

5501 N. State Route 2  
Oak Harbor, OH 43449

419-249-2300  
FAX: 419-321-8337

John K. Wood  
Vice President - Nuclear  
Davis-Besse

Docket Number 50-346

License Number NPF-3

Serial Number 2440

January 30, 1997

United States Nuclear Regulatory Commission  
Document Control Desk  
Washington, D. C. 20555-0001

Subject: 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), Toledo Edison hereby requests an exemption from the requirements of 10 CFR 70.24(a), "Criticality Accident Requirements," for the Davis-Besse Nuclear Power Station (DBNPS), Unit 1. This request, as described in the enclosure, involves no change to radiation monitoring instrumentation or emergency procedures presently utilized at the DBNPS.

A specific exemption from Section 70.24 was previously granted for the DBNPS and was contained in the special nuclear materials license number SNM-1601 dated June 16, 1976. However, the exemption was not explicitly included by the NRC in the 10 CFR Part 50 Operating License Number NPF-3 for the DBNPS at the time the license was issued on April 22, 1977. The Operating License Number NPF-3 paragraph 2.B.(3) states that the DBNPS is licensed under 10 CFR Part 70 to receive, possess and use at any time special nuclear material as reactor fuel, in accordance with the limitations for storage as described in the Final Safety Analysis Report. Since no criticality accident alarm system was described in the NRC's Safety Evaluation Report (NUREG-0136) for the DBNPS Operating License or the Final Safety Analysis Report, Toledo Edison has believed that the exemption granted on June 16, 1976 was valid for the life of the plant and included in the broad language of paragraph 2.B.(3) of the Operating License. This was similar to the position provided by the NRC to the Browns Ferry Nuclear Plant, Units 1, 2 and 3 by letter dated May 11, 1988 (TAC Numbers 00214, 00215, and 00216).

070007

9702070305 970130  
PDR ADOCK 05000346  
P PDR

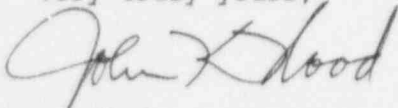
11  
Aval

However, because this exemption was not explicitly listed in the Operating License, was not issued as a separate exemption, and is an issue of regulatory contention, Toledo Edison is submitting this application for an explicit exemption from the requirements of Section 70.24(a).

Toledo Edison believes the exemption is technically appropriate for the same reasons the NRC granted the exemption in connection with the materials license number SNM-1601. As explained in the enclosure, a criticality accident monitoring system was and is not necessary at the DBNPS. Toledo Edison requests that the NRC approve this exemption by May 1, 1997.

Should you have any questions or require additional information, please contact Mr. James L. Freels, Manager - Regulatory Affairs, at (419) 321-8466.

Very truly yours,



DRW/laj

enclosure

cc: A. B. Beach, Regional Administrator, NRC Region III  
A. G. Hansen, DB-1 NRC/NRR Project Manager  
S. Stasek, DB-1 NRC Senior Resident Inspector  
Utility Radiological Safety Board

Davis-Besse Nuclear Power Station  
Request for Exemption from 10 CFR 70.24(a)  
Criticality Accident Requirements

Pursuant to 10 CFR 70.24(d) and 70.14(a), Toledo Edison hereby requests an exemption from the requirements of 10 CFR 70.24(a), "Criticality Accident Requirements," for the Davis-Besse Nuclear Power Station (DBNPS), Unit 1. This request is an administrative matter and involves no change to radiation monitoring instrumentation or emergency procedures presently utilized at the DBNPS.

A specific exemption from Section 70.24 was previously granted for the DBNPS and was contained in the special nuclear material license number SNM-1601. However, the exemption was not explicitly included in the 10 CFR Part 50 Operating License Number NPF-3 for the DBNPS at the time the license was issued on April 22, 1977, nor was it issued as a separate exemption. Accordingly, Toledo Edison is requesting that an explicit exemption be issued for the DBNPS from the requirements of 10 CFR 70.24(a).<sup>(1)</sup>

This exemption is technically appropriate for the same reasons the NRC granted the exemption to 10 CFR 70.24(a) in connection with DBNPS license SNM-1601. A criticality accident monitoring system was and is not necessary, at the DBNPS. Such exemptions from Section 70.24 have been typically granted to Part 50 licensees.<sup>(2)</sup> The NRC has recently granted exemptions under similar circumstances<sup>(3)</sup> which includes Georgia Power Company's Edwin I. Hatch Nuclear Plant, Units 1 and 2<sup>(4)</sup>, and Southern Nuclear Operating Company's Joseph M. Farley Nuclear Plant, Units 1 and 2<sup>(5)</sup>. This request for exemption is very similar to the requests of those plants referenced above and provides just cause for the granting of 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 the DBNPS. Specifically, Section 70.24(a)<sup>(6)</sup> requires licensees to:

- A. 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,
- B. 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

- C. 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 the area. The licensee shall retain any superseded portion of the procedures for three years after the portion is superseded.

Section 70.24(d) recognizes 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. Toledo Edison believes good cause exists based on the following:

1. As explained below, the fuel storage design and procedural controls preclude accidental criticality.
2. Compliance with Section 70.24(a) would not serve the underlying purpose of the regulation.
3. An exemption from Section 70.24(a) was previously extended to DBNPS in the materials license SNM-1601, dated June 16, 1976.
4. Since the original exemption was issued, no changes in use, storage, or handling of special nuclear material have occurred which would make compliance with Section 70.24(a) necessary. <sup>(7)</sup>

In addition, to show 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>(8)</sup>

For the reasons provided below, Toledo Edison believes this request for exemption from the requirements of Section 70.24(a) for the DBNPS is authorized under Section 70.14(a).

II. THE EXEMPTION REQUEST SATISFIES 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 demonstration that the exemption is authorized by law; will not endanger life or property or the common defense and security; and is in the public interest. The following discussion addresses each of these elements and demonstrates that the NRC should grant the requested exemption.

A. Exemption Requests Are Authorized by Law

The NRC's authority to grant requests for exemptions from its regulations has existed since 1956. <sup>(9)</sup> The particular authority to grant exemptions from the requirements of Part 70 was codified in 10 CFR 70.14 in 1972. See 37 Federal Register 5745, 5749 (March 21, 1972). Moreover, 70.24(d) clearly states that the NRC has specific and express authority to exempt licensees from the requirements of Section 70.24. Therefore, granting the requested exemption is explicitly authorized by the NRC's regulations.

B. An Exemption Request 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>(10)</sup> To further ensure the common defense and security are not endangered, the exemption request must demonstrate that the loss or diversion of special nuclear material is precluded. As described below, the use, storage, and handling of special nuclear material at the DBNPS provides adequate protection to the health and safety of the public, and precludes loss or diversion of special nuclear material. In particular, this discussion focuses on the following points: design configuration, Technical Specification requirements, procedural controls, and existing accident analyses.

1. Use of Special Nuclear Material (SNM)

Special Nuclear Material is present at the DBNPS principally in the form of nuclear fuel. However, other quantities of SNM are used, or may be used (and stored) in the form of fissile material incorporated into nuclear instrumentation (e.g., source range monitors, intermediate range monitors, and local power range monitors), startup source assemblies, and health physics calibration sources. The total amount of SNM used in non-fuel capacities is significantly less than the quantity specified in Section 70.24(a). The small quantity of non-fuel SNM present, and the form in which this SNM is used and stored, precludes an inadvertent criticality. Additionally, in accordance with Section 70.24(c), the DBNPS is exempt by regulation from the additional requirements of Section 70.24(b) for SNM "used or to be used in the reactor." Thus, with respect to irradiated and unirradiated nuclear fuel, the remainder of this discussion is directed toward the requirements of Section 70.24(a).

Inadvertent or accidental criticality of SNM while in use in the reactor vessel is reasonably precluded through compliance with the DBNPS Technical Specifications, including reactivity requirements (e.g., shutdown margins, limits on control rod movement), instrument requirements (e.g., reactor power and radiation monitors), and controls on refueling operations (e.g., refueling equipment interlocks, source range monitor requirements).<sup>(11)</sup> In addition, the operators' attention is directed toward instruments monitoring the behavior of the nuclear fuel in the reactor 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 below), there are no concerns associated with loss or diversion of 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

Special Nuclear Material as nuclear fuel is stored at the DBNPS in one of three locations - the spent fuel pool<sup>(12)</sup>, the new fuel storage facility,<sup>(15)</sup> or in the Dry Fuel Storage Facility licensed under 10 CFR 72.<sup>(14)</sup> The spent fuel pool and Dry Fuel Storage Facility are described in Section 9.1.2, "Spent Fuel Storage," of the DBNPS Updated Safety Analysis Report (USAR) (see attached Appendix to this request). The spent fuel pool is used to store unirradiated fuel prior to transfer to the reactor and irradiated fuel after its removal from the reactor. The pool is designed to store irradiated and unirradiated fuel in a geometric array that precludes criticality in accordance with Technical Specification 3/4.9.13, "Spent Fuel Pool Fuel Assembly Storage." The storage of new and spent fuel assemblies at the DBNPS has been previously reviewed and found acceptable by the NRC as documented in the Safety Evaluation issued with DBNPS Operating License NPF-3 Amendment Number 181, dated November 19, 1993.<sup>(22)</sup> In addition, existing Technical Specifications require that limits on  $k_{eff}$  be maintained  $\leq 0.95$ ,<sup>(13)</sup> even in the event of a fuel handling accident.<sup>(14)</sup>

The new fuel storage facility is described in Section 9.1.1, "New Fuel Storage," of the DBNPS USAR (see attached Appendix to this request). The new fuel storage facility is used to receive and store new fuel in a dry condition upon arrival on site and prior to transferring the new fuel to the spent fuel pool for loading into the reactor. New fuel is shipped in vented plastic bags. The fuel is then stored in the new fuel storage racks with either the bags removed or retained with a vented fireproof bag added over the vented plastic bag. Due to its vented design, there is no concern that the plastic used as part of the new fuel package will be able to hold water from flooding from overhead sources.

The new fuel storage facility is designed to store new fuel in a geometric array that precludes criticality. Design analyses have verified that  $k_{eff}$  is  $< 0.95$  when the new fuel racks are fully loaded and dry or flooded with unborated water, and that  $k_{eff} < 0.98$  when new fuel is immersed in a hydrogenous mist (i.e., with optimum moderator density).

## 3. Handling of SNM

Section 9.14, "Fuel Handling System," of the DBNPS (see attached Appendix to this request) describes the handling of fuel. Both irradiated and unirradiated fuel is moved between the reactor vessel and the spent fuel pool to accommodate refueling operations. Unirradiated fuel can also be moved to and from the new fuel storage facility. In addition, movements of fuel into the reactor and within the reactor vessel or within the spent fuel pool occur. In all cases, fuel movement is procedurally controlled with administrative limits on minimum boron concentrations to preclude conditions involving criticality. The Technical Specifications in Section 3/4.9 specifically address 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>(17)</sup> Moreover, previous accident analyses demonstrate that a fuel handling accident (i.e., a dropped fuel element) will not create conditions which exceed design specifications.<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 to ensure SNM is safeguarded during handling.

Relative to the SNM license for DBNPS, Unit 1,<sup>(18)</sup> the exemption from the requirements of Section 70.24 were based upon an expressed finding by the NRC that:

...because of the inherent features associated with the storage and inspection of unirradiated fuel, it is hereby determined that you have shown good cause for granting the exemption and that granting such an exemption will not endanger life or property or the common defense and security and is otherwise in the public interest.

Equivalent facilities, storage, inspection, procedures and other safeguards in place at the time the exemption was granted are in place and justify the exemption requested herein.

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

C. An 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 Section 50.12(a) (the 10 CFR 50 section concerning specific exemptions), the NRC deleted the "public interest" standard in favor of defining the "special circumstances" that justify requesting an exemption from NRC regulations (50 Federal Register 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>(19)</sup> It seems reasonable that the NRC intended the "special circumstances" 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 Section 50.12(a) also satisfies the public interest element of Section 70.14(a).

Among the several special circumstances identified in Section 50.12(a)(2), two<sup>(20)</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 Section 50.12(a)(2) items is reviewed 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 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 Federal Register 8747 November 11, 1985 (emphasis added). Based on this language, the NRC apparently promulgated Section 70.24 to ensure 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's regulatory position contained in Section C.1 of Regulatory Guide 8.12, "Criticality Accident Alarm Systems," Revision 2, October 1988 (emphasis added), further supports this perspective 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. (21)

As discussed above in Section II.B, the design of and safety analyses for the spent fuel pool and new fuel storage, as well as the associated procedural control and Technical Specification requirements, ensure conditions of accidental criticality are precluded. Therefore, the application of Section 70.24(a) to the DBNPS would not serve and is not necessary to achieve the underlying purpose of this requirement.



Based on these special circumstances, the exemption request is in the public interest for the purposes 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, or that are significantly in excess of those incurred by others.

A criticality accident monitoring system at this point in the DBNPS's remaining plant life would require 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. Accordingly, compliance with Section 70.24(a) for the plant's remaining life would result in an undue hardship and other costs that are significantly in excess of those likely contemplated when this regulation was adopted.

Exemptions from the requirements of Section 70.24(a) have been typically granted to Part 50 licensees. As a recent example, the Georgia Power Company was granted an exemption from Section 70.24(a) in connection with the possession of SNM at the Edwin I. Hatch Nuclear Plant.<sup>(4)</sup> This exemption for the Hatch Nuclear Plant was granted under circumstances very similar to the exemption request herein. Therefore, Toledo Edison concludes that since the DBNPS is not significantly dissimilar from other plants 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:

Based on the information presented above, there is reasonable assurance that irradiated and unirradiated fuel will not become accidentally critical. The circumstances for granting an exemption to 10 CFR 70.24 are met because accidental criticality is precluded with the present design configuration, Technical Specification requirements, administrative controls, and the fuel handling equipment and procedures.

Since exemptions from the requirements of 10 CFR 70.24(a) for the DBNPS 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, Toledo Edison requests that, in accordance with the requirements of 10 CFR 70.14(a) and 70.24(d), the NRC grant the requested exemption.

### NOTES

1. Compare DBNPS Operating License NPF-3 dated April 22, 1977 with the DBNPS material license SNM-1601 dated June 16, 1976.
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, Letter from Kahtan N. Jabbour, Senior Project Manager, Project Directorate II-2, Division of Reactor Projects I/II, Office of Nuclear Reactor Regulation, NRC, to J. T. Buckham, Jr., Vice President - Hatch Project, Georgia Power Company, dated July 31, 1996.
5. See, Letter from Byron L. Siegel, Senior Project Manager, Project Directorate II-2, Division of Reactor Projects I/II, Office of Nuclear Reactor Regulation, NRC, to D. M. Morey, Vice President - Farley Project, Southern Nuclear Operating Company, dated July 31, 1996.
6. Section 70.24(a) does not require underwater monitoring of SNM that is handled or stored beneath water shielding.
7. While changes in the storage of SNM as irradiated fuel has occurred at DBNPS, Unit 1, since receipt of the initial operating license (e.g., reracking the spent fuel pool and dry fuel storage), these changes did not affect previous conclusions regarding accidental criticality.
8. Although DBNPS, Unit 1, is licensed under Part 50, this exemption request 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 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 request, the Section 50.12 "special circumstances" requirement is, in effect, applicable.
9. 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).
10. See 50 Federal Register 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 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, no definitive guidance for its application is given. Therefore, it is concluded that the guidance offered under Section 50.12(a) regarding endangerment is likewise applicable to Part 70 exemptions.

11. See e.g., Unit 1 Technical Specifications 3/4.1, "Reactivity Control Systems;" 3/4.3, "Instrumentation;" and 3/4.9, "Refueling Operations."
12. 10 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.
13. See, DBNPS Technical Specification Section 5.6, "Fuel Storage."
14. See, DBNPS Updated Safety Analysis Report (USAR) Section 9.1.2, "Spent Fuel Storage."
15. See, DBNPS USAR Section 9.1.1, "New Fuel Storage."
16. See, DBNPS USAR Sections 9.1.1, "New Fuel Storage," 9.1.2, "Spent Fuel Storage," and 15.4.7, "Fuel Handling Accident," and DBNPS Technical Specification Section 5.6, "Fuel Storage."
17. See, DBNPS Technical Specification Section 3/4.9, "Refueling Operations."
18. See DBNPS material license SNM-1601 dated June 16, 1976.
19. <sup>\*</sup> 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 Section 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. See Federal Register at 50775.
20. 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. Toledo Edison has reviewed these exemption requests against the criteria in Section 50.12(a)(2) and concluded that items (ii) and (iii) most directly apply to the DBNPS, Unit 1, in this instance.
21. 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 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....

Docket Number 50-346  
License Number NPF-3  
Serial Number 2440  
Enclosure  
Page 10

22. See, Letter from Jon B. Hopkins, Senior Project Manager, Project Directorate III-3, Division of Reactor Projects III/IV/V, Office of Nuclear Reactor Regulation, NRC, to Louis F. Storz, Vice President - Nuclear - Davis-Besse, Amendment Number 181 (TAC M86933) dated November 19, 1993.