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July 13, 1978

Mr. Victor Stello, Director
Division of Operating Reactors
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Subject: Dresden Station Units 2 and 3
Quad-Cities Station Units 1 and 2
Request for Additional Information
Concerning "Control of Heavy Loads
Near Spent Fuel"
NRC Docket Nos. 50-237/249/254/265

Reference (a): V. Stello letter to All Licensees
for Power Reactors except those in
the Systematic Evaluation Program,
dated May 17, 1978

Dear Mr. Stello:

Reference (a) requested additional information concerning control of heavy loads near spent fuel for Dresden Unit 3 and Quad-Cities Units 1 and 2. Because the enclosed information also addresses Dresden Unit 2, this issue may be evaluated now instead of later as part of the Systematic Evaluation Program (SEP). The enclosure and attachments respond to the nine (9) questions transmitted by Reference (a).

One (1) signed original and thirty-nine (39) copies of this letter with five (5) copies of the enclosure and attachments are provided for your use.

Very truly yours,

M. S. Turbak

M. S. Turbak
Nuclear Licensing Administrator
Boiling Water Reactors

Enclosures &
attachments (5)

A001 5 1/5 5 DRWGS TO LIST

ENCLOSURE

QUESTION 1

Provide a diagram which illustrates the physical relation between the reactor core, the fuel transfer canal, the spent fuel storage pool and the set down, receiving or storage areas for any heavy loads moved on the refueling floor.

RESPONSE

The requested information is provided on drawings M-6 for Dresden 2, 3 and M-7 for Quad-Cities 1 and 2. Copies of these drawings are attached.

QUESTION 2

Provide a list of all objects that are required to be moved over the reactor core (during refueling), or the spent fuel storage pool. For each object listed, provide its approximate weight and size, a diagram of the movement path utilized (including carrying height) and the frequency of movement.

RESPONSE

The objects listed in Table 1 are moved over the reactor core or spent fuel storage pool. The attached Dresden Station floor plans (Diagrams 1 thru 9) illustrate movement paths to storage locations for the listed equipment. S&L drawing M-221 (for Dresden Station) illustrates equipment storage locations during a refueling outage.

QUESTION 3

What are the dimensions and weights of the spent fuel casks that are or will be used at your facility?

RESPONSE

The cask planned for use on Dresden 2 & 3 and Quad-Cities 1 & 2 is described in Dresden Special Report No. 41 and Quad-Cities Special Report No. 16. These reports were transmitted to the NRC by J. S. Abel letter to D. L. Ziemann dated November 8, 1974. The cask involved is the NLI 10/24. The NRC review of the cask drop event for Dresden 2 & 3, and Quad-Cities 1 & 2, has been concluded with approval received to handle casks of up to 100 tons. This approval is documented in the D. L. Ziemann letter to R. L. Bolger dated June 3, 1976 issuing Amendment 22 to DPR-19 and Amendment 19 to DPR-25, and the D. L. Ziemann letter to R. L. Bolger dated January 27, 1977 issuing Amendment 37 to DPR-29 and Amendment 35 to DPR-30

QUESTION 4

Identify any heavy load or cask drop analyses performed to date for your facility. Provide a copy of all such analyses not previously submitted to the NRC Staff.

RESPONSE

Cask drop analyses have been submitted to the NRC in Dresden Station Special Report No. 28 by L. D. Butterfield letter to D. J. Skovholt dated May 31, 1978. Amendments 1 and 2 to that report were submitted by L. D. Butterfield letter to D. J. Skovholt dated July 2, 1973 and J. S. Abel letter to D. L. Ziemann dated August 10, 1973, respectively.

QUESTION 5

Identify any heavy loads that are carried over equipment required for the safe shutdown of a plant that is operating at the time the load is moved. Identify what equipment could be affected in the event of a heavy load handling accident (piping, cabling, pumps, etc.) and discuss the feasibility of such an accident affecting this equipment. Describe the basis for your conclusions.

RESPONSE

There is no equipment required for the safe shutdown of the plant located on the refueling floor. The enclosed drawings for Dresden Station (M-217, Rev. B; M-218, Rev. A; M-219, Rev. A; M-220, Rev. A; M-221, Rev. A; M-222, Rev. B; M-223, Rev. A; B-974, Rev. B; B-977, Rev. B ; B-978, Rev. B) illustrate equipment removal paths. Most objects are only moved when LPCI, CS, etc. are not required (i.e. when reactor is shutdown). The only load normally moved during plant operation is the spent fuel cask. Dresden Station Unit 2 Special Report 28 contains an analysis for various cask drop accidents. Included in this analysis are descriptions of the effect of a cask drop on plant equipment that is required for a safe plant shutdown.

QUESTIONS 6 & 7

If heavy loads are required to be carried over the spent fuel storage pool or fuel transfer canal at your facility, discuss the feasibility of a handling accident which could result in water leakage severe enough to uncover the spent fuel. Describe the basis for your conclusions.

Describe any design features of your facility which affect the potential for a heavy load handling accident involving spent fuel, e.g., utilization of a single failure-proof crane.

RESPONSE (6 & 7)

A single failure-proof hoisting system has been installed on Dresden 2/3 and Quad-Cities 1/2. This system is described in detail in Dresden Special Report No. 41 and Quad-Cities Special Report No. 16. All outstanding information requests have been complied with, and an inspection program defined. The installed system has been approved by the NRC for use with casks weighing up to 100 tons as is indicated in the response to Question 3.

QUESTION 8

Provide copies of all procedures currently in effect at your facility for the movement of heavy loads over the reactor core during refueling, the spent fuel storage pool, or equipment required for the safe shutdown of a plant that is operating at the time the move occurs.

RESPONSE

Attachment A contained procedures for Dresden Station and Attachment B contains procedures for Quad-Cities Station. Attachment A contains procedures DFP 800-20, Rev. 2; (Unit 1) DFP 800-32 Rev. 0; DFP 800-24, Rev. 0: DFP 800-54, Rev. 3; DFP 800-54, Rev. 1; DMP 234, Rev.1; DMP 262, Rev. 0; DMP 231, Rev. 0; DMP 232, Rev. 0; DMP 239, REV. 1; DMP 240, Rev. 2; DMP 218, Rev. 0; DMP 219, Rev. 0; DMP 220, Rev. 2; Dresden Station Cask Handling Procedures, May 1973. Attachment B contains procedures QFP 100-1, Rev. 5; QFP 100-2, Rev. 4; QFP 100-3, Rev. 4; QFP 150-3, Rev. 3; QFP 150-5; Rev. 1; QFP 300-1, Rev. 3; QFP 300-2, Rev. 2, QFP 500-3, Rev. 2; QFP 500-4, Rev. 2; QMP 300-1, Rev. 2; QMP 300-2, Rev. 2; QMP 300-3, Rev. 1; QMP 300-4, Rev. 1; QMP 300-5, Rev. 2; QMP 300-6, Rev. 2.

QUESTION 9

Discuss the degree to which your facility complies with the eight (8) regulatory positions delineated in Regulatory Guide 1.13 (Revision 1, December, 1975) regarding Spent Fuel Storage Facility Design Basis.

RESPONSE

Regulatory Position - The spent fuel storage facility (including its structures and equipment except as noted in Paragraph 6 below) should be designed to Category I seismic requirements:

As is addressed in the Dresden and Quad-Cities FSAR Section 10.1.2, Paragraph 3, "the fuel storage pool has been adequately designed to withstand the anticipated earthquake loadings as a Class I structure."

The facility should be designed: (a) to keep tornadic winds and missiles generated by these winds from causing significant loss of watertight integrity of the fuel storage pool and, (b) to keep missiles generated by tornadic winds from contacting fuel within the pool:

The fuel storage pool is located in the reactor building which is secondary containment. The secondary containment is addressed in the Dresden and Quad-Cities FSAR Section 5.3.1 is designed in accordance with Class I design criteria in accordance with Section 12 of the FSAR. As such, the pool and fuel are protected from tornadic winds and missiles generated by these winds.

Interlocks should be provided to prevent cranes from passing over stored fuel (or near stored fuel in a manner such that if a crane failed, the load could tip over on stored fuel) when fuel handling is not in progress. During fuel handling operations, the interlocks may be bypassed and administrative control used to prevent the crane from carrying loads that are not necessary for fuel handling over the stored fuel or other prohibited areas. The facility should be designed to minimize the need for bypassing such interlocks:

The Dresden and Quad-Cities cranes and interlock systems are addressed in Special Reports No. 41 and 16 respectively, dated October, 1974 and Section 3.10/4.10 of the applicable technical specifications.

A controlled leakage building should enclose the fuel pool. The building should be equipped with an appropriate ventilation and filtration system to limit the potential release of radioactive iodine and other radioactive materials. The building need not be designed to withstand extremely high winds, but leakage should be suitably controlled during refueling operations. The design of the ventilation and filtration system should be based on the assumption that the cladding of all of the fuel rods in one fuel bundle might be breached. The inventory of radioactive materials available for leakage from the building should be based on the assumptions given in Regulatory Guide 1.25, "Assumptions Used for Evaluating the Potential Radiological Consequence of a Fuel Handling Accident in the Fuel Handling and Storage Facility for Boiling and Pressurized Water Reactors" (Safety Guide 25):

> The fuel storage pool is located in the reactor builidng. The ventilation is addressed in the Dresden and Quad-Cities FSAR Section 5.3. The reactor building ventilation and filtration system is designed to limit potential releases of radioactive iodine and other radioactive materials.

The spent fuel storage facility should have at least one of the following provisions with respect to the handling of heavy loads, including the refueling cask:

a. Cranes capable of carrying heavy loads should be prevented, preferably by design rather than by interlocks, from moving into the vicinity of the pool; or

b. Cranes should be desinged to provide single failure-proof handling of heavy loads, so that a single failure will not result in loss of capability of the crane-handling system to perform its safety function; or

c. The fuel pool should be designed to withstand, without leakage that could uncover the fuel, the impact of the heaviest load to be carried by the crane from the maximum height to which it can be lifted. If this approach is used, design provisions should be made to prevent the crane, when carrying heavy loads, from moving in the vicinity of stored fuel:

> The crane is designed to provide single failure-proof handling of heavy loads, so that a single failure will not result in loss of capability to the crane-handling system to perform its safety function. This is addressed in Special Report No. 28, "Analyses and Procedures for Handling General Electric IF-300 Spent Fuel Shipping Cask for Dresden Unit 2 dated May, 1973," and Special Reports 41 and 16 for Dresden and Quad-Cities, respectively, dated October, 1974 dealing with the redundant crane modifications.

Drains, permanently connected mechanical or hydraulic systems, and other features that by maloperation or failure could cause loss of coolant that would uncover fuel should not be installed or included in the design. Systems for maintaining water quality and quantity should be designed so that any maloperation or failure of such systems (including failures resulting from the Safe Shutdown Earthquake) will not cause fuel to be uncovered. These systems need not otherwise meet Category I seismic requirements:

> As is addressed in the Dresden and Quad-Cities FSAR Section 10.1.2, "to avoid unintentional draining of the pool, there are no penetrations that would permit the pool to be drained below a safe storage level, and all lines extending below this level are equipped with suitable valving to prevent backflow."

Reliable and frequently tested monitoring equipment should be provided to alarm both locally and in a continuously manned location if the water level in the fuel storage pool falls below a predetermined level or if high local-radiation levels are experienced. The high radiation-level instrumentation should also actuate the filtration system:

> As is addressed in the Dresden and Quad-Cities FSAR Section 10.1.3, "A radiation monitor at the new fuel storage vault provides warning of any radiation level increase. A liquid level switch monitoring pool water level is provided to detect loss of water and permit refilling of the pool from the condensate storage system. In addition, a second level switch in the skimmer surge tank is provided to permit water loss detection."
>
> As part of the surveillance requirements of the technical specification, the pool water level is checked daily when irradiated fuel is stored in the pool.

A seismic Category I makeup system should be provided to add coolant to the pool. Appropriate redundancy or a backup system for filling the pool from a reliable source, such as a lake, river, or onsite seismic Category I water-storage facility, should be provided. If a backup system is used, it need not be a permanently installed system. The capacity of the makeup systems should be such that water can be supplied at a rate determined by consideration of the leakage rate that would be expected as a result of damage to the fuel storage pool from the dropping of loads, from earthquakes, or from missiles originating in high winds.

Pool water is made up from the condensate storage system. Blind flanged connections are provided to the Shutdown Reactor Cooling System at Dresden and the Residual Heat Removal System at Quad-Cities should the need arise for additional make-up water. Leakage rates as a result of a cask drop are discussed in Special Report No. 28 referenced in response number 2 of this section. It was concluded in that report that the condensate transfer pumps could more than adequately make up the amount of leakage as a result of a cask drop.