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ComEd

April 8, 1998

JMHLTR: #98-0042

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

Subject: Dresden Station Units 2 and 3
Request For Exemption from 10CFR 70.24 in accordance with 10CFR 70.24(d) and 10CFR 70.14(a) Criticality Accident Requirements
NRC Dockets 50-237 and 50-249

References: NRC INFORMATION NOTICE 97-77: Exemptions From The Requirements Of Section 70.24 Of Title 10 Of The Code Of Federal Regulations.

Pursuant to 10CFR 70.24(d) and 10CFR 70.14(a), ComEd hereby requests an exemption from the requirements of 10CFR 70.24, "Criticality Accident Requirements," for Dresden Station Units 2 and 3.

10CFR 70.24 was initially published in response to a series of criticality accidents at facilities licensed to handle Special Nuclear Material (SNM). 10CFR 70.24 requires facilities authorized to possess SNM to provide criticality monitors and appropriate emergency response procedures aimed at protecting personnel during a postulated criticality accident. Nuclear power reactors are governed under regulations contained primarily in 10CFR50. These regulations protect the health and safety of the public as well as the employees. 10CFR50 assures adequate design requirements are incorporated to preclude the occurrence of any accidental criticality event. Dresden Station is requesting an exemption from the requirements of 10CFR 70.24 because the plant design for fuel storage, handling and use preclude an accidental criticality event; therefore, the requirements of 10CFR 70.24 do not provide a significant increase in overall safety. This request involves no change to radiation monitoring instrumentation presently utilized at Dresden Station. 130076

The basis for this exemption request is described in the enclosure which was performed in accordance with the criteria provided by the above reference.

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ComEd requests NRC approval of this exemption request within six months of receipt of this submittal. If there are any questions regarding this issue, please contact Frank Spangenberg, ComEd Dresden Nuclear Power Station at 815-942-2920 x3800.

Sincerely,

J.M. Heffley
Vice President
Dresden Station

Signed before me on this 8TH day,

APRIL, 1998,

by Sandra L. Miller
Notary Public

OFFICIAL SEAL
SANDRA L MILLER
NOTARY PUBLIC, STATE OF ILLINOIS
MY COMMISSION EXPIRES:09/02/01

Enclosure: 10CFR70.24 Exemption Request for Dresden Station,

cc: A. Beach, Regional Administrator-RIII
S. Richards, Director of Directorate III-2, NRR
L. Rossbach, Dresden Project Manager, NRR
K. Riemer, Senior Resident Inspector (Dresden)
Office of Nuclear Facility Safety - IDNS

10CFR70.24 Exemption Request
Criticality Accident Requirements

Dresden Station

Pursuant to the requirements of 10CFR 70.14(a) and 10CFR 70.24(d), ComEd requests permanent exemption from the criticality monitoring requirements specified in 10CFR 70.24 for Dresden Station. Title 10CFR 70.24 provides the requirements for a monitoring system that will energize clearly audible alarms if accidental criticality occurs in each area in which licensed quantities of special nuclear material (SNM) is handled, used, or stored. In addition, the licensee shall maintain emergency procedures to ensure that all personnel withdraw to an area of safety when the alarm sounds. 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. ComEd believes that the exemption is technically appropriate because the station design and licensing bases in accordance with the requirements of 10CFR50 preclude an accidental criticality event. General Design Criterion (GDC) 62, Prevention of Criticality in Fuel Storage and Handling, states that criticality in the fuel storage and handling system shall be prevented by physical systems or processes, preferably by use of geometrically safe configurations. In addition, GDC 63, Monitoring Fuel and Waste Storage, states that appropriate systems shall be provided in fuel storage and radioactive waste systems and associated handling areas (1) to detect conditions that may result in loss of residual heat removal capability and excessive radiation levels and (2) to initiate appropriate safety actions. The design of refueling systems and associated radiation monitoring equipment at Dresden Station is consistent with these requirements.

The specific requirements for granting exemptions from Part 70 regulations are set forth in 10CFR 70.24(d) and 10CFR 70.14(a). Section 70.24(d) anticipates that licensees may need relief from 10CFR 70.24, in whole or in part, if "good cause" is shown. As further discussed below, ComEd believes that "good cause" exists and that the exemption requirements of 10CFR 70.14(a) are satisfied for Dresden Station.

EXEMPTION REQUEST

Under Section 70.14(a), the Commission is authorized to grant an exemption to Part 70 requirements provided the exemption: (a) is authorized by law; (b) will not endanger life, property, or the common defense and security; and (c) is in the public interest. As described below, ComEd believes the exemption request clearly meets these requirements.

A. The Exemption Request Is Authorized By Law

The NRC's authority to grant exemptions from the requirements of Part 70 is codified in 10CFR 70.14(a). 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 requested exemption for Dresden Station is authorized by the NRC's regulations.

B. The Exemption Will Not Endanger Life or Property

The manner in which SNM is used, stored, and handled at Dresden Station provides adequate protection for the health and safety of the public. Specifically, design characteristics, procedural controls, and accident analyses ensure that accidental or inadvertent criticality will not occur at Dresden Station.

1. Use of SNM

Special nuclear material is present principally in the form of nuclear fuel. However, other quantities of SNM are used and stored at Dresden Station in the form of fissile material, such as fission chamber detectors used in the source range, intermediate range, and power range monitors. The detectors are described in section 7.6 of the Dresden Updated Final Safety Analysis Report (UFSAR). The small quantity of SNM present in these latter items precludes an inadvertent criticality.

Inadvertent or accidental criticality in the reactor vessel is prevented through compliance with the facility Technical Specifications, including reactivity requirements (e.g., shutdown margin limits and control rod movement limits), instrumentation requirements (e.g., power and radiation monitors), and control of refueling operations.

2. Monitoring of SNM

The reactor building ventilation GM monitoring system continuously monitors the reactor building air in two locations: in the Reactor Building Ventilation System (RBVS) exhaust plenum and on the refueling floor near the spent fuel pool. The GM monitor in both the Unit 2 and Unit 3 RBVS plenums monitors the reactor building ventilation exhaust air and when high radioactivity is detected the secondary containment isolation is initiated. The GM monitors located on the refueling floor (one each side of the spent fuel storage pool) monitor the environment around the spent fuel storage pool and when high radioactivity is detected secondary containment is isolated.

A high-radiation level trip on any monitor or downscale trips on both monitors in a given location initiates secondary containment isolation. The reactor building ventilation GM monitoring system is completely redundant, i.e., it meets the single failure criterion for active components.

The range of the ventilation duct GM monitors is 10^{-2} to 10^{2} mrem/hr. The range of the refueling floor GM monitors is 1 to 10^{6} mrem/hr. All channels are indicated, alarmed, and recorded in the main control room.

Protective interlocks prevent handling of fuel over the reactor when a control rod is withdrawn, and another set of interlocks prevents control rod withdrawal when fuel is being handled over the reactor. Optional boundary zones generated by the PLC prevent moving the bridge outside of the fuel pool area or reactor cavity without additional operator action. The telescoping fuel grapple in the normal up position cannot lift any load, including fuel assemblies, which would result in less than seven feet of water coverage at normal fuel pool water level. For a fuel assembly, the top of active fuel (pellets) is about 18 inches below the bale handle. This results in about 8.5 feet of water coverage over fuel in the normal up position. Additional information on refueling activity may be found in section 9.1.4.3.1 of the UFSAR.

Procedures require the main control room operator to be in communication with the refueling operator during CORE ALTERATIONS. The reactor is verified to be subcritical by observing the source range monitor (SRM) count rate, which is maintained at greater than 3 counts per second (cps) in accordance with the Technical Specifications, during core alterations except when two or fewer bundles are located in each of the four quadrants. This assures that the facility is operated in a manner that precludes inadvertent criticality.

Therefore, the requirements of Section 70.24 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.

3. 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 irradiated fuel under water after its discharge from the reactor, or new fuel following receipt. The pool is designed to store the fuel in a geometric array that precludes criticality. The spent fuel assembly racks are designed to ensure subcriticality in the storage pool. A maximum K_{eff} of 0.95 is maintained with the racks fully loaded with fuel of the highest anticipated reactivity and flooded with unborated water at a temperature corresponding to the highest reactivity. This value is met with a 95/95 confidence level. Details of the spent fuel pool design are found in section 9.1.2 of the UFSAR.

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. New fuel U-235 enrichment is limited to less than 5 weight percent nominal enrichment. The spacing of fuel bundles in the new fuel storage vault maintains k_{eff} less than or equal to 0.90 dry and k_{eff} less than or equal to 0.95 flooded with a 95/95 confidence level. Dresden does not analyze for optimum moderation conditions. Consistent with industry practice, Dresden has implemented administrative and physical controls in accordance with GE SIL 152, Criticality Margin for the Storage of New Fuel, to preclude the existence of an optimum moderation condition in the new fuel storage vault area. These controls include: low velocity fog nozzles (fire protection) in the vicinity of the dry storage vault have been removed and the new fuel storage vault plugs are installed if no authorized work is planned. These conditions will be met, if for any enriched lattice in the assembly, the maximum enrichment is less than or equal to 5.0 weight percent U-235 and the minimum gadolinia loading is greater than or equal to 6 gadolinia rods at 2 weight percent GD_2O_3 (natural uranium blankets are excluded). Additional information on the new fuel storage can be found in section 9.1.1.3 of the UFSAR.

Therefore, the requirements of Section 70.24 are not necessary for the SNM stored in the new fuel storage racks or the spent fuel pool, and thus, granting this exemption will not endanger life or property.

4. Handling of SNM

Nuclear fuel is moved between the new fuel storage racks, the reactor vessel, the refueling pool, and the spent fuel pool to accommodate refueling operations. In addition, fuel is moved into the facility and within the reactor vessel, or within the spent fuel pool. In all cases, fuel movements are procedurally controlled and designed to preclude conditions involving criticality concerns. No more than a single fuel assembly can be transported between the associated shipping container and final storage location. Previous accident analyses have demonstrated that a fuel handling accident (i.e., a dropped fuel assembly) will not create conditions which could result in inadvertent criticality. The reactor core is designed to remain subcritical with one control rod fully withdrawn and all other control rods fully inserted, even if it is assumed that a fresh fuel assembly is dropped into an empty fuel space in an otherwise fully constituted core. At least two control rods adjacent to the empty fuel space would have to be withdrawn for a nuclear excursion to occur. Methods, assumptions, and conditions related to the fuel handling accident are found in section 15.7.3 of the UFSAR.

Therefore, the criticality monitoring requirements of Section 70.24 are not necessary for the safe handling of SNM, and thus, granting this exemption will not endanger life or property.

C. The Exemption Request is in the Public Interest

The maintenance of a criticality accident monitoring system and program meeting the requirements of 10CFR 70.24 requires an expenditure of resources without a significant increase in overall safety. These expenses would include the planning and conducting of drills specifically designed to respond to a criticality accident. Monitoring based on the guidance in 10CFR 70.24 is unnecessary because the Dresden Station design and licensing bases preclude an accidental criticality consistent with the requirements of 10CFR50 Appendix A, General Design Criteria For Nuclear Power Plants. The resources required to maintain an accidental criticality system in accordance with 10CFR 70.24 could be better used to augment the safe operation of the plant in other areas. Consequently, the exemption request is in the public interest.

CONCLUSION

As discussed above, an exemption from the requirements of 10CFR 70.24 for Dresden Station is authorized by law, will not endanger life or property or the common defense and security, and is in the public interest. An exemption from 10CFR 70.24 for Dresden Station is technically appropriate because the plant design basis features for fuel storage, use and handling preclude an accidental criticality event; therefore, the requirements of 10CFR 70.24 do not provide a significant increase in overall plant safety. This is ensured by the use of refueling and radiation monitoring systems that are consistent with the requirements of the 10CFR50 Appendix A General Design Criterion.

For these reasons, ComEd believes the specific requirements for granting an exemption from 10CFR 70.24 have been met and respectfully requests the NRC to grant the exemption for Dresden Station Units 2 and 3.