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U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, DC 20555-0001

Subject: Beaver Valley Power Station, Unit No. 1
Docket No. 50-334, License No. DPR-66
Request for Exemption from 10 CFR 70.24
Criticality Accident Requirements

In accordance with the provisions of 10 CFR 70.14(a) and 70.24(d) Duquesne Light Company (DLC) requests an exemption from the requirements of 10 CFR 70.24, "Criticality Accident Requirements," for Beaver Valley Power Station Unit No. 1. Specifically, DLC requests an exemption from 10 CFR 70.24(a) which requires in part that a licensee maintain in each area in which special nuclear material (SNM) is handled, used, or stored, a monitoring system which will energize clearly audible alarms if accidental criticality occurs.

When granted, this exemption would be similar to the one previously granted within the Beaver Valley Unit No. 1 Special Nuclear Material License No. SNM-1472, issued on August 12, 1974. This exemption was contingent upon (1) storing new fuel assemblies in a manner which would not permit retention of water in or around the assemblies, (2) limiting handling to one assembly at a time and (3) requiring that assemblies be located only in their shipping containers or fuel storage areas. Upon issuance of the operating license for Beaver Valley Unit No. 1 the exemption was inadvertently omitted. The NRC has already granted an exemption for BVPS-2 as part of its operating license.

Any questions concerning this topic may be directed to Mr. Roy K. Brosi, Manager, Nuclear Safety Department, at 412-393-5210.

Sincerely,

Sushil C. Jain

c: Mr. D. M. Kern, Sr. Resident Inspector
Mr. H. J. Miller, NRC Region I Administrator
Mr. D. S. Brinkman, Sr. Project Manager

A001

DELIVERING QUALITY ENERGY

ATTACHMENT NO. 1

Request for Exemption From 10 CFR 70.24

PROPOSED EXEMPTION

Duquesne Light Company (DLC) hereby requests an exemption for Beaver Valley Power Station (BVPS) Unit No. 1 from 10 CFR 70.24(a) which requires that a licensee maintain in each area in which special nuclear material (SNM) is handled, used, or stored, a monitoring system which will energize clearly audible alarms if accidental criticality occurs. Also, 10 CFR 70.24(a) requires that emergency procedures be maintained to ensure that all personnel withdraw to an area of safety upon the sounding of the alarm. These procedures must include the conduct of drills to familiarize personnel with the evacuation plan, designation of responsible individuals for determining the cause of the alarm, and placement of radiation survey instruments in accessible locations for use in such an emergency.

SNM at BVPS-1 which exists in sufficient quantities to require criticality monitoring is in the form of reactor fuel only. When granted, this exemption would be similar to the one previously granted within the Beaver Valley Unit 1 Special Nuclear Material License No. SNM-1472, issued on August 12, 1974. This exemption was inadvertently omitted from the operating license for Beaver Valley Unit No. 1. The design of Unit 1 and the administrative and procedural controls for the handling, use, and storage of SNM at Unit 1 are similar to Unit 2. The NRC has already granted an exemption to 10 CFR 70.24(a) for Unit 2.

BASIS FOR EXEMPTION

The specific requirements for granting exemptions from Part 70 regulations are set forth in 10 CFR 70.14(a). Therein the Commission is authorized to grant an exemption upon a demonstration that the exemption: (1) is authorized by law; (2) will not endanger life or property or the common defense and security; and (3) is in the public interest. Furthermore, to ensure the common defense and security are not endangered, the exemption request must demonstrate that the loss or diversion of SNM is precluded. The following justifications address each of these requirements and demonstrate that the Commission should grant the requested exemption.

1. The Exemption Is Authorized By Law

The Commission's authority to grant the requested exemption from the requirements of Part 70 is codified in 10 CFR 70.14. In addition, exemptions from 10 CFR 70.24 are specifically allowed by 10 CFR 70.24(d). Therefore, the exemption request is explicitly authorized under NRC regulations.

2. The Exemption 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 it can be shown that the exemption request meets the statutory standard of adequate protection to the health and safety of the public. Furthermore, to ensure the common defense and security are not endangered, the exemption request must demonstrate that the loss or diversion of SNM is precluded. The purpose of annunciating an accidental criticality and conducting drills is to protect personnel from accidental exposure to radiation in the event of inadvertent criticality. Therefore, the absence of criticality monitoring has no effect on potential loss or diversion of SNM.

In accordance with 10 CFR 70.24(a), a criticality monitor is required when SNM is (A) handled, (B) used, or (C) stored.

A. Handling of SNM

New fuel is received in the new-fuel storage space. The assemblies are removed one at a time by crane from the shipping container, inspected, and transferred to the new fuel storage area where they are stored. New fuel is delivered to the reactor by placing a fuel assembly into the new fuel elevator and lowering it into the spent fuel pool. Beyond this point, handling is performed beneath water shielding. Fuel movement into the new and spent fuel storage racks is administratively controlled so that assemblies are not inserted in other than the prescribed locations within the racks. In all cases, fuel movements are procedurally controlled and designed to preclude conditions involving criticality concerns. In addition, the technical specifications specifically address refueling operations and limit the handling of fuel to ensure against an inadvertent criticality. They also preclude certain movement over the spent fuel pool and the reactor vessel.

In summary, the requirements of 10 CFR 70.24(a) are not necessary for the handling of SNM, because existing procedural controls ensure the handling is authorized and controlled. Granting this exemption will not endanger life or property or the common defense and security.

B. Use of SNM

Inadvertent or accidental criticality in the reactor vessel is precluded through compliance with the facility technical specifications which include reactivity control requirements (e.g., shutdown margin demonstrations, limits on control rod movements), instrumentation requirements (e.g., reactor power and radiation

monitors), and controls on refueling operations. In addition, plant operators check instruments monitoring behavior of the nuclear fuel in the reactor to assure that the facility is operated in such a manner as to preclude inadvertent criticality. Therefore, the requirements of 10 CFR 70.24(a) are not necessary for nuclear fuel while used in the reactor vessel.

C. Storage of SNM

SNM as nuclear fuel is stored in the new fuel storage area and the spent fuel pool, both of which are located in the fuel building. The new fuel storage area is a separate and protected dry storage area, used only for storage of unirradiated fuel. The spent fuel pool is kept full of borated water, and can provide for storage of new or irradiated fuel.

New fuel assemblies are stored dry in a steel and concrete structure within the fuel building. The new fuel storage racks consist of a stainless steel support structure into which 70 stainless steel fuel guide assemblies are bolted in 14 parallel rows of five fuel guide assemblies each. New fuel assemblies are stored vertically, with a minimum center to center spacing of 21 inches. This will maintain the fuel in a subcritical condition in the unlikely presence of water at optimum moderation conditions, although both the elevation and type of construction of the new fuel storage space make it impossible to be flooded. Additional detail concerning the new fuel storage area design may be found in UFSAR 9.12.1.1.

Spent fuel assemblies are stored in the spent fuel pool. Borated water is used to fill the spent fuel pool at a concentration to match that used in the refueling cavity and fuel transfer canal during refueling operations. The spent fuel is stored in a vertical array to maintain $k_{eff} \leq 0.95$ under normal storage conditions even if unborated water is used to fill the pool. Subcriticality is ensured by spacing of the assemblies, neutron absorbing material contained in the storage racks, and technical specifications governing storage locations. Additional detail concerning spent fuel storage may be found in UFSAR 9.12.1.1.

Therefore, the requirements of 10 CFR 70.24(a) are not necessary for storage of SNM because criticality is precluded by design features and administrative controls.

3. <u>The Exemption Request Is in the Public Interest</u>

Regulatory Guide 8.12 "Criticality Accident Alarm Systems" Rev. 2 (Oct. 1988), with respect to evaluation of the need to install a criticality monitor states, "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." Monitoring based on 10 CFR 70.24(a) is unnecessary because of the lack of a credible accident that would produce criticality. The burden of criticality monitoring for new and spent fuel will require the commitment of resources that could be better used to augment the safe operation of the plant in other areas. Consequently, the exemption request is in the public interest and should be granted pursuant to 10 CFR 70.14(a).

SUMMARY

DLC believes that good cause exists to grant this exemption for four reasons: (1) an exemption from 10 CFR 70.24(a) was previously granted in the SNM license; (2) since expiration of the previous exemption upon issuance of the Operating License, there have been no changes in the handling, use, or storage of SNM that would have created new conditions in which compliance with 10 CFR 70.24(a) would be necessary; (3) the design of the fuel storage pools/racks together with the associated procedural controls preclude inadvertent criticality; and (4) an exemption was previously issued for BVPS Unit No. 2 which has similar design and procedural controls.

As discussed in this evaluation, a criticality accident monitoring system is not necessary to achieve the underlying purpose of the rule. An exemption from the requirements of the regulations is authorized by law, will not present an undue risk to the public health and safety, is consistent with the common defense and security, and is otherwise in the public interest. 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.