

UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of )  
COMMONWEALTH EDISON COMPANY ) Docket Nos. 50-295  
(Zion Station, Units 1 and 2) ) 50-304

NRC STAFF TESTIMONY IN RESPONSE TO  
BOARD QUESTIONS 4(c), 4(d), and 4(f)

by  
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Question (4)(c):

What postulated accidents, which might affect the safety of plant personnel in the spent fuel storage building or which might result in the release of radiation or radioactive materials from the spent fuel storage building, were specifically analyzed in the FSAR, SER, ER and FES utilized in the CP and OL licensing reviews of Zion Units 1 and 2?

Response:

The postulated accidents, which might affect the safety of plant operating personnel in the spent fuel storage building or which might result in the release of radiation or radioactive materials from this building, that were specifically analyzed in the Final Safety Analysis Report (FSAR), Safety Evaluation Report (SER), Environmental Report (ER) or Final Environmental Statement (FES) for Zion Nuclear Power Station, Units 1 and 2 (Zion 1/2), are given below:

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FSAR: Fuel Handling Accident  
Earthquake, Tornado Missiles & Turbine Missiles

SER: Fuel Handling Accident  
Earthquake, Tornado Missiles & Turbine Missiles

ER: None

FES: Fuel Handling Accident  
Heavy Object Drop Onto Fuel Rack

Question 4(d):

Which, if any, of the postulated accidents in (c), above, will be increased in probability, magnitude or consequence (to personnel, to the general public or to the environment) if the proposed spent fuel pool modifications are carried out?

Response:

Table 4.d-1 lists the changes in the probability, magnitude or consequences and risks for the postulated accidents which affect the safety of plant operating personnel in the Spent Fuel Storage Building or result in the release of radioactive material from this building and which were analyzed in the Zion 1/2 FSAR, SER, ER or FES. These accidents are listed in the response to Question 4(c).

The additional spent fuel which would be stored in the pool due to the expansion of pool capacity is the oldest fuel which has not been shipped from Zion. This fuel will have decayed several years. This fuel would make a negligible contribution to the magnitude or consequences of accidents in the Spent Fuel Storage Building. The only spent fuel which effectively contributes to the consequences of accidents in the Spent Fuel Storage Building is

the last spent fuel to be placed in the pool. This is the spent fuel discharged during a refueling or a full core offload. Most of the gaseous fission products in irradiated fuel have short half-lives and decay to insignificant levels in a few months.

There will be spent fuel movements during the modification of the Zion 1/2 pool equal to about 10 refuelings at Zion 1/2. This is for the pool being modified after the scheduled 1980 refueling. This is an increase of 12.5% over the number of refuelings expected at Zion 1/2 during its operating lifetime. The spent fuel should have decayed at least one month in allowing the refueling to be completed before the modification of the pool is started; therefore, the potential consequences for the Fuel Handling Accident will be at least a factor of 10 lower than the values given in the Safety Evaluation (SE) dated October 1972 for Zion 1/2. Therefore, the risk from the Fuel Handling Accident to the public, the plant and the environment will be decreased during the modification of the pool.

By letter dated November 29, 1968, the Commonwealth Edison Company (the licensee) provided the Project Milestones schedule for the Zion 1/2 fuel pool modification. Based on this letter, there should only be 632 spent fuel movements (i.e., equivalent to 5 refuelings) and the spent fuel in the Zion 1/2 pool during the pool modification will be at least one year old.

The NRC staff has under way a generic review of load handling operations in the vicinity of spent fuel pools to determine the likelihood of a heavy load impacting fuel in the pool and, if necessary, the radiological consequences of such an event. Because Zion 1/2 will be required to prohibit

loads greater than the nominal weight of a fuel assembly and handling tool to be transported over spent fuel in the SFP, we have concluded that (1) the likelihood of a heavy load handling accident is sufficiently small that the proposed modification is acceptable and no additional restrictions on load handling operations in the vicinity of the SFP are necessary while our review is under way and (2) there is no change in the probability, magnitude (to plant personnel, the public or the environment) or risk of an accident caused by dropping a heavy load into the pool during the modification of the pool.

The spent fuel shipping cask will not be brought into the Spent Fuel Storage Building during the modification of the pool.

The spent fuel pit, the Auxiliary Building housing the spent fuel pit and the spent fuel pit cooling system are Class I seismic structures and components (response to FSAR Question 4.23). The Auxiliary Building has been designed to withstand the impact of turbine and tornado-driven missiles (response to FSAR Question 10.8 and 15.2). Therefore, the probability, magnitude or consequences, and risk for accidents resulting from an earthquake, tornado missiles or turbine missiles are unchanged during the modification of the pool.

A malfunction or loss of the spent fuel pit cooling system is not considered an accident. The consequence of such an event is addressed in the response to Contention 2(g).

Table 4.d-1

CHANGE IN RISK FOR  
POSTULATION ACCIDENTS DURING SFP MODIFICATION

Change in the Following	Accident			
	<u>FHA*</u>	<u>HODA*</u>	<u>CDA*</u>	<u>ETM</u>
Probability	increase (about 12.5%)	none	zero	none
Magnitude or Consequences	decrease (by a factor of about 10)	none	-	none
Risk	decrease	none	zero	none

- \* FHA = Fuel Handling Accident
- HODA = Heavy Object Drop Accident
- CDA = Cask Drop Accident
- ETM = Earthquake, Tornado Missiles and Turbine Missiles

Question 4(f):

Which, if any, of the postulated accidents in (c), above, will be increased in probability, magnitude or consequence (to personnel, to the general public or to the environment) as a result of the completion of the proposed spent fuel pool modifications and the proposed subsequent usage of the increased spent fuel storage capacity?

Response:

Table 4.f-1 lists the changes in the probability, magnitude or consequences and risks for the postulated accidents which affect the safety of plant personnel in the Spent Fuel Storage Building or result in the release of radioactive material from this building and which were analyzed in the Zion 1/2 FSAR, SER, ER or FES. These accidents are listed in the response to Question 4(c).

As discussed in the response to Question 4(d), the additional spent fuel in the pool because of the pool modification makes a negligible contribution to the consequences of accidents in the Spent Fuel Storage Building.

There will not be a significant increase in the number of fuel handling and shipping cask movements because of the increase in capacity of the SFP. The total number of shipping cask movements will depend on the size of the cask and the number of assemblies to be shipped and not on the capacity of the SFP. Because there are no requirements in the specifications as to where the freshly discharged spent fuel must be stored, the number of fuel handling movements should not change because of the increase in the SFP capacity. Therefore, the modification of the pool does not change the probability of the Fuel Handling Accident and the Cask Drop Accident.

The scenario for the postulated fuel handling accident is the dropping of a fuel assembly directly onto another assembly in the spent fuel pool resulting in the rupture of all of the pins in the equivalent of one assembly. Since this scenario is the most severe fuel handling accident and results in the most conservative analysis, the increased fuel density in the pool would not increase the consequences of this accident and further analysis is not needed. In addition, operating experience to date has indicated that no appreciable radiological releases can be expected from a fuel handling accident.

The NRC staff has not completed its review and evaluation of the potential radiological consequences of a spent fuel shipping cask falling into the Zion 1/2 pool. Until this review is completed, a shipping cask will not be allowed near the pool. If a shipping cask fell into the pool, the additional spent fuel in the pool because of the proposed pool modification may increase the consequences of this accident to the plant personnel, the public and to the environment; however, this increase would not be significant. The additional fuel in the pool because of the proposed pool modification will have decayed several years. This decay will reduce the radioactivity of volatile and gaseous material to negligible levels so that this additional fuel is not important in calculating the potential consequences of this accident.

The NRC staff has under way a generic review of load handling operations in the vicinity of spent fuel pools to determine the likelihood of a heavy load impacting fuel in the pool and, if necessary, the radiological consequences of such an event. Because Zion 1/2 will be required to prohibit loads greater than the nominal weight of a fuel assembly and handling tool to be transported

over spent fuel in the SFP, we have concluded that (1) the likelihood of a heavy load handling accident is sufficiently small that the proposed modification is acceptable and no additional restrictions on load handling operations in the vicinity of the SFP are necessary while our review is under way and (2) there is no change in the probability, magnitude (to plant personnel, the public or the environment) or risk of an accident caused by dropping a heavy load into the pool after completion of the modification of the pool.

The spent fuel pit, the Auxiliary Building housing the spent fuel pit and the spent fuel pit cooling system are Class I seismic structures and components (response to FSAR Question 4.23). The Auxiliary Building has been designed to withstand the impact of turbine and tornado-driven missiles (response to FSAR Question 10.8 and 15.2). Therefore, the probability, magnitude or consequences, and risk for accidents resulting from an earthquake, tornado missiles or turbine missiles are unchanged after completion of the modification of the pool.

A malfunction or loss of the spent fuel pit cooling system is not considered an accident. The consequence of such an event is addressed in the response to Contention 2(g).



Table 4.f-1

CHANGE IN RISK FOR  
POSTULATED ACCIDENTS AFTER SFP MODIFICATION

<u>Change in the Following</u>	<u>Accident</u>			
	<u>FHA*</u>	<u>HODA*</u>	<u>CDA*</u>	<u>ETM</u>
Probability	none	none	none	none
Magnitude or Consequences	none	none	insignificant increase	none
Risk	none	none	insignificant increase	none

- \* FHA = Fuel Handling Accident
- HODA = Heavy Object Drop Accident
- CDA = Cask Drop Accident
- ETM = Earthquake, Tornado Missiles and  
Turbine Missiles