UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of Commonwealth Edison Company (Dresden Station, Units 2 and 3)	)))	Docket Nos. 50-237 50-249

TESTIMONY OF
RON RAGAN

Contention 3: Preventing and Protecting Against Transportation Damage

Contention 5: Health and Safety of Workers in Spent Fuel Pool Area

A. Introduction

1. My name is Ronald M. Ragan. I am employed by Commonwealth Edison Company, Dresden Nuclear Power Station, R.R. #1, Morris, Illinois 60450. I hold a Bachelor of Science in Mechanical Engineering degree from Illinois Institute of Technology. I have been assigned to Dresden Station since April, 1966; and at the present time, I hold the position of Assistant Superintendent - Operations. In this capacity, I have overall responsibility of supervising the operating activities at the station. Prior to this position, I have held the position of Startup Engineer (2 years), Unit Operating Engineer (5 years), and Lead Operating Engineer (1 year) at the station. I have a Senior Control Operator's License to operate Dresden Units 1, 2, and 3, which I received in 1972.

2. As a result of my employment at Dresden Station, I am personally familiar with all aspects of the station's operation, including the on-site Quality Assurance and Quality Control programs designed to prevent the installation of defective spent fuel racks and the precautions taken to limit the occupational radiation doses to workers to a safe level.

3. Accordingly, I have personal knowledge of the

facts relating to Intervenor's Contentions 3 and 5.

B. Contention 3: High Density Spent Fuel Rack Packaging, Transport, and Receipt

4. Intervenor's Contention 3 reads:

> The application does not demonstrate that rack and tube packing, transportation, and receipt inspections are adequate to prevent and detect transportation damage.

5. My testimony deals specifically with the receipt of new high density spent fuel racks at Dresden Station.

6. When the new spent fuel racks arrive at Dresden, they will undergo a preliminary visual inspection by Storeroom personnel prior to unloading. This inspection verifies that no damage occurred during handling and shipping from fire, rough handling, tie-down failure, or environmental conditions. The Storeroom documents its findings in a Receiving Inspection Notice, which is forwarded to the station Quality Control Department.

7. Quality Control personnel in turn perform a Quality Receipt Inspection. This inspection includes a visual inspection of the accessible welds which is performed by a certified Level II inspector. Quality Control also makes a review of the documents which accompany the new racks to make sure that the racks conform to all applicable speci-

fications and standards. The documentation also shows that all required weld examinations, chemical, and physical tests have been completed.

8. Both the Receiving Inspection Notice and Quality Receipt Inspection are then forwarded to the Quality Assurance Department for review and approval. The Quality Assurance Department is located at the station but is autonomous of station management. Quality Assurance can, if it chooses, perform an independent inspection. Upon approval by Quality Assurance, the Storekeeper can release the racks for installation.

9. Additional tests will be performed on the racks prior to using them for fuel storage. Before a rack is lowered into the pool, each storage location will be subjected to a drag test. A dummy fuel assembly of dimensions identical to that of assemblies in use will be inserted and withdrawn from each storage location. The dummy assembly will be supported by a scale; a significant change in the scale reading while lowering or raising the dummy assembly will indicate the existence of a physical defect in the contours of a tube. If the drag exceeds a pre-set level, the storage location will be "plugged" by welding straps across the top, which will still allow circulation of cooling water through that location. The criteria originally recommended for the test was $<$50 lb. drag. Zion Station subjectively decided to use $<$20 lb. drag for their testing,

but this figure may be unduly conservative. A decision as to what criteria to use at Dresden will be made pending investigation of the matter, particularly the results at Zion.

10. After a rack is lowered into the pool, the presence of the boral neutron absorber plates in the tubes will be verified before the rack is used for fuel storage. A neutron source will be lowered in a tube and detectors into surrounding locations so that by observing the attenuation of the neutrons, a qualitative determination as to the presence of the plates can be made. A sufficient number of tubes will be checked to verify to a 95% confidence level that all plates are in place in each rack. Should a plate be found to be missing, all tubes will be checked, and the appropriate storage location(s) will be plugged.

11. The concern of the station that no defective or otherwise unsatisfactory racks be installed is illustrated by the following incident which occurred on Friday, October 3, 1980.

The first two racks had arrived at the station and had been accepted by the Storeroom. Although examinations had been completed prior to shipment, and the packing of the racks precluded any chance of damage, Quality Control personnel performed an additional dye-penetrant examination of the

external welds to satisfy themselves. No defects were found. As the official receiving inspection procedure had not yet arrived from Commonwealth Edison's Station Nuclear Engineering Department (SNED), and the documentation for each rack was still being compiled, Quality Control did not accept the racks pending receipt of these items. The Fuel Handlers took this opportunity to examine the racks and noticed that the lead-in clips on the top of the tubes had a somewhat sharp bottom edge. Although this was not actually a defect, it was the opinion of the Fuel Handling Foremen that damage could possibly result to unchanneled fuel assemblies while removing them due to the fuel cladding scraping on this edge. Although it was not originally specified, it was decided by station management that the bottom edges of these lead-in clips must be rounded off, and Nuclear Services Corp. (NSC) was notified the same day via SNED. By Tuesday, Leckenby (the manufacturer) had been notified and an investigation was underway as to the best way to round the clip edges on both the racks being constructed and those already received.

12. At the present time, four racks have been received at Dresden Station. Quality Receipt Inspections have still not taken place and the racks have not been accepted by Quality Control or Quality Assurance. The racks

are being stored indoors with Quality Assurance "hold" tags; two in the Turbine Building and two on the refueling floor of the Reactor Building.

13. In my opinion, the Dresden Station Quality Assurance and Quality Control procedures described above are adequate to ensure that damaged or defective racks will not be installed at Dresden.

C. Health and Safety of Workers in Spent Fuel Pool Area

14. Intervenor's Contention 5 reads:

> There is no assurance that the health and safety of workers in the spent fuel pool areas will be adequately protected during rack removal and installation in that:
>
> a. The Application does not supply adequate information to assess the occupational radiation dosage to workers involved in removing and installing racks and rearranging spent fuel in the pools, and to other workers who may be in the pool areas.
>
> b. There is no consideration of the occupational radiation hazards from accidents that may occur as a result of rack removal and installation, e.g., flooding of the pool area and water spraying on workers.

15. My testimony outlines the practices in use at Dresden to limit the overall radiation exposure of workers to a safe level and the method by which the new racks will be installed, and discusses the possibility of flooding of the pool area and of water spraying on workers during the installation of the racks.

16. All workers at Dresden are protected from receiving an unsafe radiation exposure by a number of measures. These are governed by a lengthy set of procedures, but to provide a brief description, they are:

a. Personnel monitoring:

i) Film badges for legal exposure record,

ii) Pocket dosimeters (ionization chambers) for daily monitoring,

iii) Special neutron film badges, extremity monitoring, and self-reading pocket dosimeters when necessary,

iv) Timekeeping on individuals in high radiation or airborne areas when necessary, and

v) Periodic whole body counting and isotopic analysis to check for ingestion of radioisotopes.

b. Routine measuring of dose-rates and contamination levels (if any) in all work areas by Rad-Chem Department.

c. Control of accessibility to high radiation and airborne areas:

i) Locked doors with special keys,

ii) Logging into/out of areas, and

iii) Special monitoring, clothing, and mask requirements for areas when necessary.

d. Decontamination, placement of shielding in areas when necessary.

Limits on exposure conform to all federal standards. A copy of the applicable procedure is included with the testimony as Attachment 1.

17. A very detailed breakdown of the anticipated occupational radiation exposure for rack replacement was in fact provided by Commonwealth Edison in its response to NRC Round 1, Question 1. A copy of this response is included as Attachment 2.

18. The general method by which the racks will be replaced is as follows:

a. All the fuel in the pool will be moved to the south end of the pool. Low Power Range Monitors and other objects stored in the pool will also be moved to the south end. A licensed Fuel Handling Foreman will supervise the fuel moves and the rack removal and installation.

b. The racks will be removed from the north end of the pool starting with the A racks.

c. The vacated area of the pool floor will be vacuumed.

d. High Density Racks will be set into the north end of the pool.

e. The new racks will undergo neutron attenuation testing to verify the presence of the boral plates.

f. Fuel will be moved to the new racks starting with the north-most fuel in the old racks, moving it to the north-most locations in the new racks. The fuel will be moved in stages so that the greatest possible distance will be maintained in all directions between the nearest fuel and the area where the new racks are being set in.

g. The process of moving fuel, removing old racks, vacuuming, and installing and testing new racks will proceed north to south until all but six of the new racks are installed. These six racks will be temporarily stored indoors at the station to leave room for control blade storage. They will be installed when additional fuel storage space is needed.

h. A diver will be on call to assist in the modification when necessary. When a diver is used, health physics personnel and radiation chemistry technicians will survey the pool and ensure that the diver will stay a safe distance from fuel and other radioactive material.

19. Except for refueling outages, during which

re-racking will not be taking place, there will be few workers, if any, other than those installing racks on the refuel floor. The dose rate to workers on the refuel floor should not be increased significantly due to the re-racking since the station has not previously experienced any crud problems due to fuel moving and because the fuel pool clean-up system will maintain the water purity as described in Don Adam's testimony.

20. Addressing Part b. of Contention 5: the likelihood of flooding due to a Spent Fuel Pool (SFP) over-flow is unrelated to rack removal and installation. The modification will not affect the normal level control mechanisms of the pool. The normal level of the fuel pool is 37' 9". An alarm will annunciate in the control room on a high level of 38' or a low level of 37' 7".

21. The volume displacement of a 9 x 13 rack is approximately 32 $ft.^3$ (see Attachment 3) or 240 gal. Setting it into the pool would raise the water level approximately .28 inches. The displaced water will overflow into the skimmer/surge tanks which also receive the skimmed overflow resulting from normal recirculation. There are two skimmer/surge tanks located next to each fuel pool, cross-tied at the bottom and connected to the pools by skimmer weirs which can accomodate a flow of 700 gpm.

22. It is possible to overflow a pool by adding water at a sufficiently high rate; but this does not result in flooding on the refueling floor. Air intake vents are located about 3 inches above the high water level, in all four sides of the fuel pool wall. (These draw off the humid air over the pool water.) Water additions beyond the capacity of the skimmer/surge tanks will result in overflow into the vent ducts and low level contamination of the floors below.

An event of this type occurred with the Unit 3 fuel pool on October 25, 1979. No apparent damage was caused. A copy of the Deviation Report is included with this testimony as Attachment 4.

23. It is not possible, however, to mistakenly open a wrong valve and drain a fuel pool. No drains are provided in the pool below the level of the stored material. The pool can only be drained by use of a portable sump pump.

24. It is unlikely that any water could be sprayed onto workers. The only way water could be sprayed would be during hydro-lazing of the old racks, and in this case, the personnel performing the work would be wearing protective clothing designed for the task and working in an area enclosed by plastic sheeting, usually in the dryer/

separator pit. Whether or not hydro-lazing will be done has not yet been decided, pending further study into the matter of how to dispose of the old racks with a minimum of personnel radiation exposure as per the ALARA program. If fuel pool water were somehow splashed onto the workers, it would possibly mean the inconvenience of decontamination, but would not be dangerous as the radioactivity in the water is typically very low.

25. Based on my education and experience, I am confident that the health and safety of workers in the spent fuel pool areas will be adequately protected during the rack removal and installation.