VIRGINIA ELECTRIC AND POWER COMPANY
RICHMOND, VIRGINIA 23261

W. L. STEWART
VICE PRESIDENT
NUCLEAR OPERATIONS

June 16, 1983

Mr. Harold R. Denton, Director
Office of Nuclear Reactor Regulation
Attn: Mr. Robert A. Clark, Chief
Operating Reactors Branch No. 3
Division of Licensing
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Serial No.: 450B
PSE&C/HSM:jdm:0518C

Docket Nos.: 50-338
50-339
License Nos.: NPF-4
NPF-7

Gentlemen:

ADDITIONAL INFORMATION
PROPOSED OPERATING LICENSE AMENDMENTS NPF-4 and NPF-7
NORTH ANNA POWER STATION UNIT NOS. 1 AND 2

In our letter of August 20, 1982, Serial No. 450, Vepco requested an amendment to Operating Licenses NPF-4 and NPF-7 to allow the installation and use of neutron absorber spent fuel storage racks in the North Anna 1 and 2 spent fuel pool. In support of this request, we forwarded the report, "A Summary of Information in Support of Increasing the Spent Fuel Storage Capacity at North Anna Unit Nos. 1 and 2".

In response to a request for additional information by a member of your staff, we are providing additional information on the enclosed pages on the ALARA aspects of the Neutron Absorber Spent Fuel Racks.

If you require further information on this matter, we would be pleased to meet with your staff at their convenience.

Very truly yours,

W. L. Stewart

cc: Mr. James P. O'Reilly
Regional Administrator
Region II
U.S. Nuclear Regulatory Commission
Atlanta, Georgia 30303

Mr. M. B. Shymlock
NRC Resident Inspector
North Anna Power Station

Mr. Charlie Price
Department of Health
109 Governor Street
Richmond, Virginia 23219

A001
1/1

1. For each of the following operations - high density rack removal, decontamination and disposal, and neutron absorber rack installation, provide a table of the following information.

   a. Number of workers required for each phase of the operation including divers, if necessary.
   b. Dose rates working in the pool.
   c. Occupancy times for each dose rate.
   d. Total person rems to complete the operation.

Vepco is still in the process of planning the procedures to be used for the removal/disposal of the high density racks so the numbers of workers, etc. has not been finalized. We do, however, plan to use divers to assist in the proper placement of the fuel racks in the pool.

For the purpose of estimating personnel exposure for this work, a comparison may be made to the spent fuel rack change out that was performed at Surry Power Station in 1978. This is a valid comparison for the following reasons. The Surry and North Anna fuel pools are very similar in design with the exception of a wall at North Anna between the fuel storage area and the cask laydown area. There will be approximately the same amount of spent fuel stored in the fuel pool at North Anna as there was in the Surry pool at the time of the fuel rack modification. The radiation levels in the two fuel pool areas are similar as was described in Section 5 of Vepco's license application. At North Anna, the number of fuel rack modules to be handled will be smaller than the number of modules handled at Surry. And finally, divers were also used for the fuel rack modifications at Surry.

At Surry, a total of 13 manrem was expended. The breakdown of this exposure was 3.0 manrem for contractor personnel (this included the divers and personnel cutting up the old fuel racks for disposal) and 10.0 manrem for Vepco personnel who performed the rack installation and necessary fuel movements.

This amount of personnel exposure is also comparable to exposure experienced at other nuclear facilities in performing replacement of fuel racks. Some examples are Connecticut Yankee 20 manrem and Ginna 18 manrem.

2. For each operation described in question 1 above, describe the ALARA measures to ensure that personal exposure will be kept ALARA since there will be approximately 357 spent fuel assemblies in the pool during these operations. Describe what measures you have taken to minimize the dose from these fuel assemblies to divers working in the spent fuel pool.

As part of Vepco's commitment to maintain personal exposures ALARA there are a number of things that will be done both in the planning and the performance of the replacement of the fuel racks at North Anna.

During the preparation of the engineering and installation procedures, reviews will be performed to ensure that ALARA principles have been incorporated into the steps of the installation procedures. Vepco engineering has written procedures and guidelines for the performance of these reviews.

The fuel rack replacement will involve the following operations:

1. Movement of Spent Fuel
2. Removal and disposal of the old spent fuel racks
3. Installation of the new neutron absorber spent fuel racks

The following ALARA measures will be utilized in the fuel rack replacement operations:

Movement of Spent Fuel

The personnel at North Anna who are responsible for fuel movements and spent fuel storage have been aware of the plans to replace the spent fuel storage racks for some time. For this reason, an effort has been made to concentrate the storage of spent fuel into the northeast corner of the spent fuel pool. This will allow the fuel rack removal process to begin without having to first make movement of spent fuel which will minimize personnel exposure to the personnel responsible for fuel movements.

Removal and Disposal of the Old Spent Fuel Racks

During the removal of the spent fuel racks care will be taken to remove as much loose contamination as possible. This will be done by means such as hydrolasing the racks prior to removing them from the pool and washing of the fuel racks with demineralized water.

During the disposal of the fuel racks, measures described in the answer to question 3 will be taken to ensure that exposures are maintained ALARA.

Installation of the New Neutron absorber Fuel Racks

The installation of the new spent fuel racks will consist of the placement of interface plates on the floor of the spent fuel pool and placing the fuel racks on the floor of the pool. The interface plates are only used where it is necessary to bridge over weld seams and leak chase channels in the fuel pool liner. The role of the divers used in the installation of the fuel racks will be to precisely place the interface plates and to visually confirm the proper placement of the fuel racks on the fuel pool floor and the interface plates.

In order to minimize the exposure to the divers, measures similar to these used in the fuel rack replacement at Surry will be used. After the old fuel racks are removed, the floor of the pool will be vacuumed if required to minimize the amount of contamination which would possibly be stirred up by the divers and the installation process. Also, Health Physics personnel will perform surveys of the areas in which divers will work. Also, it is standard practice with the type of diving equipment used to be in constant voice communication with the diver in the pool. Health Physics personnel will also monitor the divers location in the pool to ensure that the diver stays within the prescribed work area based on survey data.

3. Describe the procedure for decontamination and/or cutting up the High Density Spent Fuel Racks for disposal. Compare the person rems that will be incurred using the chosen method of disposal as compared with shipping the racks intact. Show that the method chosen is cost effective with respect to ALARA exposure criteria and adequacy of burial space.

At this time, Vepco has not chosen the exact method by which the present spent fuel racks will be disposed of. The methodologies currently under consideration are as follows:

1. Decontamination of th fuel racks
2. Cutting up spent fuel racks for offsite disposal

This actual choice of the methodologies to be used in the disposal of the racks will be made based on competitive bidding of the disposal operations with the evaluation of bids being based on the following criteria:

1. ALARA personnel exposure
2. Minimization of waste volume
3. Cost effectiveness

Based on Vepco's previous experience with the disposal of contaminated spent fuel storage racks we do not anticipate the exposure levels to be very large.

At Surry, as each rack was removed, it was hydrolased underwater to remove as much contamination as possible. After it was lifted out of the water, it was washed down with demineralized water to remove the remaining loose contamination. This resulted in the rack for the most part having dose readings of less than 30mR/hr with very localized spots having levels greater than 100 mR/hr (crevices and crud traps). The racks at Surry had been in use for approximately 5 years prior to their removal.

There is no reason to believe that the North Anna High Density Storage Racks which will be removed will have higher contamination levels as they have only been in use for four years.