PECO ENERGY

PECO Energy Company
Nuclear Group Headquarters
965 Chesterbrook Boulevard
Wayne, PA 19087-5691

October 21, 1994

Docket Nos. 50-352
50-353
License Nos. NPF-39
NPF-85

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555

SUBJECT: Limerick Generating Station, Units 1 and 2
Technical Specifications Change Request No. 93-19-0
Response to Requests for Additional Information

Gentlemen:

By letter dated January 14, 1994, PECO Energy Company submitted Limerick Generating Station (LGS), Unit 1 and Unit 2, Technical Specifications (TS) Change Request No. 93-19-0 to increase the storage capacity of the spent fuel pools.

By telecon with the NRC's Limerick Project Manager on September 6, 1994, the NRC requested additional information involving installation of storage platforms above the fuel storage racks, in support of TS Change Request No. 93-19-0. This information is provided in Attachment 1.

At a September 28, 1994 meeting with the NRC's Limerick Project Manager, the NRC requested additional radiological information in support of TS Change Request No. 93-19-0. This information is provided in Attachment 2.

The additional information is being submitted under affirmation, and the associated affidavit is enclosed.

If you have any questions, please do not hesitate to contact us.

Very truly yours,

G. A. Hunger Jr.

G. A. Hunger, Jr.,
Director - Licensing

Attachments

Enclosure

cc: T. T. Martin, Administrator, Region I, USNRC (w/ attachments and enclosure)
N. S. Perry, USNRC Senior Resident Inspector, LGS (w/attachments and enclosure)
R. R. Janati, PA Bureau of Radiological Protection (w/attachments and enclosure)

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COMMONWEALTH OF PENNSYLVANIA :

: ss.

COUNTY OF CHESTER :

W. H. Smith, III, being first duly sworn, deposes and says: That he is Vice President of PECO Energy Company, the Applicant herein; that he has read the enclosed Requests for Additional Information supporting Technical Specifications Change Request No. 93-19-0 "Increased Spent Fuel Pool Storage Capacity," for Limerick Generating Station, Unit 1 and Unit 2, Facility Operating License Nos. NPF-39 and NPF-85, and knows the contents thereof; and that the statements and matters set forth therein are true and correct to the best of his knowledge, information and belief.

Vice President

Subscribed and sworn to
before me this 20th day
of OCTOBER 1994.

Notary Public

Notarial Seal
Wayne H. Shych, Notary Public
Tredyffrin Twp., Chester County
My Commission Expires May 13, 1996
Member, Pennsylvania Association of Notaries

ATTACHMENTS 1 AND 2

LIMERICK GENERATING STATION
UNIT 1 AND UNIT 2

DOCKET NOs.
50-352
50-353

LICENSE NOs.
NPF-39
NPF-85

TECHNICAL SPECIFICATIONS CHANGE REQUEST
NO. 93-19-0

REQUESTS FOR ADDITIONAL INFORMATION

"Increased Spent Fuel Pool Storage Capacity"

Additional Information Supporting Change - 6 pages

By telecon on September 6, 1994, the NRC requested additional information involving installation of storage platforms above the fuel storage racks, in support of TS Change Request No. 93-19-0. The response to this request for additional information follows.

The licensee has proposed installing "storage platforms" above the fuel storage racks if they are installed. The weight of each of the platforms is apparently about 2,000 lbs.

(1) What controls will be exercised to limit the types, amounts and dimensions of materials to be stored on each of these platforms?

Response:

This item was addressed in PECO Energy Company's letter to the U.S. Nuclear Regulatory Commission (NRC) dated September 1, 1994. This letter provided responses to open items resulting from the NRC Structural Audit of the Spent Fuel Pool Rerack Modification 6118, on August 3rd and 4th of this year. This item was addressed as part of the response to Question 4 in the subject letter.

(2) During normal plant operations, what affect will the stored materials have on the radiation levels in the vicinity of the pool, especially on the fuel handling bridge?

Response:

At this time, this item has not been fully addressed since PECO Energy has not purchased the storage platforms. However, review of the preliminary list of items to be stored on the platform, (which were supplied to the NRC as part of the letter identified in the response to question 1 above), reveals that all items are presently stored in the pool. Therefore, radiation levels should be similar to those currently occurring in the spent fuel pool. In the future, if PECO Energy purchases the storage platform, this item would be reviewed in further detail as part of the design process.

(3) What is the most serious abnormal occurrence that could occur (e.g., pool drain-down) involving the storage platforms and stored materials and what affect (projected dose rates in and around the pool, projected worker doses) would the stored material have on recovery operations?

Response:

The most serious abnormal occurrence is the same as that which is documented in the Licensing Report for SPENT FUEL POOL STORAGE CAPACITY EXPANSION, Modification 6118 - SFP Rerack, for Limerick Generating Station. The storage platform is designed such that it will not provide any adverse affects to the spent fuel or spent fuel racks. At this time PECO Energy has not decided to purchase the storage platform.

(4) What is the configuration of each storage platform?

Response:

This item was addressed in PECO Energy Company's letter to the U.S. Nuclear Regulatory Commission (NRC) dated September 1, 1994. This letter provided responses to open items resulting from the NRC Structural Audit of the Spent Fuel Pool Rerack Modification 6118, on August 3rd and 4th of this year. This item was addressed as part of the response to

Questions 2 and 3 in the subject letter.

(5) Has the affect of the platforms on fuel cooling been analyzed?

Response:

Yes. The affect on fuel cooling has been evaluated and is bounded by analysis which is documented in the Licensing Report for SPENT FUEL POOL STORAGE CAPACITY EXPANSION, Modification 6118 - SFP Rerack, for Limerick Generating Station. Table 5.8.3 of this report reveals the results of the thermal-hydraulic analysis for zero percent (0%) and fifty-percent (50%) cell blockage. This analysis bounds the use of the storage platform, because the placement and configuration of the platform is designed to minimize its affects on the stored fuel. The storage platform does not cause a detrimental restriction of flow to the spent fuel in the racks.

(6) Have the platforms been considered in other accident analyses; e.g., seismic events?

Response:

Yes. This item was addressed in PECO Energy Company's letter to the U.S. Nuclear Regulatory Commission (NRC) dated September 1, 1994. This letter provided responses to open items resulting from the NRC Structural Audit of the Spent Fuel Pool Rerack Modification 6118, on August 3rd and 4th of this year. This item was addressed as part of the response to Questions 2 and 3 in the subject letter.

(7) What will be stored over the pool?

Response:

This item was addressed in PECO Energy Company's letter to the U.S. Nuclear Regulatory Commission (NRC) dated September 1, 1994. This letter provided responses to open items resulting from the NRC Structural Audit of the Spent Fuel Pool Rerack Modification 6118, on August 3rd and 4th of this year. This item was addressed as part of the response to Question 4 in the subject letter.

On Wednesday, September 28, 1994, at a meeting between the NRC's Limerick Project Manager and PECO Energy Licensing Representative held at the NRC's Headquarters in Rockville, Maryland, the NRC requested additional information in support of TS Change Request No. 93-19-0 "Increased Spent Fuel Pool Storage Capacity." The response to this request for additional information follows.

(1) All licensees should address IE No. 87-13, "Potential for High Radiation Fields Following Loss of Water from Fuel Pool." The IE notice is to alert the licensee to the potential for high radiation fields following the inadvertent loss of water from the spent fuel pool or transfer canal.

Response:

At Limerick Generating Station, there are procedures in place to provide specific actions in response to a loss of fuel pool inventory.

Limerick does not store irradiated control rod blades above the refuel transfer canal elevation. Items which do hang above this elevation can readily be lowered below the transfer canal elevation.

(2) The generic environmental effects of uranium fuel cycle and the environmental impact of transportation of the fuel and waste to and from a reactor site are provided in tables S-3 and S-4 of 10 CFR51.51 and 51.52. The tables currently limit batch-average fuel burnup levels to 33 GWD/MTU and fuel enrichment to 4 weight percent (w/o) U-235. However, the environmental effects of extended burnup and higher enrichments have been addressed by the NRC. Since the licensee is proposing an extended burnup and higher fuel enrichment the licensee should address the significant effects or adverse effects of the 4.9 wt% initial enrichment burned to 40,000 MWD/MTU. What will be the maximum rod-average burnup level? Please note that the present batch-average burnup levels of 33 GWD/MTU to 50 GWD/MTU or above, as long as the maximum rod-average burnup level of any fuel rod is not greater than 60 MWD/MTU.

Response:

Maximum rod-average burnup level of any fuel rod will not exceed 60 MWD/MTU.

(3) Provide a description of anticipated personnel exposures during the reracking including data on representative concentrations of radionuclides in the Unit 1 and Unit 2 Spent Fuel Pool water.

Response:

Personnel Exposures

During normal operations, personnel working on the fuel floor are exposed to radiation from the spent fuel pool. Operating experience has shown that the area radiation dose rates, which originate primarily from radionuclides in the pool water, are generally <2 to 10mRem/hr.

Radiation levels in zones surrounding the pool are not expected to be affected significantly. Existing shielding around the pool (water and concrete) provide more than adequate protection, despite the slightly closer approach of the new racks to the walls of the pool.

All fuel will be removed from the Unit 2 spent fuel pool prior to divers entering the fuel pool. When reracking the Unit 1 spent fuel pool, fuel may be stored in the pool. All appropriate precautions will be taken to ensure the divers do not approach the racks which contain spent fuel. Diving activities will be governed by a procedure which incorporates the requirements of Regulatory Guide 8.38.

Representative concentrations of radionuclides in the pool water are shown in the attached table. During fuel reload operations, the concentrations might be expected to increase due to crud deposits spalling from spent fuel assemblies and to activities carried into the pool from the primary system. Experience to date has not indicated a major increase as a consequence of refueling.

Operating experience has also shown that there have been negligible concentrations of airborne radioactivity and no increases are expected as a result of the expanded storage capacity. Area monitors for airborne activities are in constant use in the immediate vicinity of the spent fuel pool.

No increase in radiation exposure to operating personnel is expected; therefore, neither the current health physics program nor the area monitoring system needs to be modified.

Anticipated Exposure During Reracking

All of the operations involved in reracking will utilize detailed procedures prepared with full consideration of ALARA principles. Similar operations have been performed in a number of facilities in the past, and there is every reason to believe that reracking can be safely and efficiently accomplished at Limerick Generating Station, with minimum radiation exposure to personnel.

Total occupational exposure for the reracking operation is estimated to be between 4 and 6 person-Rem per fuel pool. The elements of this estimate are shown in the attached table. Divers will be used, and the estimated person-Rem burden includes a figure for their possible exposure.

The existing radiation protection program at Limerick is adequate for the reracking operations. Where there is a potential for any airborne activity, continuous air samplers will be in operation. Personnel will wear protective clothing and, if necessary, respiratory protective equipment. Diving activities will be governed by a procedure which incorporates the requirements of Regulatory Guide 8.38.

Work, personnel traffic, and the movement of equipment will be monitored and controlled to minimize contamination and to assure that exposures are maintained ALARA.

In reracking, the storage racks designated for disposal will be removed, then washed down in preparation for packaging and shipment. Shipping containers and procedures will conform to Federal DOT regulations and to the requirements of any state through which the shipment may pass, as set forth by the State DOT office.

Representative Concentrations of Radiolonuclides
In the Unit 1 Spent Fuel Pool Water

Nuclide	Concentration uCi/ml
Mn-54	9×10^{-6}
Co-60	3×10^{-5}
Zn-65	5×10^{-5}
Cs-134	3×10^{-6}
Cs-137	2×10^{-5}

Representative Concentrations of Radiolonuclides
In the Unit 2 Spent Fuel Pool Water

Nuclide	Concentration uCi/ml
Mn-54	7×10^{-6}
Co-58	5×10^{-7}
Co-60	2×10^{-5}
Zn-65	3×10^{-5}
Cs-134	4×10^{-6}
Cs-137	2×10^{-5}
Sb-125	4×10^{-7}

Preliminary Estimate Of Person-Rem Exposure
During Reracking Per Unit

Step	Number of Personnel	Hours	Estimated Person-Rem Exposure
Move Fuel to Unaffected Unit	2	400	0.6 - 0.9
Remove Old Racks	6	600	1.0 - 1.5
Ship Racks for Disposal	6	700	0.5 - 0.9
Remove Underwater Appurtenances	4	600	0.75 - 1.0
Clean & Vacuum pool	4	60	0.3 - .75
Install New Racks	6	400	0.85 - 0.95
Total Person-Rem Exposure			4.0 - 6.0