No. B-78, dated January 3, 1996 as well as an exemption to 10 CFR 50.54(w) by letter dated November 17, 1993. The NRC Staff concluded that 5100 million primary financial protection was all that was needed and that participation in the industry retrospective rating plan (secondary level financial protection) was no longer required. The specific spent fuel cladding temperature criteria of the proposed rule was not explicitly stated in the PGE exemption, though both PGE and the NRC Staff concluded that zirconium fuel cladding fires are no longer a concern since the fuel has cooled for more than 3 years. Even though the 565 degree C criteria, for the spent fuel in the proposed rule, is not explicitly stated in the past NRC Staff exemptions, new analyses should not be required to satisfy the any final rule.

Since the previous actions by the NRC Staff relate to the applicability of the current rules to the Trojan facility, and the rule change is forward looking, to reduce the level of NRC Staff actions for plant specific exemptions to 10 CFR 50 and 140, the Trojan staff is of the opinion that the rule change is not intended to apply to plants similar to Trojan. It is recommended that the proposed rule be revised to clarify applicability for plants that have received NRC Staff actions (e.g., exemptions). Specifically, the final rule should have a provision that excludes from the scope of the rule any facility that has received NRC exemptions related to the application of 10 CFR 50.54(w) and 10 CFR 140.11(a)(4). This could also be accomplished by the final rule permitting lesser limits to be granted, if warranted, on a case-by-case basis.

The criteria described in the Trojan exemption requests were limited to spent fuel pool water inventory loss or fuel handling type of events. The new rule has introduced liquid radioactive inventory incidents as an additional criteria. This represents imposition of new requirements not currently being applied to the Trojan facility. The 'backfit analysis' discussion does not reflect

these new requirements for facilities that have exemptions to the existing rules. In the case of 10 CFR 50.54(w) 'on-site' stabilization fund requirements, the proposed rule represents a factor of 10 increase in insurance requirements for the Trojan facility. The additional premium costs would have a potential negative impact on decommissioning funds. The limiting events for on-site stabilization are related to solid waste fire events and not liquid releases. The NRC and PGE analyses of these events reflect that financial requirements for on-site cleanup costs are approximately \$5 million. The proposed on-site insurance protection requirement of \$50 million is not consistent with past NRC Staff actions and is not needed to ensure the protection of the public health and safety.

If there are any questions related to these comments, please contact Mr. H. R. Pate at (503) 556-7480 or Mr. C. J. Stephenson at (503) 556-7465.

DOCKETED  
USMRC

January 13, 1998

'98 JAN 15 P 4 :55

Trojan Nuclear Plant  
Docket 50-344  
License NPF-1

OFFICE OF THE  
GENERAL COUNSEL  
ADJUTANT GENERAL

Secretary, U. S. Nuclear Regulatory Commission  
Attention: Rulemakings and Adjudications Staff  
Washington, DC 20555-0001

DOCKET NUMBER  
PROPOSED RULE PR 50+70  
(62FR63825)  
(62FR63911)

9

Dear Sirs:

**Proposed Rule Change Issues**

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Since the previous actions by the NRC Staff relate to the applicability of the current rule to the Trojan facility, and the rule change is forward looking, to reduce the level of NRC Staff actions for plant specific exemptions to 10 CFR 70.24, the Trojan staff is of the opinion that the rule change is not intended to apply to plants similar to Trojan. It is recommended that the proposed rule be revised to clarify applicability for plants that have received NRC Staff actions (e.g., exemptions or other clarifying letters). Specifically, the final rule should have a provision that excludes from the scope of the rule any facility that has received NRC Staff action related to the application of 10 CFR 70.24(a).

It should be noted that the criteria for determining that the Part 70.24(a) requirements did not apply to Trojan in the March 24, 1993 NRC letter are slightly different than the new

requirements included in the proposed 10 CFR 50.68 that would form the basis for making Part 70.24(a) not applicable for shutdown and operating plants.

The new criteria are not particularly difficult to implement (if we understand them correctly to not relate to cask movement evolutions), but they would require some procedure revisions and implementation of additional controls that are not currently required (e.g., items b.1, b.5, and b.6 of the proposed 50.68). The 'backfit analysis' section of the proposed rule making does not reflect these addition costs. The Trojan facility is interested in minimizing cost for changes, particularly ones that have limited safety implications, since additional costs may impact the funds available for the decommissioning of the facility.

If there are any questions related to these comments, please contact Mr. H. R. Pate at (503) 556-7480 or Mr. C. J. Stephenson at (503) 556-7465.

(Retrieved from interactive rulemaking website -- ATB)

Commenter:

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