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SUBJECT:

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RESPONSE TO NRC 03/08/78 REQUEST... FORWARDING ADDL INFO PETAINING TO THE PROPOSED SUBJECT FACILITY"S SPENT FUEL STORAGE CAPACITY MODIFICATION.

PLANT NAME: DAVIS BESSE - UNIT 1

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April 4, 1978

Docket No. 50-346

License No. NPF-3

Serial No. 425

TOLEDO EDISON

LOWELL E. ROE
Vice President
Facilities Development
(419) 259-5242

Director of Nuclear Reactor Regulation
Attention: Mr. John F. Stolz, Chief
Light Water Reactors Branch #1
Division of Project Management
United States Nuclear Regulatory Commission
Washington, D. C. 20555

Dear Mr. Stolz:

Included with this letter as Enclosure 1 are Toledo Edison's responses to your March 8, 1978 Request for Additional Information pertaining to the proposed Davis-Besse Nuclear Power Station Unit 1 spent fuel storage capacity modification.

Yours very truly,

Lowell E. Roe

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Enclosures

Enclosure 1

QUESTIONS/RESPONSES FOR THE DAVIS-BESSE UNIT 1

SPENT FUEL STORAGE CAPACITY MODIFICATION

1. Has the spent fuel pool water become contaminated so that the low density fuel racks would be contaminated prior to modification? If the SFP racks are contaminated, the following information is required with respect to removal and disposal of the low density racks and installation of the high density racks:

   (a) Describe the manner in which the SFP became contaminated.

   (b) Identify the principal radionuclides and their respective concentrations in the SFP as a result of the contamination.

   (c) Describe the method that will be used to remove and dispose of the low density racks (i.e., crating intact racks or cutting and drumming them) and install the high density racks.

   (d) How many workers will be required for each operation (include drivers, if necessary).

   (e) Discuss the dose rates associated with each phase of the operation, the occupancy times and the total man-rem that will be received for the entire operation.

   (f) Demonstrate that the method used for removal and disposal of the racks will provide as low as is reasonable achievable exposes.

Response

The proposed modification to the spent fuel pool will be completed prior to the placement of irradiated fuel into the pool; therefore, the existing fuel racks will not be contaminated.

2. Identify the principal radionuclides and their respective concentration expected in the SFP following the first refueling, after completion of the modification, and thereafter.

Response

Measurements taken on the activity in the pool water before and after refuelings indicated essentially no change in concentrations at plants with a number of years of operation. Therefore, increasing the number of assemblies in the pool is expected to have little effect on concentrations. Measurements at these plants showed that the important radionuclides were Co-58 and Co-60 with concentrations of approximately 10^{-2} uCi/cc. All other radionuclide concentratiins were at least 2 orders of magnitude less.

It is expected that Co-58 will predominate during the first refueling. It has a much shorter half life and reaches equilibrium sooner than Co-60. In subsequent refuelings, Co-60 should predominate.

3. Provide the dose rate above and around the SFP from the concentration of the radionuclides identified in (2) above, and the concomitant estimated collective occupational exposure, in annual man-rem, due to all operations in the SFP area.

Response

There is expected to be no significant increase in total man-rem due to the additional fuel assemblies. The radiation level and the concentrations of radionuclides in the water have been shown to be independent of the number of assemblies in the pool from readings taken before and after refu[illegible]lings at plants with a number of years of operation. The typical [illegible]se rates at these plants are 1-5 mrem/hr in the vicinity of the sp[illegible] pool. The annual occupational exposure for operations i[illegible]ent fuel pool area is expected to be approximately one man-r[illegible]

4. If the spent fuel pool has been contaminated, provide the estimated volume of contaminated material (e.g., spent fuel racks, seismic restraints) expected to be removed from the spent fuel pool and shipped from the plant to a licensed burial site because of the modification.

Response

The spent fuel pool has not been contaminated; therefore, there will be no contaminated volume to be sent to a licensed burial site due to the modification.

5. For the modified pool, you explained on page 13 of your December 5, 1977 submittal that the pool bulk water temperature may be above the FSAR design value of 120°F during normal refueling. Discuss when this may occur and for what period of time.

<u>Response</u>

As indicated in the December 5, 1977 (page 13) submittal the increase in temperature to 125°F will be only for 10 to 15 days following a refueling. This time frame is based on the maximum heat load which consists of one freshly discharged batch in addition to 11 batches from previous refueling outages. After the 10 to 15 days the newly discharged spent fuel will have decayed sufficiently to reduce the heat load such that the spent fuel pool cooling system can maintain the pool less than the design temperature which is 120°F.

6. Provide a list of any loads other than those listed in Section 2.3.2.2 of your December 5, 1977 submittal that might be carried near or over the spent fuel pool. Provide the weight and dimensions of each load including those listed in your December 5, 1977 submittal. Discuss the load transfer path, including whether the loan must be carried over the pool, the maximum height at which it could be carried and the expected height during transfer. Provide a description of any written procedures instructing crane operators about loads to be carried near the pool. Provide the number of spent fuel assemblies that could be damaged by dropping and/or tripping each typical load carried over the pool.

Response

The radiological consequences of a fuel handling accidental are addressed in Sections 15.4.7.2 and 15.4.7.3 of the FSAR. In both analyses the resultant doses do not exceed 10CFR Part 100 guideline values. Though the analysis presented for Section 15.4.7.3 is for inside containment, the assumptions used make it applicable to an equivalent accident in the spent fuel pool area. Damage equivalent to the rupture of one entire assembly is the maximum damage considered credible for the cases presented below.

In addition to a fuel assembly complete with its control rod which was addressed in the December 5, 1977 submittal the following loads might be carried near or over the spent fuel racks: the failed fuel container with a failed fuel assembly inside, the spent fuel pool bulkhead gates, and the spent fuel shipping cask.

The fuel assembly complete with a control rod weighs approximately 1685 pounds (dry weight) and is described in detail in FSAR Section 4.2. The fuel assembly must be carried over all portions of the spent fuel racks. An assembly drop is discussed in Section 2.3.2.2 (Load Case 6) of the December 5, 1977 submittal.

The failed fuel container is an octagonal canister 174.69 inches long and 6 inches on a side weighing 460 pounds. The failed fuel container is used in transporting failed fuel from the containment vessel to the fuel handling area. Failed fuel is defined as any fuel assembly that leaks fission products under cold conditions or any fuel assembly in which the structural integrity of the assembly has been impaired. Failed fuel assemblies that are "leakers" only, will be stored in the spent fuel pool without the aid of a failed fuel container. Travel over the spent fuel pool of the failed fuel container with a failed fuel assembly inside will be limited to only those instances when the failed fuel lacks structural integrity. When this handling arrangement is required the new fuel handling tool will be attached with a double sling to the 2-ton auxiliary hoist located on the spent fuel handling bridge. The tool will be locked into the top of the failed fuel container while sitting in the upending mechanism in the transfer tube pit. The container will then be transported to the storage locations along the east wall of the spent fuel pool. The transfer path will include a a straight line traverse of the spent fuel pool from the gate between the spent fuel pool and fuel transfer tube pit to the failed fuel container storage locations in order to minimize handling time. The lift height of the failed fuel container over the spent fuel storage racks will be limited to not greater than 24 inches in order to maintain adequate water cover over the spent fuel assembly. The assembly drop discussed in Section 2.3.2.2 of the December 5, 1977 submittal has been reanalyzed assuming a drop weight of 1995 pounds (fuel assembly + failed fuel container) with no change in the results presented for the 1685 pound drop.

The spent fuel pool bulkhead gates are 26 feet long, 3 feet 10 inches wide, 1 inch thick and weigh about 4700 pounds each. The gate between the fuel transfer tube pit area and the spent fuel pool may be moved each refueling (if the transfer tube pit is kept dry) to allow the spent fuel to be moved from the upender to the spent fuel racks. The gate between the spent fuel pool and the cask pit will only be moved when fuel is to be transferred off-site. In order to move the gate it is lifted about 4 feet with the auxiliary hook on the spent fuel cask crane, moved to its storage location next to the opening, and lowered to its original height onto the storage lugs. The gate will not be handled directly over the spent fuel racks. In order to assure that the gate is not dropped a double sling will be used. The safety features of the spent fuel cask crane auxilliary hook are addressed in FSAR Question 9.1.4 part J and K.

The handling of the spent fuel cask is addressed in FSAR Section 9.1.4.3 and Question 3.1.4. Crane travel interlocks are discussed in Section 9.1.4.3 and shown on FSAR Figure 9-28.

7. Discuss the instrumentation to indicate the spent fuel pool water temperature and level. Include their capability to alarm.

<u>Response</u>

As discussed in the response the FSAR Question 9.1.4 part e. the spent fuel pool water is maintained at a normal level of El. 601 feet 6 inches, which corresponds to approximately 23'-8" of water over the top of the fuel assemblies. There is a level instrument provided to monitor the pool level with both a high level and a low level alarm at 601 feet 9 inches and 600 feet 0 inches respectively. Similarly a temperature instrument is provided with an indicator and a high temperature alarm set at 125°F. Both instruments have indication and alarm functions both on the station computer and on the main control board.

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