UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of	)	
	)	Docket Nos. 50-254
COMMONWEALTH EDISON COMPANY	)	50-265
	)	(Spent Fuel Pool Modifications)
(Quad Cities Station, Units 1 and 2)	)	

TESTIMONY OF SEYMOUR BLOCK ON CONTENTION 3.b

I, Seymour Block, do state as follows:

I am employed by the United States Nuclear Regulatory Commission, as a Senior Health Physicist in the Division of Systems Integration, Radiological Assessment Branch.

This testimony addresses Contention 3.b concerning the matter of spent fuel pool instrumentation, which is stated as follows:

3. "Intervenors contend that the increased amounts of irradiated fuel in the proposed spent fuel pools will increase radiological releases from the pools and occupational exposures in the pool's area. In light of this, the present radiation monitoring system is inadequate to provide a reasonable assurance of public health and safety. Specifically, reanalysis of the present system should be required, and should consider:

   b. increasing the range, sensitivity and number of area monitors, including GM monitors, and monitors of the pool water itself.

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Response:

(3)(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 spent fuel pool capacity. The spent fuel assemblies themselves contribute a negligible dose rate to the pool area because of the depth of water shielding in 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 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. Thus, the increase in the number of fuel elements in the pool due to 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, ^{134}Cs, ^{137}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 provide 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, 6 remote area monitors (RAMS) have been installed as follows: two are on the west wall adjacent to the pool in a general occupied area; one monitors Unit 1 pool while the other monitors Unit 2 pool. They have a sensitivity range of 0.01 to 100 mr/hr and are in a background expected to be 1 mr/hr. The alarm set-point for these monitors is 5 mr/hr and they have local and control room read-out and alarm. Two additional monitors are at the same location as the previous two, but have sensitivity ranges of from 10 to 10^6 mr/hr and an alarm set point of 100 mr/hr. They serve as monitors for Unit 1 and Unit 2 pools that will initiate the standby gas treatment system and isolate the Reactor Building Ventilation System in case of abnormal releases. These monitors have control room read-out and alarm. The fifth RAMS is on the fuel loading crane and will always be at location of crane work. It has a range of from 0.1 to 1000 mr/hr, and local read-out and alarm at 15 mr/hr. The last RAMS is located at the east wall and is adjacent to the equipment hatch. It has a range of 0.01 to 100 mr/hr and set to alarm at 15 mr/hr. It also has control room read-out and alarm. The dose rate ranges and set points described above will not be affected as a result of the modification.

Besides the RAMS systems in the spent fuel pool area, continuous airborne radioactivity monitors (CAMS) are available which can be used to monitor any airborne radioactivity that may be generated in the SFP area. These monitoring systems use scintillation detectors and GM detectors to monitor for iodine and particulates respectively. Their sensitivity ranges from 10 to 10^6 counts per minute and a variable set point alarm is available so that the alarm set point can be determined based on the background in the area to be monitored. The count rate is continuously recorded on chart paper.

There are no radiation monitors which continuously and directly monitor the spent fuel pool water. Direct pool water monitors are not needed, although they can be acceptably sensitive devices for monitoring spent fuel pool water under certain conditions (e.g. on-line monitoring of water upstream of clean-up system pipe lines). However, the existing area radiation monitors, airborne radioactivity monitors and portable survey meters are adequate to detect any changes in background radiation levels around the spent fuel pool that could result in significant occupational exposure. Thereby, spent fuel pool water monitors are not necessary for maintaining occupational exposure ALARA.

Experience has also 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 performed in the Quad-City spent fuel pool is adequate to detect normal and abnormal releases of radioactive materials from the increased number of spent fuel bundles.

The above statements and opinions are true and correct to the best of my personal knowledge and belief.

Seymour Block

Seymour Block, Senior Health Physicist
Radiation Protection Section
Radiological Assessment Branch
Division of Systems Integration, NRR

Subscribed and sworn to before me
this 25th day of November 1981.

Judy L. Butts, Notary Public
My Commission Expires: 7-1-1982