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ACCESSION NBR:9706190152 DOC.DATE: 97/06/05 NOTARIZED: NO DOCKET #
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VISSING,G.

SUBJECT: Requests exemption from requirements of 10CFR70.24(a), "Criticality Accident Requirements."

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ROBERT C. MECREDY
Vice President
Nuclear Operations

June 5, 1997

U.S. Nuclear Regulatory Commission
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Attn: Guy Vissing
Project Directorate I-1
Washington, D.C. 20555

Subject: Request for Exemption for 10 CFR 70.24
R.E. Ginna Nuclear Power Plant
Docket No. 50-244

Ref.(a): Letter, Guy Vissing, NRC, to Dr. Robert C. Mecredy, "Exemption from the Requirements of 10CFR70.24", June 3, 1997.

Dear Mr. Vissing:

Pursuant to 10 CFR 70.24(d) and 70.14(a), Rochester Gas and Electric Corporation requests an exemption from the requirements of 10CFR70.24(a), "Criticality Accident Requirements," for the R.E. Ginna Nuclear Power Plant. This request, as described in the enclosure, involves no change to the radiation monitoring alarm response or emergency procedures presently utilized. We request approval of this exemption by July 25, 1997, to accommodate the onsite arrival of new fuel that will be used in the 1997 Fall refueling outage.

This exemption meets all eight of the criteria delineated in Reference (a). Should you have any questions please contact George Wrobel at 716-724-8070.

Very truly yours,

Robert C. Mecredy

Attachment
REJ\461

A009

xc: Mr. Guy Vissing (Mail Stop 14B2)
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Washington, D.C. 20555

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Ginna Senior Resident Inspector

Request for Exemption from 10 CFR 70.24(a)
Criticality Accident Requirements

Pursuant to 10 CFR 70.24(d) and 70.14(a), RG&E hereby requests an exemption from the requirements of 10 CFR 70.24(a), "Criticality Accident Requirements," for the R.E. Ginna Nuclear Power Plant. This request is an administrative matter and involves no change to radiation monitoring alarm response or emergency procedures presently utilized at Ginna.

It is our understanding that the Nuclear Regulatory Commission (NRC) has recently taken the position that any exemptions from section 70.24 granted in an SNM license expires with the issuance of the Part 50 license.

RG&E believes that an exemption is technically appropriate for Ginna Station and that a criticality accident monitoring system is not necessary.

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 Ginna. Specifically, section 70.24(a) 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.

2. Maintain emergency procedures for each area in which this licensed special nuclear material is handled, used, or stored to assure 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. RG&E believes that good cause exists for three 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, and (iii) since the operating license was issued, no changes in the use, storage, or handling of SNM have occurred which would make compliance with section 70.24(a) necessary.

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).

For the reasons given below, the application for exemption from the requirements of section 70.24(a) is justified under section 70.14(a).

II. THE EXEMPTION APPLICATION SATISFIES THE STANDARDS UNDER SECTION 70.14(a) AND SHOULD BE GRANTED

Under section 70.14(a), the NRC is authorized to grant an exemption upon a demonstration that the exemption: (i) will not endanger life or property or the common defense and security, and (ii) is in the public interest. The following addresses each of these requirements and demonstrates that the NRC should grant the requested exemption.

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

An exemption 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. 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 Ginna 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 principally in the form of nuclear fuel. However, other quantities of SNM are used in the form of fissile material incorporated into incore detectors (fission chambers) and sources (for radiation monitoring equipment calibration). The total amount of SNM used in nonfuel capacities is small - significantly less than the quality 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), Ginna is 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., boron concentration and source range monitor requirements). In addition, the operators' continuous attention to 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. The UFSAR chapter 15 Accident Analysis specifically evaluates postulated boron dilution events which could lead to a criticality and the event can be mitigated without a criticality occurring. Finally, since access to the fuel in the reactor vessel is not physically possible while in use and is procedurally controlled during refueling, 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 this exemption 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 or the new fuel storage area. The spent fuel pool is used to store new, or irradiated fuel under water. 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 .95, even in the event of a fuel handling accident. Though not credited in the criticality analysis, SFP boron concentration is administratively maintained at > 2300 ppm which is significantly above the Technical Specification minimum of 300 ppm. The fuel storage area is also provided with area radiation monitoring to alert personnel of excessive radiation levels.

The new fuel storage area can be 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 .9146 when the new fuel racks are fully loaded and dry or flooded with unborated water and less than or equal to .666 for optimum moderation conditions (e.g., because of the presence of aqueous foam or mist).

Fresh fuel is shipped in a plastic wrap. The plastic wrap is removed prior to storage in the new fuel storage racks. Even if 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 results showed that k_{eff} is maintained less than or equal to .9146.

Also, by letter to Dr. Robert C. Mecredy from Allen R. Johnson, "Safety Evaluation of Rochester Gas and Electric's Proposed Criticality Analysis of the Ginna New and Spent Fuel Racks/Consolidated Rod Storage Cannisters," dated August 30, 1995, the NRC found the criticality aspects for Ginna acceptable.

This criticality analysis specified that:

1. K-effective does not exceed 0.95 at a 95% probability, 95% confidence level with the fresh fuel storage racks filled with fuel of the maximum permissible U-235 enrichment and flooded with pure water.

2. K-effective does not exceed 0.98, at a 95% probability, 95% confidence level with the fresh fuel storage racks filled with fuel at the maximum permissible U-235 enrichment and flooded with moderator at the (low) density corresponding to optimum moderation.

3. K-effective does not exceed 0.95 at a 95% probability, 95% confidence level with the spent fuel storage racks filled with fuel of the maximum permissible U-235 enrichment and flooded with pure water.

4. The maximum nominal U-235 enrichment is 5% wt.

3. Handling of SNM

Both irradiated and unirradiated fuel can be 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. This includes limitations on movement to one fuel assembly at a time between the shipping container and the new fuel storage racks. Personnel responsible for fresh fuel movement have received training at the vendor manufacturing facility. 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. 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.

The procedural controls discussed 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 Ginna to ensure SNM is safeguarded during handling.

Original industry exemptions from the requirements of section 70.24 approved by the AEC in connection with SNM licenses were based upon the AEC's agreement that the nature of the special nuclear material, storage arrangements, and procedural controls proposed would preclude any possibility of accidental criticality during receipt, unloading, inspection and storage of new fuel assemblies. The Ginna facilities, storage and inspection and procedures and other safeguards are consistent with that position.

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

B. The Exemption Request Is 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 action 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). 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 are relevant to this exemption request:

> (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) Compliances 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 other 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.

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 those 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.

As discussed above in section II.A, 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 Ginna would not serve and is not necessary to achieve the underlying purpose of this requirement. Additionally, Ginna fuel storage requirements for new and spent fuel were reviewed and approved by the NRC upon issuing the Operating License and License Amendment No. 61 with no safety concerns directed at the fuel storage and handling arrangements. Finally, this issue was specifically reviewed in SEP Topic IX-1, "Fuel Storage." RG&E responded to an NRC request for information regarding

features used to detect criticality in the new fuel storage area. We responded that because of the inherently safe design ensuring subcriticality if the new fuel storage area filled with unborated water, there were no features provided specifically to do this (December 23, 1981). This response was accepted by the NRC in an SER dated Jan. 27, 1982.

Based on these special circumstances which would justify the granting of the exemption application using the guidance of section 50.12(a), the exemption request is in the public interest for the purpose of section 70.14(a).

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 systems 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, strict 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, the Farley Units 1 and 2 plants were granted an exemption from section 70.24(a) in connection with the possession of SNM at its nuclear facility. Therefore, we conclude that 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 exemption from the requirements of 10 CFR 70.24(a) for Ginna is 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 exemption.