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 (Spent Fuel Pool Modification)

SUPPLEMENTAL TESTIMONY OF SEYMOUR BLOCK
ON CONTENTIONS 4 AND 5

I am employed as a Senior Health Physicist, Division of Systems Integration, Office of Nuclear Reactor Regulation, United States Nuclear Regulatory Commission. A statement of my professional qualifications is attached to this testimony.

Contention 4 states:

Applicant has not provided adequate monitoring equipment in the spent fuel pool water to detect abnormal releases of radioactive materials from the increased number of spent bundles. Absence of such monitoring and alarms could result in undue exposure to workers in excess of ALARA, specifically:

(A) There is no description of monitoring devices, and therefore no assurance exists that workers in each pool area will have adequate warning of possible hazardous conditions;

(B) The applicant should demonstrate that the radiation monitoring equipment has adequate range and sensitivity to indicate accurately the rates and magnitudes of radiation releases that could occur in the reracked pools.

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Response:

(A)(B) The increment in dose rate resulting from the proposed increase in stored fuel assemblies will be quite small compared to the dose rate from the present pool spent fuel capacity. This is because the spent fuel assemblies themselves contribute a negligible dose rate to the pool area because of the depth of water shielding the pool. Calculations made for the dose equivalent rate (mrem/hr) above the surface of a typical spent fuel pool from 1100 fuel elements stored in high density racks showed a radiation level of about 10-8 mrem/hr. Thus it would appear as if the direct radiation dose rate levels from the fuel assemblies themselves is not an important part of the total dose rate in the spent fuel pool area. The major contribution of dose rate in the spent fuel pool area comes from introduction of reactor coolant water into the pool area during refueling. Dislodging of crud (activation products) from the surface of an assembly during fuel handling, radioactivity in the reactor coolant water from fuel leaks, and leakage of radioactivity from the stored spent fuel provides the radioactivity in the pool so that the spent fuel pool modification should not cause a significant increase in the radionuclide concentration and subsequent increase in dose rate.

Gamma isotopic concentrations indicate that the contribution from the ^{60}Co, ^{137}Cs, ^{134}Cs and ^{58}Co activities provides the major source of dose rate above the pool. Most of the activation products producing this dose rate comes from the water interchange of the primary coolant water during transfer from the reactor during refueling. Many of these products will be removed from the pool by the spent fuel pool clean-up system. Therefore the monitoring equipment used at the pool are essentially low range survey meters which provides dose rate data to occupants in the spent fuel pool area during the fuel transfer and eventual clean-up. These radiation surveys are performed independent of the modification to assure that exposures to personnel occupying the pool area will be maintained ALARA during all spent fuel pool operations. Additionally, two remote area monitors (RAMS) have been installed one on the refueling floor, adjacent to the pool in a general occupied area, and the other on the skimmer surge tank to warn personnel in case of abnormal releases should they occur. These monitors have a range of from 0.1 to 1000 mr/hr. A local alarm and control room alarm and recorder has been established for the pool monitor. The set point for this monitor varies from 1 1/2 to 2 times background. The skimmer tank monitor is used for isolation of the reactor building. In case of an accident in the spent fuel pool, the ventilation system will be shut off and the emergency stand-by-gas treatment system initiated. The alarm set point for this RAMS is 100 mr/hr.

Dose rates measured in the spent fuel pool area range from 2 to 5 mr/hr, with the latter dose rate usually following refueling. Therefore, based on the set point criteria established above, the alarm set point would be from about 4 to 10 mr/hr depending upon operational status in the spent fuel pool area. This dose rate range and set point criteria will not be affected as a result of the modification.

Experience has indicated that there is little radionuclide leakage from spent fuel stored in the pool after the fuel has cooled for several months since, as stated previously, the radionuclides that were present in the reactor coolant system prior to refueling or crud dislodged from the surface of the spent fuel during transfer, comprise the activity in the SFP water. During and after refueling, the spent fuel pool clean-up system reduces the radioactivity concentration in the water considerably.

In conclusion the staff feels that the radiation monitoring perfomed in the Dresden spent fuel pool is adequate to detect normal and abnormal releases of radioactive materials from the increased number of spent fuel bundles.

Contention 5 states:

There is no assurance that the health and safety of workers in the spent fuel pool area 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 area,

(B) There is not 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.

Response:

(A) Based on a question by the NRC staff to the licensee on July 21, 1978 to address occupational exposure expected during the spent fuel pool modification, the licensee provided a response that included the specific operation performed, the dose rate expected, the occupancy time of workers and their collective dose rate (man-rem) to perform this operation. This information was presented in the Safety Evaluation submitted by the staff on June 5, 1980 to Commonwealth Edison.

(B) With respect to flooding of the pool area and water spraying on workers, the staff knows of no incidents or circumstances at Dresden by which the spent fuel pool area has been flooded or water sprayed on workers, nor can we expect such events to happen here. The spent fuel pool has been designed with two high water level alarms. One of the alarms is in the pool itself with the sensor activated when the water level is about 1 foot from the top. Additionally all valves that may cause an overflow if activated have been identified by tags. The pool design also incorporates a feature which precludes the spent fuel pool area from being flooded since if there is an overflow the water would flow into ventilation duct openings on top of the pool which lead to other levels in the reactor building. An incident occurred on 10/25/79 whereby an Equipment Attendant Trainee inadvertently opened a valve supplying condensate water to Unit 3 spent fuel pool. By the time the error was identified and the valve closed, the high level alarm was activated and the water had overflowed into the vent duct and spilled on all levels of the reactor building. Only very low contamination was involved and all contaminated areas were isolated.

Actions taken to preclude repetition of this licensee deviation include providing better lighting in the area of the valves which had been poorly lit; replacement of valve nameplates to assure proper and easy to read identification; and revision of on-the-job training instructions to Trainees to delineate appropriate conduct of their actions.

The Staff feels that this accident was of minor nature and could not result in serious consequences and that the licensees actions were appropriate. Therefore no further actions are deemed necessary.

SEYMOUR BLOCK

PROFESSIONAL QUALIFICATIONS

RADIOLOGICAL ASSESSMENT BRANCH

DIVISION OF SYSTEMS INTEGRATION

I am employed as a member of the staff of the Radiological Assessment Branch, Division of Systems Integration, U.S. Nuclear Regulatory Commission, Washington, D.C. My duties include the determination and evaluation of the design and operation of operating nuclear power plants as well as review of Safety Analysis Reports of applicants for construction permits and operating licenses of nuclear power plants with respect to safety and environmental impact considerations including matters related to Health Physics Radiation Protection Programs.

I first became associated with the atomic energy program in 1944 when I was trained and educated as a Health Physicist at Clinton Laboratories in Oak Ridge, Tennessee, during the Manhattan Engineering Project. I later joined the Brookhaven National Laboratories as a Health Physicist responsible for radiological safety of Chemistry and Reactor operations. In 1953 I transferred to the University of California Radiation Laboratory and set up a small Health Physics program at the Livermore site. When the Livermore Hazards Control Department was formed in 1959, I was made Section Leader of the Special Projects Research and Development Group. For twelve years I engaged in Research and Development in Radiological Instrumentation and Applied Health Physics.

I am a Certified Health Physicist and former Treasurer of the Health Physics Society. I am Past President of the Northern California Chapter of the HPS and a former consultant to Physics International Corporation in San Leandro, California.

From 1938 - 1941 I attended City College in New York. I was inducted into the Army Air Force in 1942 and attended the University of Pennsylvania, Moore School of Electrical Engineering from 1943 - 1944.

I have published numerous articles in technical journals on instrumentation development and radiation dosimetry. I am a member of the Health Physics Society.