

affidavits. Since the Staff has not reviewed the analysis for Case 2, I offer no opinion in that regard.

3. Contention 5 states:

That the main safety function of the spent fuel pool which is to maintain the spent fuel assemblies in a safe configuration through all environmental and abnormal loadings, may not be met as a result of a recently brought to light unreviewed safety question involved in the current rerack design that allows racks whose outer rows overhang the support pads in the spent fuel pool. Thus, the amendments should be revoked.

Contention 5 questions the safety of the fuel in the storage pool based on a Licensee letter which indicated that the structural design of the racks, whose outer rows overhang the support pad, could cause the racks to lift-off (bounce) from the pool floor during seismic events. See Letter from J. W. Williams, Jr., FPL, to Steven A. Varga, NRC, dated February 1, 1985. Intervenors argue that, due to this potential for lift-off, the current high density rack design is deficient.

The structural design of spent fuel pool racks as well as the spent fuel pool must satisfy General Design Criterion 2, "Design bases for protection against natural phenomena." GDC 2 provides that fuel storage be designed to withstand the effects of earthquakes without loss of capability to perform its safety function. In addition, the spent fuel pool and pool storage racks must be designed to assure adequate safety under normal and postulated accident conditions (GDC 61, "Fuel storage and handling and radioactivity control") and geometrically safe configurations of the fuel storage system should be used in order to prevent fuel criticality (GDC 62, "Prevention of criticality in fuel storage and handling").

4. The spent fuel pools for Units 3 and 4 each have a total of twelve free standing racks. Each of the racks have support assemblies on the bottoms which include remotely adjustable leveling screws. Four of the twelve racks have the support assemblies located at each of the four corners. The remaining eight racks have the support assemblies recessed from the corners. The location of the support assemblies for all of the racks was determined by the location of preexisting steel support plates which are permanently embedded in the concrete floors of the spent fuel pools. The racks which have support assemblies recessed from the corners could allow storage of fuel assemblies in the rows which overhang the support assemblies with the remainder of the racks empty. Since the racks are free standing, i.e. they are not anchored to the floor nor braced to the pool walls, the loading of fuel assemblies in the overhanging rows with the remainder of the racks empty would increase the likelihood of lift-off during a seismic event.

5. The February 1, 1985 letter cited by Intervenors in the Bases for Contention 5 identified the potential for lift-off during a seismic event. The Licensee indicated in the letter that to be consistent with an assumption made by Westinghouse in the seismic/structural analysis for the racks with overhanging rows, administrative controls would be necessary to prevent lift-off during a seismic event. The Licensee initiated administrative controls on loading fuel assemblies in the overhanging rows prior to loading of fuel assemblies in the remaining portion of the affected racks. The Licensee also submitted a reanalysis which considered loading the outer rows with the remainder of the

affected racks empty. This request was subsequently withdrawn by letter dated November 13, 1985 from C. O. Woody, FPL, to S. A. Varga and Licensee indicated in the letter that the administrative controls would be maintained.

6. The Staff agrees that the imposition of administrative controls which do not allow loading of fuel assemblies in the overhanging rows prior to loading fuel assemblies in the remaining portion of the affected racks preclude lift-off of the racks during a seismic event. Therefore, the conclusions in the Staff's Safety Evaluation (SE), dated November 21, 1984, and appended Technical Evaluation Report (TER) remain valid. As stated in Section 3.3.4 of the TER, there will be no lift-off of the racks during a seismic event. In addition, Sections 2.3.4 and 2.3.5 of the SE and appended TER indicate that postulated loads from a seismic event will not result in failures to the racks or pool structures, thus their integrity will be maintained.

7. Assurance of safe storage of the fuel has been documented in the Licensee submittal. Upon reviewing the submittal, the Staff concluded in Section 2.3.6 of the SE that the design of the rack satisfied the structural aspect of the Appendix A requirements of 10 C.F.R. Part 50 (GDC 2, 4, 61 and 62), as applicable to structures. The Staff conclusion was based on the following:

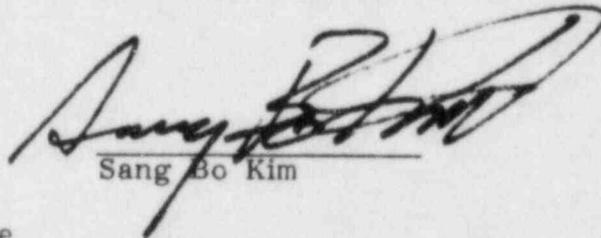
- a) The Licensee considered all the required loading conditions including earthquakes and accidents;
- b) the analysis methods that calculate stresses and displacements are in accordance with industry practice which Staff's consul-

tant reviewed and found to be acceptable as detailed in the TER which is appended to the Staff's SE; and,

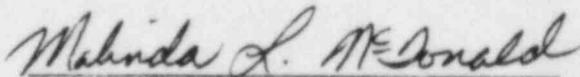
- c) resultant stresses and displacement are within allowable limits specified in the Staff position "OT Position, for Review and Acceptance of Spent Fuel Storage and Handling Applications," dated April 14, 1978 and amended January 18, 1979.

8. In summary, the Licensee has adequately demonstrated safe storage of the fuel for all possible cases. In light of the initiation of administrative controls, the Staff conclusions in the SE, as supported by the appended TER, that the racks will not lift-off during a seismic event and that seismic loads will not result in failures to the rack or pool structures, remain valid.

The foregoing and the attached statement of professional qualifications are true and correct to the best of my knowledge and belief.


Sang Bo Kim

Subscribed and sworn to before me
this 12th day February, 1986.


Notary Public

My commission expires: 7/1/86

PROFESSIONAL QUALIFICATIONS

SANG BO KIM

My name is Sang Bo Kim. I am a Structural Engineer in the Engineering Branch, Division of BWR Licensing, Office of Nuclear Reactor Regulation, U.S. Nuclear Regulatory Commission.

I received a B.S. degree in Engineering Mechanics from the University of Illinois in 1960, a M.S. degree in Applied Mechanics from Rensselaer Polytechnic Institute in 1965, and a M.S. in Applied Mathematics from New York University in 1968.

Prior to joining the Nuclear Regulatory Commission, I was a Supervisory Engineer for David Ehrenpreis, Consulting Engineers (1960 - 1963) a Stress Analyst for Combustion Engineering (1963 - 1965), a Senior Engineer for the Singer Company (1965 - 1968), a Senior Engineer for Gulf United Nuclear Fuels Corporation (1968 - 1971), and a Lead Engineer for Nuclear Fuels Service (1971 - 1972).

While at David Ehrenpreis, I was a Supervisory Engineer for Consulting Engineers (1960 - 1963) for a group of six engineers whose primary function was to evaluate structural integrity of Navy Shipboard nuclear. Between 1963 and 1965, I was a stress specialist for the Combustion Engineering Co. performing evaluations of fossil boiler structural system integrity. At the Singer Company (1965-1968), my function was to perform kinematic analysis of mechanisms for design purposes. From 1968 to 1971 and 1971 to 1972, I was employed by the Gulf United Nuclear Fuel Co. as a Senior Engineer and by the Nuclear Fuels Service as Lead Engineer, providing expert services in the area of nuclear fuel dynamic response analysis as well as design evaluation.

I joined the NRC in 1972 as a Structural Engineer in the Transportation Branch of the Office of Nuclear Materials Safety and Safeguards. From 1973 to 1979, I was a Reactor Engineer with the Core Performance Branch of the Office of Nuclear Reactor Regulation. From 1979 to November 24, 1985, I was a Structural Engineer in the Structural Engineering Branch of the Office of Nuclear Reactor Regulation. Since November 1985, I have been a Structural Engineer with the Engineering Branch, Division of BWR Licensing. My present duties include: evaluating the structural and earthquake engineering aspects of safety-related structures, systems and components, as proposed in Safety Analysis Reports, from the standpoint of functional capability and integrity under normal plant operation and for safe plant shutdown during normal, transient, accident and environmental conditions; performing independent calculations and engineering analyses to confirm or verify applicants' or vendors' assessment of structural integrity and response under pertinent load combinations, including postulated transient and accident conditions; and performing on-site technical audits of applicants' plant designs for selected structures and systems in the branch's area of responsibility to observe "as built" implementation of NRC Safety Criteria.