WOLF CREEK
NUCLEAR OPERATING CORPORATION

Robert C. Hagan
Vice President Engineering

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ET 95-0097

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Mail Station P1-137
Washington, D. C. 20555

Reference: Letter NA 94-0029, dated March 30, 1994, from R. C. Hagan, to USNRC
Subject: Docket No. 50-482: Revision to Request for Exemption From 10 CFR 70.24 Criticality Monitoring Requirements

Gentlemen:

This letter submits a revision to an exemption request originally submitted by the Reference and replaces the Reference in its entirety. This exemption request, which applies in whole to the requirements of 10 CFR 70.24, is being submitted pursuant to 10 CFR 50.12. 10 CFR 70.24 requires, in part, a criticality alarm system in each area in which special nuclear material is handled, used or stored, and the performance of drills to familiarize personnel with the evacuation plan. The attachment to this letter contains the exemption request with an evaluation that justifies that Wolf Creek Generating Station's (WCGS) fuel handling system, operating and fuel handling procedures, and storage racks are designed such that sub-criticality will be maintained under normal and accident conditions while moving or storing new or spent fuel. This requested exemption would be similar to the one previously granted within WCGS's Special Nuclear Material License.

If you have any questions concerning this matter, please contact me at (316) 364-8831, extension 4553, or Mr. Richard D. Flannigan, at extension 4500.

Very truly yours,

Robert C. Hagan

Robert C. Hagan

RCH/jra

Attachment

cc: L. J. Callan (NRC), w/a
D. F. Kirsch (NRC), w/a
J. F. Ringwald (NRC), w/a
J. C. Stone (NRC), w/a

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EXEMPTION REQUEST

Proposed Exemption

This proposed exemption request applies in whole to 10 CFR 70.24 which requires a monitoring system that will energize clearly audible alarms if accidental criticality occurs in each area in which special nuclear material is handled, used or stored. Also, 10 CFR 70.24 requires that emergency procedures be maintained for each area in which 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. 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. This exemption would be similar to one previously granted within Wolf Creek Generating Station's Special Nuclear Material License No. SNM-1929, which was issued on May 9, 1984. This exemption expired with the issuance of the operating license for Wolf Creek Generating Station.

Special Justifying Circumstances

NRC regulations provide for specific exemptions in 10 CFR 50.12(a), 10 CFR 70.14(a), and 10 CFR 70.24(d) as follows:

10 CFR 50.12(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.
10 CFR 50.12(a)(1) 10 CFR 70.14(a)	The requirements of the regulations are authorized by law, will not present an undue risk to the public health and safety, are consistent with the common defense and security, and are otherwise in the public interest
10 CFR 70.24(d)	Any licensee who believes that good cause exists why he should be granted an exemption in whole or in part from the requirements of this section may apply to the Commission for such exemption.

Special circumstances are present that preclude the necessity of maintaining the criticality alarm monitors and conducting drills to achieve the underlying purpose of the rule. The exemption is authorized by law, will not present an undue risk to the public health and safety, and is consistent with the common defense and security. 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. Since the geometric spacing of the new and spent fuel assemblies will maintain sub-criticality under normal and accident conditions, inadvertent criticality is prevented and such accidental personnel exposures are prevented. In addition, since a potential for criticality does not exist, a request for exemption is appropriate in accordance with Regulatory Position C.1 of Regulatory Guide 8.12, "Criticality Accident Alarm Systems."

Evaluation

Special nuclear material is present at Wolf Creek Generating Station principally in the form of nuclear fuel. However, other quantities of special nuclear material are used, or may be used (and stored), at the facility in the form of fissile material incorporated in incore nuclear instrumentation [source range monitors, intermediate range monitors, local power range monitors, incore fission chambers], Health Physics sources, and in Quality Control radiography sources. The amount of special nuclear material contained in the nuclear instrumentation is small - significantly less than the quantities specified in Section 70.24(a). The small quantity of special nuclear material present in the nuclear instrumentation and the form in which the special nuclear material is maintained (a very thin coating sprayed on the inside of the sealed fission chamber contained at the end of each monitor) precludes inadvertent criticality.

The amount of special nuclear material contained in the Health Physics and Quality Control sources are also much less than an amount that could achieve criticality and is also less than the amounts specified in 10 CFR 70.24(a). This special nuclear material is used for Health Physics instrument calibrations and Quality Control industrial radiography. The material is kept separate (under procedural control) from special nuclear material in the form of fuel or nuclear instrumentation used in the reactor vessel.

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, the plant operator's continuous attention directed toward 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. 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 10 CFR 70.24 are not necessary for special nuclear material 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.

Unirradiated and irradiated fuel is moved to and from the reactor vessel and spent fuel pool racks to accommodate refueling operations. 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 and to preclude certain movements over the spent fuel pool and the reactor vessel.

The Wolf Creek Generating Station spent fuel storage facility is located within the fuel building and has a total capacity of 1340 fuel assemblies with a minimum center to center spacing of 12.92 inches. The storage facility, which contains spent fuel storage racks, is constructed of reinforced concrete with a stainless steel lining and is an integral part of the fuel building. The facility provides a cooling and shielding medium for the spent fuel (borated water) and an efficient method for safe and reliable fuel handling operations within the spent fuel pool. It also provides protection for the spent fuel assemblies under conditions such as tornadoes, hurricanes, earthquakes, and flooding.

The spent fuel storage facility is divided into two separate and distinct regions which, for the purpose of criticality considerations may be considered as separate pools. Suitability of this design assumption regarding pool separability is assured through appropriate design restrictions at the boundaries between Region 1 and Region 2. The smaller region, Region 1, of the pool is designed on the basis of currently accepted conservative criteria which allow for the safe storage of a number of fresh unirradiated fuel assemblies (including a full core loading if that should prove necessary). The larger region of the pool, Region 2, is designed to safely store irradiated fuel assemblies, which are discharged from the reactor. Technical Specification 3.9.12, "Spent Fuel Assembly Storage," provides specific criteria that must be met prior to storing spent fuel assemblies in Region 2. Specifically, the combination of initial enrichment and cumulative exposure of the fuel assembly must be within the acceptable domain of Technical Specification Figure 3.9-1 and no spent fuel assembly can be placed in Region 2, nor can any storage location be changed in designation from being in Region 1 to being in Region 2, while refueling operations are in progress.

Region 1 has fuel assemblies stored in two out of four box positions in a checker board pattern. Region 2 has fuel assemblies stored in three out of four box positions. During a normal refueling operation, each fuel assembly is first moved from the core to Region 1. After the refueling operation is complete and the suitability of each spent fuel assembly for movement into Region 2 is verified, the fuel assembly may be moved into Region 2. Region 1 of the pool is designed to maintain stored fuel of up to 4.50 weight percent of U-235 in a safe, coolable, subcritical (effective multiplication factor less than 0.95) configuration. Region 1 consists of a minimum of 200 spent fuel storage positions and Region 2 has an ultimate capacity of 1140 spent fuel assemblies.

Updated Safety Analysis Report (USAR) Section 9.1.2 states that, with the spent fuel assemblies placed at their prescribed locations in the storage racks, and with unborated water as a moderator in the spent fuel storage facility, the separation of 12.92 inches is sufficient to maintain a subcritical array with an effective multiplication factor of less than 0.95. Also, the spent fuel storage racks are constructed so as to preclude insertion of spent fuel assemblies into other than prescribed storage locations. If a fuel assembly is accidentally lowered or dropped onto the top of the racks or into the annular space between the spent fuel racks and the storage facility wall, subcriticality is maintained in all cases with an effective multiplication factor of less than 0.95. Therefore, the design of the spent fuel storage racks, handling equipment, and administrative controls are such that subcriticality will be maintained under normal and accident conditions.

The new fuel storage facility, which contains new fuel storage racks, is located in the fuel building and is a separate and protected area. The facility provides the option for onsite dry storage of 66 new fuel assemblies in the racks in a lattice array. The new fuel storage racks are usually only used during the limited time period between new fuel receipt and refueling operations. During this period, fuel shipments are received and temporarily stored in the new fuel storage racks, inspected, and then stored in the spent fuel pool for loading into the reactor vessel. The racks are formed from square steel tubes with inner dimension of 9 inches by 9 inches and walls 0.078 inches thick. Each port will hold one fuel assembly. There are three double rows (2 by 11) of ports in the new fuel storage facility. The ports within each double row are on 21 inch

centers and there is a 28 inch (approximate) aisle between each pair of rows. The facility is enclosed by a reinforced concrete structure with an associated steel plate top containing hinged openings covering each fuel assembly. It is protected from the effects of natural phenomena, including earthquakes, tornadoes, hurricanes floods, and external missiles. Drainage is also provided to prevent accumulation of water within the facility.

The criticality analysis described in Section 9.1.1 of the USAR states that spacing between new fuel assemblies in the storage racks is sufficient to maintain the array in a subcritical condition, even when fully flooded. Assuming that the pit was flooded by unborated water, the array would have an effective multiplication factor of less than 0.95 (0.98 assuming possible sources of moderation, such as aqueous foam or mist). The probability of a dropped mass accident occurring is remote since the storage racks are protected from dropped objects by a steel protective cover and safety handling features are incorporated into the new fuel assembly handling tools. Therefore, the design of the new fuel storage rack, the fuel handling equipment, and the administrative controls is such that subcriticality will be maintained under normal and accident conditions.

Special Nuclear Material License No. SNM-1929, which was issued for Wolf Creek Generating Station on May 9, 1984, approved an exemption from the provisions of 10 CFR 70.24. As part of this special nuclear material license, an additional control for the new fuel storage facility was implemented to preclude inadvertent criticality. Specifically, new fuel assemblies had to be stored in such a manner that the polyethylene wrappers would be open at the bottom so that water would drain freely from the assemblies in the event of flooding and subsequent draining of the new fuel storage facility. Therefore, during the period of time that the new fuel storage racks are used, an administrative control will be imposed by plant procedures to ensure that this condition from the original special nuclear material license is implemented. No other administrative controls will be implemented due to the design of the new fuel storage facility and the results of the criticality analysis which concluded that criticality is not possible in the facility.

New fuel shipping containers arrive at Wolf Creek Generating Station on a flatbed trailer which normally carries six containers with each container having two new fuel assemblies. The containers are unloaded on the 2000 foot elevation of the fuel building with a maximum stacking limit of two containers high. One shipping container at a time is taken up to the 2047 foot elevation of the fuel building to remove the enclosed fuel assemblies.

The procedure used for new fuel receipt (FHP 01-001) requires the use of the monorail auxiliary hoist on the cask handling crane for all lifting operations. A special new fuel handling tool is required to be attached to the monorail auxiliary hoist to lift each fuel assembly from the shipping container. This new fuel handling tool can only be attached to the top nozzle of one fuel assembly at a time. The attached fuel assembly is moved to either the new fuel storage racks or the new fuel elevator if the assembly is being stored in the spent fuel storage facility. Both of these storage positions will only accommodate one fuel assembly in a designed location, and criticality has been evaluated in Section 9 of the USAR. The new fuel assembly is unlatched in the new fuel elevator or the new fuel storage vault location and the hoist is positioned to latch onto the second new fuel assembly in the shipping container. The second new fuel assembly is removed in the same manner in which the first was removed. The empty shipping container is then taken down to the 2000 foot elevation of the fuel building and

another container with two new fuel assemblies is then brought up to the 2047 foot elevation of the fuel building where the same unloading process is repeated.

The use of current fuel building equipment will not permit more than one new fuel assembly to be outside the shipping container at a given time which is not in an acceptable designed fuel assembly location (new fuel rack, new fuel elevator, spent fuel storage facility or in transient to the spent fuel rack in the spent fuel storage facility supported by the spent fuel handling tool from the electric hoist of the spent fuel pool bridge crane). Therefore, based on the process for receiving and handling new fuel, WCNOC does not believe the restrictions identified in Special Nuclear Material License No. SNM-1929 are required.

Based upon the previously provided justification and with the addition of the above commitment for criticality control within the new fuel storage facility, the requirements of 10 CFR 70.24 are not necessary for the storage of special nuclear material in the spent and new fuel storage facilities. Therefore, granting this exemption to the requirements of 10 CFR 70.24 is authorized by law, will not present an undue risk to the public health and safety, and is consistent with the common defense and security.