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*the southern electric system*

May 31, 1996

Docket Nos. 50-348  
50-364

10 CFR 70.24

U. S. Nuclear Regulatory Commission  
Attention: Document Control Desk  
Washington, DC 20555

Joseph M. Farley Nuclear Plant  
Request for Exemption from 10 CFR 70.24(a)  
Criticality Accident Requirements

Ladies and Gentlemen:

Pursuant to 10 CFR 70.24(d) and 70.14(a), Southern Nuclear Operating Company (SNC) hereby requests an exemption from the requirements of 10 CFR 70.24(a), "Criticality Accident Requirements," for the Joseph M. Farley Nuclear Plant, Units 1 and 2. This request, as described in the enclosure, involves no change to radiation monitoring instrumentation or emergency procedures presently utilized at Farley Units 1 and 2. Approval of this exemption request is needed by August 1, 1996, to accommodate the onsite arrival of new fuel that will be used in the Farley 2 1996 Fall reload.

Specific exemptions from section 70.24 were previously granted for these units and were contained in the special nuclear material (SNM) licenses for each unit. However, the exemptions were inadvertently omitted from the Part 50 operating licenses at the time those licenses were subsequently issued. It is SNC's understanding that the Nuclear Regulatory Commission (NRC) has taken the position that the exemptions from section 70.24 granted in SNM licenses expire with the issuance of a Part 50 license. SNC is submitting these applications for exemption in order to clearly and conservatively resolve the matter by obtaining formal relief from the requirements of section 70.24(a).

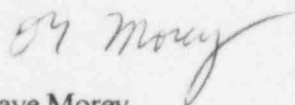
SNC believes that the exemption is technically appropriate for the same reasons the NRC granted the exemption in connection with the SNM licenses. A criticality accident monitoring system was not and is not necessary at Farley Nuclear Plant.

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Please contact this office if you have any questions or require any additional information.

Respectfully submitted,



Dave Morey

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DNM/TMM

cc: Southern Nuclear Operating Company  
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## Enclosure

### Joseph M. Farley Nuclear Plant Request for Exemption from 10 CFR 70.24(a) Criticality Accident Requirements

Pursuant to 10 CFR 70.24(d) and 70.14(a), Southern Nuclear Operating Company (SNC) hereby requests an exemption from the requirements of 10 CFR 70.24(a), "Criticality Accident Requirements," for the Joseph M. Farley Nuclear Plant, Units 1 and 2. This request is an administrative matter and involves no change to radiation monitoring instrumentation or emergency procedures presently utilized at Farley Units 1 and 2.

Specific exemptions from section 70.24 were previously granted for these units and were contained in the special nuclear material (SNM) licenses for each unit. However, the exemptions were inadvertently omitted from the Part 50 operating licenses at the time those licenses were subsequently issued.<sup>1</sup> It is SNC's understanding that the Nuclear Regulatory Commission (NRC) has taken the position that the exemptions from section 70.24 granted in SNM licenses expire with the issuance of a Part 50 license.

SNC believes that the exemption is technically appropriate for the same reasons the NRC granted the exemption in connection with the SNM licenses. A criticality accident monitoring system was and is not necessary at Farley Units 1 and 2. Such exemptions from section 70.24 are typically granted to Part 50 licensees.<sup>2</sup> The NRC has recently granted an exemption under similar circumstances.<sup>3</sup> Similarly, the NRC has incorporated into Georgia Power Company's (GPC's) Part 50 operating licenses for Vogtle Electric Generating Plant Units 1 and 2 the exemptions from section 70.24 granted in connection with GPC's SNM licenses for Vogtle.<sup>4</sup> This application for exemption is very similar to those requests and explains the reasons for granting the exemption.

#### **I. REGULATORY REQUIREMENTS:**

10 CFR 70.24(a) requires licensees authorized to possess certain amounts of special nuclear material to maintain a monitoring system and emergency procedures for the purpose of detecting and responding to accidental criticality. These requirements are applicable to Farley Units 1 and 2. Specifically, section 70.24(a)<sup>5</sup> requires licensees to:

1. Maintain in each area in which such licensed special nuclear material is handled, used, or stored, a monitoring system meeting the requirements of either paragraph (a)(1) or (a)(2), as appropriate, and using gamma- or neutron-sensitive radiation detectors which will energize clearly audible alarm signals if accidental criticality occurs,

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2. Maintain emergency procedures for each area in which this licensed special nuclear material is handled, used, or stored to ensure that all personnel withdraw to an area of safety upon the sounding of the alarm, and
3. Retain a copy of current procedures for each area as a record for as long as licensed special nuclear material is handled, used, or stored in an area. The licensee shall retain any superseded portion of the procedures for three years after the portion is superseded.

Section 70.24(d) anticipates that relief from these requirements is appropriate in some circumstances and allows licensees to apply for an exemption from section 70.24 if good cause is shown. SNC believes that good cause exists for four reasons: (i) as explained below, the fuel storage design and procedural controls preclude accidental criticality, (ii) compliance with section 70.24(a) would not serve the underlying purpose of the regulation, (iii) exemptions from section 70.24(a) were previously extended to Farley Units 1 and 2 in their SNM licenses, and (iv) since the original exemptions were issued, no changes in the use, storage, or handling of SNM have occurred which would make compliance with section 70.24(a) necessary.<sup>6</sup>

In addition to a showing of good cause pursuant to section 70.24(d), a request for an exemption from section 70.24(a) must also satisfy the requirements of 10 CFR 70.14(a).<sup>7</sup>

For the reasons given below, SNC believes that the applications for exemption from the requirements of section 70.24(a) for Farley Units 1 and 2 are authorized under section 70.14(a).

**II. THE EXEMPTION APPLICATIONS SATISFY THE STANDARDS UNDER SECTION 70.14(A) AND SHOULD BE GRANTED:**

The specific requirements for granting exemptions from Part 70 regulations are set forth in 10 CFR 70.14(a). Under section 70.14(a), the NRC is authorized to grant an exemption upon a demonstration that the exemption: (i) is authorized by law, (ii) will not endanger life or property or the common defense and security, and (iii) is in the public interest. The following addresses each of these requirements and demonstrates that the NRC should grant the requested exemptions.

**A. The Exemption Requests Are Authorized By Law**

The NRC's authority to grant requests for exemptions from its regulations has existed since 1956.<sup>8</sup> The particular authority to grant exemptions from the requirements of Part 70 was codified at 10 CFR 70.14 in 1972. See 37 Fed. Reg. 5745, 5749 (March 21, 1972). Moreover, 70.24(d) makes it clear that the NRC has specific and express authority to exempt licensees from the requirements of section 70.24. Therefore, granting the exemptions is explicitly authorized by the NRC's regulations.



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B. The Exemption Requests Will Not Endanger Life or Property Or the Common Defense and Security

An exemption request will not endanger life or property or the common defense and security if the request meets the statutory standard of adequate protection to the health and safety of the public.<sup>9</sup> To further ensure that the common defense and security are not endangered, the exemption request must demonstrate that the loss or diversion of SNM is precluded. As described below the use, storage, and handling of SNM at Farley provides adequate protection to the health and safety of the public, and precludes against loss or diversion of SNM. In particular, this discussion will be focused on the following points: design, characteristics, technical specification requirements, procedural controls, and existing accident analyses.

1. Use of SNM

SNM is present at Farley Units 1 and 2 principally in the form of nuclear fuel. However, other quantities of SNM are used, or may be used (and stored) at each unit in the form of fissile material incorporated into nuclear instrumentation (e.g., incore detector system, and gammametrics), and Health Physics calibration sources. The total amount of SNM used in non-fuel capacities is small -- significantly less than the quantity specified in section 70.24(a). The small quantity of non-fuel SNM present, and the form in which the SNM is used and stored, precludes an inadvertent criticality. Additionally, in accordance with section 70.24(c), Farley Units 1 and 2 are exempt from section 70.24(b) for SNM "used or to be used in the reactor." Thus, the remainder of this discussion is directed only toward the requirements of 70.24(a) with respect to irradiated and unirradiated nuclear fuel.

Inadvertent or accidental criticality of SNM while in use in the reactor vessel is precluded through compliance with the facility technical specifications, including reactivity requirements (e.g., shutdown margins, limits on control rod movement), instrumentation requirements (e.g., reactor power and radiation monitors), and controls on refueling operations (e.g., control rod interlocks and source range monitor requirements).<sup>10</sup> In addition, the operators' continuous attention directed toward instruments monitoring behavior of the nuclear fuel in the reactor assures that the facility is operated in such a manner as to preclude inadvertent criticality. Finally, since access to the fuel in the reactor vessel is not physically possible while in use and is procedurally controlled during refueling (see section II.B.3), there are no concerns associated with loss or diversion of the fuel.

Therefore, the requirements of section 70.24(a) are not necessary for SNM in the form of nuclear fuel while used in the reactor vessel, and thus, granting these exemptions will not endanger life or property or the common defense and security.

## 2. Storage of SNM

SNM as nuclear fuel is stored in one of two locations--the spent fuel pool<sup>11</sup> or the new fuel storage area. The spent fuel pool is used to store irradiated fuel under water after its discharge from the reactor. The pool is designed to store the fuel in a geometric array that precludes criticality. In addition, existing technical specification limits on  $k_{eff}$  are maintained less than or equal to 0.95,<sup>12</sup> even in the event of a fuel handling accident.<sup>13</sup>

The new fuel storage area is used to receive and store new fuel in a dry condition upon arrival on site and prior to loading in the reactor. The new fuel storage area is designed to store new fuel in a geometric array that precludes criticality. In addition, existing safety evaluations demonstrate that  $k_{eff}$  is maintained less than or equal to 0.95 when the new fuel racks are fully loaded and dry or flooded with unborated water and less than or equal to 0.98 for optimum moderation conditions (e.g., because of the presence of aqueous foam or mist) or in the event of a fuel handling accident.<sup>12,14</sup>

Fresh fuel is shipped in a plastic wrap. In some cases the fuel is stored in the new fuel storage racks with the plastic wrap in place and in other cases the plastic wrap is removed prior to storage. In all cases where fuel is stored with the plastic wrap in place, the wrap either cannot hold water due to its design or it is rendered incapable of holding water prior to fuel storage. Therefore, there is no concern that the plastic wrap used as part of fresh fuel storage will hold water from flooding from overhead sources. Additionally, as discussed above, the new fuel storage racks have been analyzed for a postulated flooded condition and the results showed that  $k_{eff}$  is maintained less than or equal to 0.95.

## 3. Handling of SNM

Both irradiated and unirradiated fuel is moved to and from the reactor vessel, and the spent fuel pool to accommodate refueling operations. Also, unirradiated fuel can be moved to and from the new fuel storage area. In addition, movements of fuel into the facility and within the reactor vessel or within the spent fuel pool occur. In all cases, fuel movements are procedurally controlled and designed to preclude conditions involving criticality concerns. Moreover, previous accident analyses have demonstrated that a fuel handling accident (i.e., a dropped fuel element) will not create conditions which exceed design specifications.<sup>15</sup> In addition, the technical specifications specifically address the refueling operations and limit the handling of fuel to ensure against an accidental criticality and to preclude certain movements over the spent fuel pool and the reactor vessel.<sup>16</sup>

The procedural controls discussed in section II.B.2 ensure SNM handling is authorized and monitored, thereby minimizing the potential opportunity for loss or diversion. Similarly, the absence of an accidental criticality monitoring system would not affect the capability of SNC to ensure SNM is safeguarded during handling.

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The exemptions from the requirements of Section 70.24 approved by the NRC in connection with the SNM licenses for Farley Units 1 and 2<sup>17</sup> were based upon NRC's express finding that "the inherent features associated with the storage and inspection of unirradiated fuel established good cause for granting the exemption and that granting such an exemption will not endanger public life or property or the common defense and security and is otherwise in the public interest." The facilities, storage and inspection and procedures and other safeguards that were in place at the time the exemptions were granted in connection with the SNM licenses remain in place and justify the exemptions requested herein.

Therefore, the requirements of section 70.24(a) are not necessary for the handling of SNM. Granting these exemptions as regards fuel handling will not endanger life or property or the common defense and security.

C. The Exemption Requests Are In The Public Interest

The NRC has not provided specific detailed guidance on how to apply the "public interest" standard under section 70.14(a). However, in a 1985 amendment to section 50.12(a) the NRC deleted the "public interest" standard from that section in favor of defining the "special circumstances" that justify requesting an exemption from the NRC regulations. 50 Fed. Reg. 50764 (December 12, 1985). At the same time, the NRC implied that section 70.14(a) was not revised to be consistent with section 50.12(a) only because the NRC did not envision frequent use of section 70.14(a).<sup>18</sup> It seems reasonable to accept that the NRC intends the "special circumstances" articulated in section 50.12(a) to serve the same purpose as the "public interest" criterion of section 70.14(a) and that an exemption request which satisfies the special circumstances of 50.12(a) also satisfies the public interest element of 70.14(a).

Among the several special circumstances identified in section 50.12(a)(2), two<sup>19</sup> are relevant to these exemption requests:

- (a)(2)(ii) Application of the regulation in the particular circumstances would not serve the underlying purpose of the rule or is not necessary to achieve the underlying purpose of the rule; or
- (a)(2)(iii) Compliance would result in undue hardship or other costs that are significantly in excess of those contemplated when the regulation was adopted, or that are significantly in excess of those incurred by others similarly situated . . . .

Each of these 50.12(a)(2) items are reviewed in turn below.

- ii) Application of 10 CFR 70.24 would not serve and is not necessary to achieve the underlying purpose of this requirement.

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The explicit language of section 70.24 does not identify the purpose(s) for requiring an accidental criticality monitoring system and the associated emergency procedures. However, the regulatory history underlying this requirement indicates that:

The following amendments [i.e., section 70.24] to these regulations [i.e., Part 70] is [sic] designed to assure that all licensees who are authorized to possess special nuclear material in amounts which may produce conditions of accidental criticality have in operation adequate alarm systems and emergency plans to evacuate personnel.

23 Fed. Reg. 8747 (November 11, 1958) (emphasis added). Based on this language, the NRC apparently promulgated section 70.24 to ensure that licensees are aware of, and take appropriate response to, conditions of accidental criticality.

As a corollary, this language further implies that where design and/or procedural safeguards ensure against conditions of accidental criticality in the first place, compliance with section 70.24 would not serve the underlying purpose of the regulation. The NRC echoes support for this interpretation in its regulatory position contained in Section C.1 of Regulatory Guide 8.12, Criticality Accident Alarm Systems, Revision 2, (October 1988) (emphasis added) as follows:

Section 70.24 of 10 CFR Part 70 requires alarm coverage "in each area in which such licensed special nuclear material is handled, used or stored . . ." whereas paragraph 4.2.1 of the standard states that the need for criticality alarms must be evaluated for such areas. If such an evaluation does not determine that a potential for criticality exists, as for example where the quantities or form of special nuclear material make criticality practically impossible or where geometric spacing is used to preclude criticality, such as in some storage spaces for unirradiated nuclear plant fuel, it is appropriate to request an exemption from 70.24.<sup>20</sup>

As discussed above in section II.B, the design of and safety analyses for the spent fuel pool and new fuel storage area, as well as the associated procedural control and technical specification requirements, ensure that conditions of accidental criticality are precluded. Therefore, the application of section 70.24(a) to Farley Units 1 and 2 would not serve and is not necessary to achieve the underlying purpose of this requirement. Additionally, Farley fuel storage requirements for new and spent fuel were reviewed and approved by the NRC in December 1991<sup>21</sup> with no safety concerns directed at the fuel storage and handling arrangement at Farley.

Based on these special circumstances which would justify the granting of the exemption applications using the guidance of section 50.12(a), the exemption requests are in the public interest for the purposes of section 70.14(a).



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- iii) Compliance with section 70.24(a) would result in undue hardship or other costs significantly in excess of those contemplated when this regulation was adopted, and that are significantly in excess of those incurred by others.

A criticality accident monitoring system requires a considerable expenditure of resources, including the design and installation of the system, the development and implementation of any associated emergency procedures, and the operation and maintenance of the system for the life of the plant. In light of the purpose of an accidental criticality monitoring system, these expenditures could otherwise be put to better use improving the operation of the plant. Accordingly, compliance with section 70.24(a) would result in an undue hardship and other costs that are significantly in excess of those likely contemplated when this regulation was adopted.

It is our understanding that exemptions from the requirements of section 70.24(a) are typically granted to Part 50 licensees. As a recent example, Centenor Energy was granted an exemption from section 70.24(a) in connection with the possession of SNM at its nuclear facility. Moreover, this exemption was granted under circumstances very similar to the present application.<sup>22</sup> Moreover, an exemption was included in the Operating Licenses for GPC's Vogtle Units 1 and 2,<sup>23</sup> which employs facilities and procedures that are not materially different from those in place at Farley. Therefore, SNC concludes that since Farley Units 1 and 2 are not dissimilar from other facilities which have received such an exemption, compliance with section 70.24(a) would certainly create an undue hardship and other costs significantly in excess of those incurred by others similarly situated.

### **III. CONCLUSION:**

Because exemptions from the requirements of 10 CFR 70.24(a) for Farley Units 1 and 2 are authorized by law, will not endanger life or property or the common defense and security, is in the public interest due to the presence of special circumstances, and is requested for good cause, we respectfully submit that, in accordance with the requirements of 10 CFR 70.14(a) and 70.24(d), the NRC should grant the requested exemptions.

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NOTES

1. Compare the Farley 1 and Farley 2 operating licenses dated June 25, 1977 and March 31, 1981, respectively, with the Farley 1 and Farley 2 SNM licenses dated July 20, 1976 and March 12, 1980, respectively.
2. This request is in accordance with NRC guidance on section 70.24 contained in Regulatory Guide 8.12, "Criticality Accident Alarm Systems," Revision 2, dated October 1988, Section C.1. which provides that: "[W]here the quantities or form of special nuclear material make criticality practically impossible or where geometric spacing is used to preclude criticality, such as in some storage spaces for unirradiated nuclear power plant fuel, it is appropriate to request an exemption from 70.24."
3. See, Letter from J. W. Roe, Director, Office of Nuclear Reactor Regulation, NRC, to R. A. Stratman, Vice President Nuclear-Perry, Centerior Service Company, dated September 26, 1994.
4. See, Vogtle Supplemental Safety Evaluation Report, Revision 9, NUREG-1137, March 1989; Vogtle Unit 1 Operating License, Item 2.D; and Vogtle Unit 2 Operating License, Item 2.D.
5. Section 70.24(a) does not require underwater monitoring of SNM that is handled or stored beneath water shielding.
6. While changes in the storage of SNM as irradiated fuel have occurred at Farley Units 1 and 2 since receipt of the initial operating licenses (e.g., reracking both spent fuel pools), these changes did not affect previous conclusions regarding accidental criticality.
7. Although Farley Units 1 and 2 are licensed under Part 50, these exemption requests need not be brought under section 50.12 because relief is not being sought from any of the Part 50 requirements. See 50 Fed. Reg. 50764, 50775 (December 12, 1985) ("exemptions from the provisions of each part of the regulations must be evaluated and granted under the exemption provisions contained in that part."). However, as described later in this application, the section 50.12 "special circumstances" requirement is in effect applicable to this request.
8. See, 50 Fed. Reg. at 50766-67, citing U.S. v. Allegheny-Ludlum Steel, 406 U.S. 742, 755 (1972); Alabama Power Co. v. Costle, 636 F.2d 323, 357 (D.D. Cir. 1979), and WAIT Radio v. FCC, 418 F.2d 1153, 1157 (D.C. Cir. 1969).
9. See, 50 Fed. Reg. at 50767-68. In discussing the "not endanger" terminology in the original language of section 50.12(a), the NRC concluded that this criterion was "never intended to embody any special standards for exemptions that differed from the statutory

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standards that licensees must provide adequate protection to the health and safety of the public and be in accord with the common defense and security." *Id.* at 50678. Although section 70.14(a) still employs the "not endanger" language, it does not offer any definitive guidance for its application. It is therefore concluded that the guidance offered under section 50.12(a) regarding endangerment is likewise applicable to Part 70 exemptions.

10. See, e.g., Farley Technical Specification Sections 3/4.1, "Reactivity Control Systems"; 3/4.3.1, "Reactor Trip System Instrumentation"; and 3/4.9, "Refueling Operations."
11. CFR 70.24(a) expressly provides that the section "is not intended to require underwater monitoring when SNM is handled or stored beneath water shielding...." Thus, no exemption is necessary for storage of SNM as nuclear fuel in the spent fuel pool and, as such, is not described herein.
12. See, Farley Technical Specification Section 5.6, "Fuel Storage."
13. See, Farley Final Safety Analysis Report (FSAR) Sections 4.3.2.7, "Criticality of the Reactor During Refueling," and 9.1.2, "Spent Fuel Storage."
14. See, Farley FSAR Sections 4.3.2.7, "Criticality of the Reactor During Refueling," and 9.1.1, "New Fuel Storage."
15. See, Farley FSAR Sections 4.3.2.7, "Criticality of the Reactor During Refueling," 9.1.1, "New Fuel Storage," 9.1.2, "Spent Fuel Storage," and 15.4.5, "Fuel Handling Accident," and Farley Technical Specification Section 5.6, "Fuel Storage."
16. See, Farley Technical Specification Section 3/4.9 "Refueling Operations."
17. See, Farley 1 and Farley 2 SNM licenses, dated July 20, 1976, and March 12, 1980, respectively.
18. Specifically, the NRC commented as follows on the need for consistent exemption language throughout its regulations:

The NRC has considered the need to revise other parts of its regulations to correspond to the criteria in 50.12(a). Because the majority of exemption situations arise in the context of 10 CFR Part 50 requirements, the NRC has determined that revisions to other parts of the regulations are not necessary at this time.

Federal Register at 50775.
19. Section 50.12(a)(2) identifies six special circumstances that can be used to justify requesting an exemption; however, an exemption does not require that all six circumstances be justified. SNC has reviewed these exemption requests against the criteria

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in Section 50.12(a)(2) and concluded that items (ii) and (iii) most directly apply to Farley Units 1 and 2 in this instance.

20. The value/impact statement published in connection with Revision 1 to Regulatory Guide 8.12 which remained applicable to Revision 2 to Regulatory Guide 8.12 provides:

As indicated in Regulatory Position 1, a request for an exemption to the requirements of 10 CFR 70.24, "Criticality Accident Requirements," . . . is appropriate when there is no real possibility of criticality, for example in situations where geometric spacing is used to preclude criticality . . . .

21. See, Letter from S. T. Hoffman, Division of Reactor Projects, to W. G. Hairston, III, Senior Vice President-SNC, dated December 30, 1991, transmitting Farley 1 and 2 License Amendments Numbers 91 and 84, respectively, to allow storage of 5.0 weight percent (nominal) U-235 optimized fuel assemblies and VANTAGE-5 fuel assemblies in the spent fuel and new fuel storage racks.
22. Fed. Reg. 50260 (October 3, 1994).
23. See, Vogtle Supplemental Safety Evaluation Report, Revision 9, NUREG-1137, March 1989; Vogtle Unit 1 Operating License, Item 2.D; and Vogtle Unit 2 Operating License, Item 2.D.