7590-01-P

UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

In the Matter of	)	
	)	
OMAHA PUBLIC POWER DISTRICT	)	Docket No. 50-285
	)	
Fort Calhoun Station, Unit No. 1	)	

EXEMPTION

I.

The Omaha Public Power District (OPPD) is the holder of Facility Operating License No. DPR-40 for the Fort Calhoun Station, Unit No. 1 (FCS) which authorizes operation of the Fort Calhoun Station, Unit No. 1. The license provides, among other things, that the licensee is subject to all rules, regulations, and orders of the Commission now or hereafter in effect.

The facility consists of one pressurized-water reactor at the licensee's site located in Washington County, Nebraska.

II.

Section 70.24 of Title 10 of the Code of Federal Regulations, "Criticality Accident Requirements," requires that each licensee authorized to possess special nuclear material (SNM) shall maintain a criticality accident monitoring system in each area where such material is handled, used, or stored. Subsections (a)(1) and (a)(2) of 10 CFR 70.24 specify detection and sensitivity requirements that these monitors must meet. Subsection (a)(1) also specifies that all areas subject to criticality accident monitoring must be covered by two detectors. Subsection (a)(3) of 10 CFR 70.24 requires licensees to maintain emergency procedures for

each area in which this licensed SNM is handled, used, or stored and provides that (1) the procedures ensure that all personnel withdraw to an area of safety upon the sounding of a criticality accident monitor alarm, (2) the procedures must include drills to familiarize personnel with the evacuation plan, and (3) the procedures designate responsible individuals for determining the cause of the alarm and placement of radiation survey instruments in accessible locations for use in such an emergency. Subsection (b)(1) of 10 CFR 70.24 requires licensees to have a means to identify quickly personnel who have received a dose of 10 rads or more. Subsection (b)(2) of 10 CFR 70.24 requires licensees to maintain personnel decontamination facilities, to maintain arrangements for a physician and other medical personnel qualified to handle radiation emergencies, and to maintain arrangements for the transportation of contaminated individuals to treatment facilities outside the site boundary. Paragraph (c) of 10 CFR 70.24 exempts Part 50 licensees from the requirements of paragraph (b) of 10 CFR 70.24 for SNM used or to be used in the reactor. Paragraph (d) of 10 CFR 70.24 states that any licensee who believes that there is good cause why he should be granted an exemption from all or part of 10 CFR 70.24 may apply to the Commission for such an exemption and shall specify the reasons for the relief requested.

III.

The SNM that could be assembled into a critical mass at FCS is in the form of nuclear fuel. In addition, the quantity of SNM other than fuel that is stored on site in any given location is small enough to preclude achieving a critical mass. As set forth below, the Commission's technical staff has evaluated the possibility of an inadvertent criticality of the nuclear fuel at FCS.

By letter dated August 29, 1997, as supplemented by letter dated October 23, 1997, the licensee requested an exemption from the requirements of 10 CFR 70.24 in its entirety for FCS. The licensee proposes to handle and store unirradiated fuel without having a criticality monitoring system with the sensitivity required by 10 CFR 70.24.

The basis for the staff to determine that inadvertent or accidental criticality is extremely unlikely can be established through compliance with the FCS Technical Specifications, the geometric spacing of fuel assemblies in the new fuel storage racks and spent fuel storage pool, and administrative controls imposed on fuel handling procedures.

SNM, as nuclear fuel, is stored in the new fuel storage rack and in the spent fuel pool. The spent fuel pool is used to store irradiated fuel under water after its discharge from the reactor and new (unirradiated) fuel prior to loading into the reactor. New fuel is stored in the new fuel storage rack in a dry condition.

SNM is also present in the form of excore fission chamber detectors and startup neutron sources. The small quantity of SNM present in these latter items precludes an inadvertent criticality.

The spent fuel pool is designed to store the fuel in a geometric array using a solid neutron absorber that precludes criticality. The effective neutron multiplication factor, k_{eff}, is maintained less than or equal to 0.95 by the solid neutron absorber for fuel enriched to 4.5 wt% U-235. Although soluble boron is maintained in the spent fuel pool, no credit is taken for it in determining k_{eff}.

The new fuel storage racks may be used to receive and store new fuel in a dry condition upon arrival onsite and prior to loading in the reactor or spent fuel pool. The spacing between new fuel assemblies and the solid neutron absorbers in the storage racks is sufficient to

maintain the dry array in a subcritical condition. The new fuel storage rack is located at an elevation of 18.75 feet above the main floor which provides adequate drainage and precludes flooding. Because no fire protection sprinkler system exists in this area, there is no source of low-density aqueous foam optimum moderation. The current approved maximum enrichment of 4.5 wt% U-235 for the new fuel assemblies results in a maximum k_{eff} of less than 0.90 under dry conditions.

Nuclear fuel is moved between the NRC-approved shipping containers, the new fuel storage racks, the reactor vessel, and the spent fuel pool to accommodate refueling operations. In all cases, fuel movements are procedurally controlled and designed to preclude conditions involving criticality concerns. For example, during new fuel receipt inspection, FCS fuel handling procedures allow a maximum of two fuel assemblies to be in the inspection stands in the receipt area (out of the shipping container and not in the new fuel storage rack). However, when installed in the inspection stands, both assemblies have an edge-to-edge separation distance in excess of 14 feet. This geometric spacing is well in excess of that maintained by the NRC-approved shipping container (approximately 3 inches). There are no sprinklers in the new fuel receipt/storage room and the use of fire fighting equipment is very unlikely since there are no combustible materials permanently stored in this room. Even if fire suppression water were introduced into the room, sufficient drainage exists to preclude potential moderation of new fuel assemblies. Therefore, because of the large physical separation of new fuel assemblies and the extremely unlikely event of any potential moderation, there is sufficient assurance that k_{eff} remains less than 0.95, thus precluding criticality.

FCS was licensed to the 70 General Design Criteria for Nuclear Power Plant Construction published as drafts in the Federal Register (32 FR 10213) on July 11, 1967. Draft

Criterion 18, Monitoring Fuel and Waste Storage, was met. As noted in Section 11.2.3 and Appendix G of the FCS Updated Safety Analysis Report, area monitoring of dose rates is supplied in the containment and auxiliary buildings, including the fuel storage areas. Local and control room alarms and indicators (not necessarily meeting the 10 CFR 70.24 sensitivity requirements) are provided to alert personnel to take appropriate action in the unlikely event of excessive radiation levels due to accidental criticality.

The purpose of the criticality monitors required by 10 CFR 70.24 is to ensure that if a criticality were to occur during the handling of SNM, personnel would be alerted to that fact and would take appropriate action. In view of the above information, the staff has determined that it is extremely unlikely for an inadvertent criticality to occur in SNM handling or storage areas at FCS. Criticality is precluded with the present design configuration, Technical Specification requirements, administrative controls, and the fuel handling equipment and procedures. In addition, as described above, the licensee has radiation monitors, as required by General Design Criterion 63, in fuel storage and handling areas. These monitors will alert personnel to excessive radiation levels and allow them to initiate appropriate safety actions. The low probability of an inadvertent criticality, together with the licensee's adherence to General Design Criterion 63, constitutes good cause for granting an exemption to the requirements of 10 CFR 70.24.

IV.

Accordingly, the Commission has determined that, pursuant to 10 CFR 70.14, this exemption is authorized by law, will not endanger life or property or the common defense and security, and is otherwise in the public interest. Therefore, the Commission hereby grants

Omaha Public Power District an exemption as described in Section II above from 10 CFR 70.24, "Criticality Accident Requirements" for the Fort Calhoun Station.

Pursuant to 10 CFR 51.32, the Commission has determined that the granting of this exemption will have no significant impact on the quality of the human environment (63 FR 5821).

This exemption is effective upon issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

Frank J. Miraglia, Jr., Acting Director
Office of Nuclear Reactor Regulation

Dated at Rockville, Maryland,
this 6th day of February 1998