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USNRCUNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

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BEFORE THE ATOMIC SAFETY AND LICENSING BOARDOFFICE OF SECRETARY  
INSPECTING & SERVICE

In the Matter of	)
CONSUMERS POWER COMPANY	) Docket No. 50-155-OLA
(Big Rock Point Nuclear Power Plant)	) (Spent Fuel Pool Modification)

CONSUMERS POWER COMPANY'S  
PROPOSED PARTIAL INITIAL DECISION  
(CONCERNING O'NEILL CONTENTION II-C, CASK DROP)

This is the fourth in a series of partial initial decisions arising out of evidentiary hearings held in Boyne Falls, Michigan on June 7 through 12, 1982 on the application of Consumers Power Company ("Licensee") for a license amendment which would increase the spent fuel storage limit in the spent fuel pool at Licensee's Big Rock Point Plant. This decision considers that aspect of O'Neill Contention II-C concerning a drop of the spent fuel transfer cask. This contention was reworded by the Licensing Board to read:

Is the spent fuel pool safe from a rupture which might be caused by a drop of a spent fuel transfer cask or of the overhead crane?

The Licensing Board established a number of genuine issues of fact under this contention. One concerning the structural integrity of the concrete pool questions whether or not it is necessary for the safety of the enlarged spent fuel pool that 200 gpm of makeup water be available to protect the pool from

the consequences of a drop of a spent fuel transfer cask.<sup>1/</sup> This decision deals solely with this issue. Other genuine issues of fact established by the Licensing Board pursuant to the February 19 Order will be litigated at hearings yet to be scheduled in this proceeding.

Although Contention II-C challenges the structural adequacy of the concrete spent fuel pool to withstand the drop of a 24-ton spent fuel transfer cask, Licensee has not undertaken to make such a showing by its evidentiary presentation. Rather, Licensee's evidence addresses the means whereby a drop of the fuel transfer cask into the spent fuel pool will be prevented due to the presence of a redundant support system for the cask. This system called a "safety sling assembly" is designed to prevent the cask from dropping into the spent fuel pool if the primary means of support fails. In this regard, Licensee has met its burden in showing us that its safety sling assembly is adequate to prevent a cask drop. Consequently, Intervenors' Contention on this genuine issue of fact is found to be without merit.<sup>2/</sup>

1. Applicable Law

The NRC, by regulation - 10 C.F.R. § 50.57(a)(3) (i), requires reasonable assurance that all licensed activities can be conducted without endangering the health and

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<sup>1/</sup> "Memorandum and Order (Concerning Motions for Summary Disposition)", p. 47, dated February 19, 1982.

<sup>2/</sup> The contention was raised originally by Mr. John O'Neill. However, it was pursued at hearing by Intervenors Christa-Maria, et al.

safety of the public. This requirement applies to the proposed expansion of the Big Rock Point spent fuel pool; and within the framework of the issue presently being considered by the Board, whether the Licensee can use the spent fuel transfer cask in connection with an expanded pool capacity without endangering the health and safety of the public.

2. Discussion

In the event of a failure of the primary lift assembly for the 24-ton spent fuel transfer cask, the safety sling assembly is designed to arrest its fall. The safety sling assembly, in simplified terms, consists of two wire ropes and a cask catch mechanism suspended from the overhead crane. If the primary lift assembly were to fail, a tag line which runs parallel with the main hoist line causes the cask catch mechanism to trip and subsequently engage wedges around the two wire ropes. The wedges firmly grip the ropes and prevent a further fall or drop of the cask.

Licensee presented a panel of four witnesses whose collective testimony addressed the reliability of the safety sling assembly.<sup>3/</sup> First, Mr. John W. Johnson, a mechanical engineer with MPR Associates, quantified the extent of the dynamic load that would be incurred by the safety sling

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<sup>3/</sup> The written testimony of the John W. Johnson, Charles R. Norman, John J. Popa, and A. Davis Mullholand, Jr. appear following Tr. 2419.

assembly in the event of a drop of the spent fuel transfer cask. Based on his analysis,<sup>4/</sup> Mr. Johnson determined that in the event of the failure of the primary lifting assembly, the maximum free drop of the cask before arrest by the safety sling assembly would be 2.98 inches.<sup>5/</sup> Based on that free drop calculation, and using conservative assumptions,<sup>6/</sup> Mr. Johnson determined the dynamic load on the safety sling assembly presented by a drop of the 24-ton cask would be 14<sup>o</sup> tons.<sup>7/</sup> For purposes of the structural analyses, a design

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4/ Consumers Power Company Exhibit No. 2, "Spent Fuel Rack Addition Consolidated Environmental Impact Evaluation and Description and Safety Analysis," Appendix III, as supplemented by Mr. Johnson's written testimony following Tr. 2419.

5/ Johnson Testimony, pp. 3-5. This calculation incorporates the conservative assumption that friction will be present between the trip bar mechanism and the yoke of the cask catch mechanism. The presence of friction leads to a slower response time, thus a greater free drop. Id., p. 4.

6/ Id., p. 7-8. Mr. Johnson listed four conservative assumptions included in his dynamic loading analysis: (1) a complete and instantaneous failure of the primary lifting system is assumed without any credit being taken for the energy absorbed by the components of that system; (2) the failure is postulated to occur at the highest point of the lift while the cask is being lowered at the maximum hoist speed; (3) all parameters defined by plant procedures such as wedge clearance and tagline slack are postulated to be in their worst case position; and (4) a conservative range of friction values is used to result in highest loading on the sling.

7/ Id., pp. 5-6.

load of 150 tons (or 75 tons per sling) was used.<sup>8/</sup>

Several structural analyses were performed using the 150-ton dynamic loading as a design basis. Mr. Johnson performed one analysis solely with respect to the pertinent components of the spent fuel transfer cask, i.e., the cask safety lugs and that part of the cask shell that is welded to the lugs. It was determined by that analysis that the stresses in the lugs and cask shell are within acceptable limits.<sup>9/</sup>

The structural adequacy of the safety sling assembly and the gantry crane were analyzed by a second Licensee witness, Mr. Charles R. Norman, using the 150-ton design basis. He determined that except for two components the safety sling assembly and gantry crane met acceptable load limits.<sup>10/</sup> As to the two exceptions, Mr. Norman recommended

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<sup>8/</sup> Id., p. 6. Mr. Johnson also explained that additional analyses were performed since the analysis prepared by MPR Associates in 1980 (Consumers Power Company Exhibit No. 2, Appendix III) to account for possible differences in load between the two slings due to differences in wedge friction and wedge clearance. Results of the later analysis indicated that the maximum additional load in the highest loaded sling would be 8 percent higher than the design load of 75 tons per sling but that the total load on the crane would still be less than the design load of 150 tons. Id., pp. 6-7. Mr. Johnson stressed, however, that the conservative assumptions (supra, fn. 6) used in his analysis would more than accommodate an additional 8 percent load to one of the slings. Id., p. 8.

<sup>9/</sup> Johnson Testimony, p. 9.

<sup>10/</sup> Norman Testimony, pp. 6-13.

that the cask catch pins and certain bolts used in joining the crane's load girt beam to the trolley truck be replaced with stronger pins and bolts.<sup>11/</sup>

Mr. A. Davis Mullholand, Jr. Licensee's Project Engineer for licensing aspects of the Big Rock Point Plant spent fuel pool expansion, testified that Licensee is undertaking to perform the modifications recommended by Mr. Norman.<sup>12/</sup> Licensee will not use the 24-ton spent fuel transfer cask until the modifications are completed.<sup>13/</sup>

Licensee's fourth and final witness was Mr. John J. Popa. Mr. Popa is the Maintenance Superintendent at the Big Rock Point Plant. He testified as to the procedures which ensure that the components of the safety sling assembly are inspected, tested, and adjusted prior to use of the spent fuel transfer cask.<sup>14/</sup> In addition, the procedures incorporate the conditions specified by Mr. Johnson in his analysis of the dynamic loading of the safety sling system.<sup>15/</sup>

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<sup>11/</sup> Id., pp. 6-7, 10-11 and 13.

<sup>12/</sup> Mullholand Testimony, pp.3-4.

<sup>13/</sup> Id.

<sup>14/</sup> Popa Testimony, p. 3 and Attachments 1 and 2.

<sup>15/</sup> Johnson Testimony, pp. 10-11; Popa Testimony, p. 3 and Attachments 1 and 2. The specified conditions maintained by the procedures include: (1) wedge clearance around the safety cables will be less than or equal to 0.50 inches; (2) the angular position of the trip lever is within 0.25 inches of top dead center; (3) tagline slack is removed; and (4) no lubrication is applied between the wedges and the wire safety ropes.

The NRC Staff reviewed these cask load handling procedures against the guidelines in NUREG-0612 and found them to be consistent. The Big Rock procedures were found to delineate the preparation, wire rope inspection and testing of the spent fuel transfer cask and safety sling.<sup>16/</sup> The NRC Staff concluded that the procedures are acceptable to ensure that the safety sling assembly will be operable and able to perform within design limits whenever the spent fuel transfer cask is being handled.<sup>17/</sup>

Rigging of the spent fuel transfer cask requires about five members of the Maintenance Department, a large percentage of whom are familiar with the rigging from past experience.<sup>18/</sup> A 1981 INPO report praised the Maintenance Department for their comprehensive and effective program and experienced qualified and well-motivated personnel.<sup>19/</sup> The crane operator is trained and qualified through an extensive training course.<sup>20/</sup> In their review, the NRC Staff concluded

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<sup>16/</sup> "Joint Testimony of Fred Clemenson, Ivan Sargent, D.J. Vito and Richard L. Emch, Jr. Concerning O'Neill Contention II-C" (hereinafter "NRC Staff Testimony") following Tr. 2434, p. 8.

<sup>17/</sup> NRC Staff Testimony, pp. 24-25. Tr. 2464-2466. The NRC Staff did qualify this conclusion on the condition that Licensee cross reference its procedures so as to require a test of the safety sling trip mechanism each time the spent fuel cask is prepared for load handling. NRC Staff Testimony, pp. 24-25. Licensee has agreed to make such revision.

<sup>18/</sup> Popa Testimony, p. 4.

<sup>19/</sup> Id., pp. 4-5.

<sup>20/</sup> Id., p. 4.

that training of the crane operator was consistent with the guidance of NUREG-0612.<sup>21/</sup>

In passing, it should be noted that the NRC Staff witnesses devoted a considerable amount of their testimony to its generic review of the Big Rock Point Plant under NUREG-0612 "Control of Heavy Loads at Nuclear Power Plants." Pursuant to that review, the NRC Staff witnesses in the course of their testimony requested Licensee to submit additional information for purposes of completing its NUREG-0612 review.<sup>22/</sup> Licensee accommodated this request on the record through rebuttal testimony of Messrs. Norman and Mullholland.<sup>23/</sup> However, both parties stipulate that the NUREG-0612 concerns go beyond the scope of Contention II-C and need not affect our consideration of the use of the spent fuel transfer cask in the spent fuel pool.<sup>24/</sup> We agree. The adequacy of the Staff's "heavy loads" review pursuant to NUREG-0612 is beyond the jurisdiction of this Board.

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<sup>21/</sup> NRC Staff Testimony, p. 9. The NRC Staff's conclusion was qualified by the condition that Licensee upgrade the visual acuity standards of its crane operators. Licensee intends to meet that condition. Id.

<sup>22/</sup> NRC Staff Testimony, p. 20.

<sup>23/</sup> Tr. 2469-76, including the written "Rebuttal Testimony of Charles R. Norman" therein.

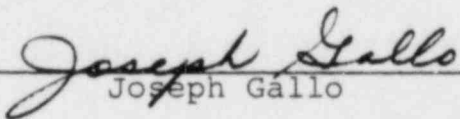
<sup>24/</sup> NRC Staff Testimony, p. 21; Tr. 2471. The NUREG review provides some helpful information, as indicated by our previous citations thereto, but for the most part concerns the allowable stresses and design limits of the crane to handle loads such as the reactor head which is not moved over the spent fuel pool and which is much heavier than the spent fuel transfer cask. Tr. 2458-2461.

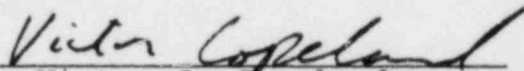


3. Conclusion

Based on the foregoing, which was uncontroverted by Intervenors Christa-Maria, et al. and Mr. O'Neill, we conclude that there is reasonable assurance that the 24-ton spent fuel transfer cask will not drop into the pool. Intervenors Contention II-C insofar as it concerns a drop of the spent fuel transfer cask is without merit and it is dismissed.

Respectfully submitted,

  
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