50-322

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555

April 6, 1993

Mr. Marvin I. Lewis
7801 Roosevelt Boulevard, Suite 62
Philadelphia, Pennsylvania 19152

Dear Mr. Lewis:

I am responding to your letter of March 8, 1993, to the Chairman, U.S. Nuclear Regulatory Commission (NRC), in which you expressed concern about the proposed transfer of slightly irradiated fuel from the Shoreham Nuclear Power Station (SNPS) to the Limerick Generating Station (LGS), Units 1 and 2. The issues you raised included concerns for transportation and handling of the fuel, emergency planning, fuel compatibility, and regulatory oversight of the proposed transfer. Your concerns are addressed below.

In a letter of March 8, 1993, the Philadelphia Electric Company (PECo) applied for an amendment to the operating license for the LGS, Units 1 and 2, which would allow PECo to receive the slightly irradiated fuel assemblies, specifically, from Shoreham. The application, a copy of which is included as Enclosure 1, is currently under review by the NRC staff. As part of its review, the NRC staff will write a safety evaluation pertaining to the proposed license amendment. Safety evaluations are required and written for all amendments to reactor operating licenses. In this way, the NRC evaluates the safety aspects of changes to the operation of the facility for situations that were not present or could not be anticipated at the time the original Safety Evaluation Report (SER) was written that supported plant licensing.

The design of the shipping cask to be used to transport the fuel was reviewed by the NRC, and the staff issued a Certificate of Compliance which confirmed that the package met the regulations of 10 CFR Part 71 for shipment of licensed radioactive material. PECo has noted in its application that the design of the cask fuel basket will need to be modified slightly to accommodate the Shoreham fuel. The NRC must review and approve those design modifications prior to transport.

The environmental impact of the transport of radioactive materials, including spent fuel, has been reviewed by the NRC and is summarized in Table S-4 in 10 CFR 51.52 (Enclosure 2). The Shoreham fuel falls within the guidelines of that environmental review. In addition, the shipment of irradiated fuel is not considered a novel or unique maneuver. Since 1979, more than 1200 individual shipments of irradiated fuel have been conducted. The NRC has published data concerning spent fuel shipments conducted between 1979 and the present which is available in NUREG-0725. I have included an overview of the regulations and agency interactions concerning the transportation of nuclear fuel and waste (Enclosure 3).

Although emergency planning efforts for transportation accidents involving radioactive material are led by State and local officials, the NRC, as a matter of policy, is available to provide assistance in the event of a transportation accident. The NRC actions, which were published in the FEDERAL REGISTER on March 29, 1984, include providing technical assistance, notifying State and Federal agencies, and making recommendations to emergency response personnel. Additional information on the NRC's role in emergency planning for transportation accidents is included in Enclosure 3.

With regard to your concerns on fuel bundle compatibility, the proposed transfer will include 560 General Electric GE6 (P8x8R) fuel assemblies. The enrichments that you inquired about in your Appendix vary: 340 assemblies have a 2.19 weight percent (w/o) U-235 enrichment, 144 assemblies are 1.76 w/o U-235, and 76 assemblies are natural uranium (0.711 w/o U-235). The GE6 assemblies are mechanically compatible with the Limerick reactor core structure; no reworking or refitting will be required. PECo is required to perform a safety evaluation to confirm that the thermal-hydraulic and nuclear physics aspects of the fuel assemblies are compatible with existing Limerick fuel assemblies. Finally, no control rods or drives are being transferred. The Shoreham fuel assemblies are compatible with existing Limerick control rods and drives.

In your second concern, you raised the issue of fuel handling from the transportation vehicle into the reactor. The Shoreham fuel will be transported to the Limerick site in the shipping casks described above. Once on site, the casks will be lifted into the refueling area by the reactor enclosure crane and placed in the shipping cask pool. From there, the fuel will be lifted out of the shipping cask under water and moved, via a connecting canal into the spent fuel pool. The Shoreham fuel will be stored in the spent fuel pool for future use in the reactor. The NRC staff reviewed the fuel handling capability at LGS in the licensing SER and is re-reviewing the fuel handling issue as part of the safety evaluation of the March 8, 1993, license amendment request.

Finally, with regard to fuel storage, PECo is required to analyze all fuel that is stored in the spent fuel pool to ensure inadvertent criticality does not occur. The conclusions of PECo's analysis of the storage of the Shoreham fuel, presented in the March 8, 1993, license amendment application, will be reviewed by the NRC staff.

I trust this reply responds to your concerns. As I described above, the NRC is reviewing many aspects of the proposed transfer of fuel from Shoreham to Limerick. The review, which is being conducted in a deliberate and comprehensive manner, is in support of our mission to ensure the health and safety of the public.

Sincerely, Original Signed by
Thomas E. Murley
Thomas E. Murley, Director
Office of Nuclear Reactor Regulation

Enclosures:
1. Application for Operating License Change Request
2. Table S-4 in 10 CFR 51.52
3. Overview - Transportation of Nuclear Fuel and Waste

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955-65 CHESTERBROOK BLVD.

WAYNE, PA 19087-5691

(215) 640-6000

NUCLEAR SERVICES DEPARTMENT

March 8, 1993

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
Operating License Change Request 93-03-0

Gentlemen:

Philadelphia Electric Company (PECo) requests a change to Operating License Nos. NPF-39 and NPF-85 for Limerick Generating Station, (LGS) Unit 1 and Unit 2, respectively. The proposed change revises paragraph 2.B.(5) to allow LGS, Unit 1 and Unit 2, to receive and possess, but not separate, such source, byproduct, and special nuclear materials as contained in the fuel assemblies and fuel channels from the Shoreham Nuclear Power Station (SNPS).

PECo requests this change to authorize it, as the licensee for LGS, Unit 1 and Unit 2, to receive and possess the slightly irradiated SNPS fuel. SNPS never commenced commercial operation and is currently being decommissioned. Our objective is to obtain the enriched SNPS fuel for eventual use in the LGS Unit 1 and Unit 2 reactors.

Attachment 1 contains information supporting a finding that the proposed change does not involve a Significant Hazards Consideration and information supporting an Environmental Assessment. Attachment 1 also contains a description of the SNPS fuel, an assessment of its general suitability for future use at LGS, and the protective packaging and shipping methods that will be used if this proposed change is approved. Attachment 2 contains the Operating License pages showing the proposed change.

ENCLOSURE 1

We request the NRC's prompt attention to this matter due to schedular considerations related to the movement of the fuel from the SNPS site to the LGS site, and the refueling schedules for LGS Unit 1 and Unit 2. If approved, we request that the amendments be made effective by June 1, 1993.

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

Very truly yours,

G. A. Hunger, Jr.

G. A. Hunger, Director
Licensing Section

Attachments

cc: T. T. Martin, Administrator, Region I, USNRC w/attachments
T. J. Kenny, USNRC Senior Resident Inspector, LGS w/attachments
W. P. Dornsife, Director, PA Bureau of Radiological Protection, w/attachments

COMMONWEALTH OF PENNSYLVANIA :
: ss.
COUNTY OF CHESTER :

G. R. Rainey, being first duly sworn, deposes and says:

That he is Vice President of Philadelphia Electric Company, the Applicant herein; that he has read the foregoing Application for Amendment of Facility Operating License Nos. NPF-39 and NPF-85 (Operating License Change Request No. 93-03-0) to allow Limerick Generating Station to receive and possess fuel assemblies and fuel channels from the Shoreham Nuclear Power Station, 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.

G R Rainey
Vice President

Subscribed and sworn to
before me this 8th day
of March 1993.

Notarial Seal
Erica A. Santori, Notary Public
Tredyffrin Twp., Chester County
My Commission Expires July 10, 1995

ATTACHMENT 1

LIMERICK GENERATING STATION
Units 1 and 2

Docket Nos. 50-352
50-353

License Nos. NPF-39
NPF-85

OPERATING LICENSE CHANGE REQUEST

"Allow Receipt and Storage of
Fuel Assemblies and Fuel Channels from
Shoreham Nuclear Power Station"

Supporting Information for Changes - 14 pages

Philadelphia Electric Company (PECo), licensee under Facility Operating License Nos. NPF-39 and NPF-85 for Limerick Generating Station (LGS), Unit 1 and Unit 2, requests that these licenses be amended as proposed herein to allow LGS to receive and possess, but not separate, such source, byproduct, and special nuclear materials as contained in the fuel assemblies and fuel channels from the Shoreham Nuclear Power Station (SNPS).

This Operating License Change Request for LGS, Unit 1 and Unit 2, provides a discussion and description of the proposed change, a safety assessment, information supporting a finding of No Significant Hazards Consideration, and information supporting an Environmental Assessment.

We request that, if approved, the change to the Operating Licenses for LGS, Unit 1 and Unit 2, be effective by June 1, 1993.

Discussion and Description of the Proposed Change

Paragraph 2.B.(5) of Operating License Nos. NPF-39 and NPF-85 states that LGS is authorized:

> "Pursuant to the Act and 10 CFR Parts 30, 40 and 70, to possess, but not separate, such byproduct and special nuclear materials as may be produced by the operation of the facility."

The word "facility," as used in these licenses, refers to LGS, Unit 1 and Unit 2. This wording limits possession of any byproduct and special nuclear materials in fuel elements to that which is produced at LGS, Unit 1 and Unit 2.

The Long Island Power Authority (LIPA) is the holder of NRC Possession Only License (POL) No. NPF-82 for SNPS. SNPS never commenced commercial operation and is presently undergoing decommissioning while in a non-operating, defueled condition with all fuel (i.e., 560 fuel assemblies) stored in the spent fuel pool.

Approval of the following proposed change to paragraph 2.B.(5) of Operating License Nos. NPF-39 and NPF-85 will authorize receipt and possession of the slightly irradiated SNPS fuel assemblies and fuel channels at LGS, Unit 1 and Unit 2. Approval of the proposed change will result in the beneficial use of the SNPS fuel by its eventual use in the LGS Unit 1 and Unit 2 reactors. We expect to use only the enriched SNPS fuel in the LGS Unit 1 and Unit 2 reactor cores in the future. Also, approximately 76

of the SNPS fuel channels may be shipped to LGS and used to channel the natural uranium assemblies in the LGS spent fuel pools. The slightly irradiated SNPS zircaloy fuel channels will be shipped separately from the SNPS fuel as radioactive material in accordance with the requirements of 49 CFR 172 and 49 CFR 173. The SNPS fuel channels will not be used in the LGS reactors.

The proposed change to paragraph 2.B.(5) of Operating License Nos. NPF-39 and NPF-85 would authorize LGS:

> "Pursuant to the Act and 10 CFR Parts 30, 40 and 70, to possess, but not separate, such byproduct and special nuclear materials as may be produced by the operation of the facility, and to receive and possess, but not separate, such source, byproduct, and special nuclear materials as contained in the fuel assemblies and fuel channels from the Shoreham Nuclear Power Station."

Safety Assessment

The purpose of these proposed changes is to authorize PECo to receive and possess, but not separate, such source, byproduct, and special nuclear materials as contained in the 560 slightly irradiated fuel assemblies and fuel channels from the SNPS.

LIPA is the licensee for SNPS and would be responsible for the transportation of the fuel from SNPS to LGS. The following is a description of the SNPS fuel, an assessment of its general suitability for future use at LGS, and the packaging, shipping, handling and storage methods that will be employed to ensure that the enriched fuel can be safely handled and stored at LGS, Unit 1 and Unit 2, and to ensure that the enriched fuel remains suitable for future use.

A. Description of the SNPS Fuel

The SNPS fuel consists of 560 GE6 (P8x8R) pressurized, C-lattice, non-barrier fuel assemblies fabricated by the General Electric (GE) Company. Of the 560 SNPS fuel assemblies, 340 are enriched to 2.19 weight percent (w/o) U-235, 144 are enriched to 1.76 w/o U-235, and the remaining 76 are natural uranium (i.e., 0.711 w/o U-235). These fuel assemblies are similar to the LGS Unit 1 initial core described and evaluated in the LGS Final Safety Analysis Report (FSAR).

The SNPS fuel has been operated intermittently at low power (i.e., less than 5% of the SNPS full power rating of 2436

megawatts thermal) for testing purposes only. The fuel has been irradiated to a core average exposure of approximately 48 megawatt days per metric ton (MWD/MT). The SNPS fuel was removed from the reactor and placed in the SNPS spent fuel pool in August 1989. As of June 1992, the calculated decay heat rate for the entire core was 265 watts (i.e., 900 Btu/hr). The fission product inventory for the entire SNPS core is less than 0.02% of the source term assumed in the analysis of the design basis loss of coolant accident described in the LGS Updated Final Safety Analysis Report (UFSAR).

A detailed inspection of two of the SNPS fuel assemblies was performed during August 1990. This inspection included eddy current testing of a number of individual fuel and water rods and a visual inspection of the whole fuel assembly. This inspection, performed by GE, determined that the SNPS fuel is in excellent condition and is suitable for future use.

An evaluation of the water chemistry history of both the SNPS reactor and spent fuel pool was performed to assess the impact on the fuel. This evaluation determined that while in the reactor or spent fuel pool at SNPS, the fuel was not exposed to an adverse environment that would preclude its future use.

B. Packaging and Shipping Criteria

The SNPS fuel will be transported in the IF-300 Series spent fuel cask. This cask is designed in accordance with all NRC and Department of Transportation (DOT) regulations governing the shipment of radioactive material of this type (i.e., 10 CFR 71 and 49 CFR 173). The cask is operational under NRC Certificate of Compliance 9001. The IF-300 Series spent fuel cask will be used with a 17 element (i.e., fuel assembly) basket designed to accommodate the shipment of slightly irradiated fuel that is intended for reuse. The holder of NRC Certificate of Compliance 9001 is requesting an amendment of the Certificate of Compliance to reflect the design of the basket and packaging.

Special packaging designed to protect the fuel from damage during shipment will be used inside the IF-300 cask basket. This packaging will consist of a special stainless steel shipment channel and plastic cluster separators. The plastic cluster separators will be inserted between the rods in each fuel assembly to support the rods while the fuel assembly is horizontal. The stainless steel channel will support and protect each fuel assembly and hold the plastic cluster separators in place.

The plastic cluster separators consist of ribbed polyethylene mounted to a polyethylene outer shell. The separators are made of the same material as the separators used during shipment of new fuel. The separators are inserted from opposite faces and each extends halfway across the assembly width. A total of 32 pairs of cluster seperators will be used per fuel assembly. A specially designed installation device will be used to push one cluster separator at a time into position while supporting and aligning the assembly. The separators will be inserted while the fuel is in the SNPS spent fuel pool.

After the cluster separators are inserted and the installation is inspected, the fuel assembly will be moved to the SNPS fuel prep machine and a stairless steel channel will be installed over the fuel assembly containing the cluster separators. The stainless steel shipment channel is similar to a normal zircaloy channel but has a larger inside dimension. The top of the stainless steel fuel channel will have corner clips similar to the normal zircaloy fuel channel. The top of the channel will be bolted to the fuel assembly upper tie plate to provide support to the tie plate. The bottom of the channel will slide over the existing fuel assembly finger springs and terminate below the finger springs in the machined area of the lower tie plate.

C. Handling of the Cask and Irradiated Fuel

Upon arrival at the LGS site, the IF-300 cask with the SNPS fuel assemblies will be lifted from the railcar by the reactor enclosure (RE) main hoist to the refueling floor through the equipment hatch. All cask handling and fuel handling activities are consistent with the methods described in LGS UFSAR Section 9.1.4.2.10, "Description of Fuel Transfer." The SNPS fuel is of the same mechanical design as originally described and evaluated in the LGS FSAR and is compatible with all existing LGS fuel handling equipment.

The RE main hoist is designed to handle loads with a maximum weight of 125 tons while maintaining a safety factor of five (5). The IF-300 cask weighs approximately 85 tons, including the basket, the 17 fuel assemblies, and the redundant cask lifting yoke. The RE main hoist is designed so that the failure of any single component does not result in a sudden displacement or dropping of the load. The single failure proof design of the RE main hoist is described in Section 9.1.5.4 of the LGS UFSAR and was reviewed and approved by the NRC in section 9.1.5 of NUREG-0991, Supplement 4, "Safety Evaluation Report Related to the Operation for Limerick Generation Station, Units 1 and 2," dated May, 1985. While handling the IF-300 cask, the requirements of

NUREG-0554, "Single Failure Proof Cranes for Nuclear Power Plants" and NUREG-0612, "Control of Heavy Loads at Nuclear Power Plants" will be met by the use of a single failure proof redundant yoke and by restricting the critical load of the RE main hoist to 110 tons.

Restricting the RE main hoist critical load to 110 tons and the use of single failure proof equipment satisfies the single failure criteria and precludes a cask drop due to a single failure. Therefore, as stated in UFSAR Section 15.7.5, an analysis of the spent fuel cask drop is not required. At no time will the cask be lifted or carried over spent fuel or the reactor cores.

D. Storage of Irradiated Fuel

New fuel and spent fuel are stored in the LGS spent fuel pool as described in the LGS UFSAR, Section 9.1.2, "Spent Fuel Storage." Spent fuel pool cooling capacity, storage capacity, and the effects of the SNPS fuel assembly packaging material on spent fuel pool criticality have been evaluated.

The contribution of the SNPS fuel to the spent fuel pool heat load is negligible. The spent fuel pool cooling system is designed to accommodate a heat load of 16.3×10^6 Btu/hr. The maximum heat rate of the spent fuel for a one-third core discharge during refueling is approximately 13×10^6 Btu/hr. As of June 1992, the full core calculated decay heat rate of the SNPS fuel was approximately 900 Btu/hr.

The capacity of each of the LGS spent fuel pools is 2,040 spaces. Currently, a total of 3,336 spaces have been installed in both pools and 1,692 spaces contain discharged fuel assemblies. Storage of the SNPS fuel in the LGS Unit 1 and Unit 2 spent fuel pools will not exceed the Technical Specification (TS) limit for the spent fuel pools and will not preclude full core discharge until approximately the end of 1996. Plans are currently being made to re-rack the spent fuel pools to increase capacity.

LGS UFSAR Section 9.1.2.3.1 describes the criticality analysis for the LGS spent fuel pool. This analysis assumed fuel assemblies with uniform 3.5 w/o enriched U-235. This analysis also assumed the presence of zircaloy channels which is a more reactive configuration than a fuel assembly stored without zircaloy channels. The worst case value of k_{eff} under these conditions was determined to be 0.933. The SNPS fuel has a significantly lower enrichment than the enrichment assumed in the LGS fuel pool criticality analysis. The highest average assembly

enrichment of the SNPS fuel is 2.19 w/o U-235 and the maximum planar enrichment is 2.33 w/o U-235. Therefore, the criticality analysis in UFSAR Section 9.1.2.3.1 bounds the storage of the SNPS fuel because of the much lower enrichment of the SNPS fuel compared to the enrichment assumed in the LGS fuel pool criticality analysis.

The SNPS fuel will arrive at LGS packaged with polyethylene spacers and a protective stainless steel channel. A criticality analysis performed by GE evaluated the effect of the polyethylene spacers and stainless steel channels on fuel pool criticality. The presence of the polyethylene spacers will increase the hydrogen concentration in the vicinity of the fuel and, therefore, neutron moderation. However, the lower enrichment of the SNPS fuel compared to the enrichment used in the UFSAR criticality analysis causes a much greater negative effect on reactivity than the positive reactivity resulting from the presence of the polyethylene spacers. Therefore, SNPS fuel containing the polyethylene spacers is bounded by the criticality analysis in LGS UFSAR 9.1.2.3.1. Furthermore, the stainless steel channels add negative reactivity and, in all cases, the presence of stainless steel channels lowers the spent fuel pool k_{eff}.

The GE analysis determined that storage of the SNPS fuel in the LGS spent fuel pool, including storage with or without the polyethylene spacers and/or stainless steel channels, will not result in a k_{eff} equal to or greater than the limit of 0.95 delineated in LGS TS Section 5.5.1.1.

E. General Suitability for Future Use

The acceptance criteria for the shipment of the SNPS fuel will be the same as applied to the shipment of new GE fuel, and is specified in GE topical report NEDE-23542 P, "Fuel Assembly Evaluation of Shipping and Handling Loads" dated March 1977. GE has determined that if the maximum acceleration and loading acceptance criteria for a fuel assembly are not exceeded during handling and shipping, the SNPS fuel will be maintained in a condition suitable for future use at LGS.

To ensure that the SNPS fuel assemblies arrive in a condition suitable for future use, a dummy test assembly will be inspected after being subjected to a shaker table test to simulate the loading and accelerations expected during shipment. During shipment, each cask will be instrumented to measure accelerations to determine compliance with the shipping criteria discussed above. Additionally, one or more fuel assemblies from the first

shipment will be disassembled and inspected before and after shipment. A procedure for this inspection process will be established. This inspection procedure may be repeated on selected fuel assemblies from subsequent shipments if determined necessary.

All the fuel assemblies shipped from SNPS to LGS will be visually inspected with optical equipment or closed circuit television before packaging to provide a record of the fuel assembly condition on film or video tape. After packaging, all fuel assemblies will be visually re-inspected to confirm all required plastic cluster separators are in place.

After arrival at LGS, all assemblies will be inspected to the same acceptance criteria used for the receipt inspection of new fuel. Any SNPS fuel assembly that does not meet the acceptance criteria established for these inspections will be excluded from future use in the LGS reactor cores unless it is repaired and meets appropriate acceptance criteria.

At the time the SNPS fuel is considered for use in either the LGS reactor cores, a cycle-specific core nuclear analysis will be performed. This analysis will be based on the latest NRC approved revision of GE licensing topical report NEDE-24011-P-A, "General Electric Standard Application for Reactor Fuel GESTAR II." The effect of the SNPS fuel on the thermal-hydraulic stability of the reactor core will also be evaluated in accordance with our commitments in response to NRC Generic Letter 88-07, Supplement 1, "Power Oscillations in Boiling Water Reactors (BWR)." These are the same evaluations that would be performed for all reactor reload core designs.

An evaluation was performed to determine if any changes are required to the cycle-specific core nuclear analysis to account for the prior operating history, handling, and transportation of the SNPS fuel. Each GESTAR II criterion and licensing bases was assessed to determine if any special evaluations will be required to utilize the SNPS fuel in the LGS reactor cores. The conclusion was that the SNPS fuel will meet all the licensing bases documented in the NEDE-24011-P-A. Therefore, no exceptions to GESTAR II will be needed when the SNPS fuel is analyzed for use in the LGS reactors.

Preliminary calculations were performed using the GENIE computer code, an NRC approved methodology, to evaluate the feasibility of using the SNPS fuel in the LGS reactor cores. The conclusion of these calculations was that the SNPS fuel can be used in the LGS reactor cores and will result in significant fuel cost savings. Reactor core designs using the SNPS fuel will limit the number of

SNPS fuel assemblies utilized each cycle and will use the SNPS assemblies only in low duty locations in the reactor core. Only the enriched fuel assemblies will be used in the LGS, Unit 1 and Unit 2, reactor cores.

Information Supporting a Finding of
No Significant Hazards Consideration

We have concluded that the proposed change that authorizes PECo to receive and possess the slightly irradiated SNPS fuel assemblies and fuel channels at LGS, Unit 1 and Unit 2, does not involve a Significant Hazards Consideration. In support of this determination, an evaluation of each of the three standards set forth in 10 CFR 50.92 is provided below.

1) The proposed change does not involve a significant increase in the probability or consequences of an accident previously evaluated.

As explained below, the receipt and storage of the SNPS fuel and fuel channels at LGS, Unit 1 and Unit 2, will not increase the probability of occurrence of any accident previously evaluated in the LGS UFSAR.

The SNPS fuel is similar to fuel previously received, stored, and used at LGS, and the SNPS fuel is the same mechanical design as originally evaluated for Unit 1 in the FSAR. Handling of the SNPS fuel will not differ significantly from the fuel handling procedures described in LGS UFSAR Section 9.1.4, "Fuel Handling System." The impact on the LGS spent fuel pool criticality is bounded by the fuel pool criticality analysis in LGS UFSAR Section 9.1.2.3.1. Furthermore, the impact of the SNPS fuel decay heat on the LGS spent fuel pool cooling capacity is negligible. The radiological consequences of a dropped fuel assembly involving the slightly irradiated Shoreham fuel are bounded by the fuel handling accident involving highly irradiated spent fuel described in LGS UFSAR Section 15.7.4 "Fuel Handling Accident." The physical consequences of a dropped fuel assembly (i.e., on fuel assemblies and structures) are within the scope of LGS UFSAR Section 9.1.2.3.2.3, "Dropped Fuel Bundle Analyses." Restricting the RE main hoist critical load to 110 tons and the use of single failure proof equipment precludes a cask drop due to single failure. Therefore, as stated in LGS UFSAR Section

15.7.5, an analysis of the spent fuel cask drop is not required.

At the time the SNPS fuel is considered for use in either of the LGS reactor cores, a cycle-specific core nuclear analysis will be performed, and will include the effect on the thermal-hydraulic stability in accordance with NRC Generic Letter 88-07, Supplement 1. The SNPS fuel will be used only if the results of the cycle specific analysis are acceptable.

Therefore, the proposed change does not involve an increase in the probability or consequences of an accident previously evaluated.

2) <u>The proposed change does not create the possibility of a new or different kind of accident from any accident previously evaluated</u>.

No physical alterations of plant configuration, changes to set points, or changes to operating parameters are involved in implementing the proposed change. The receipt, handling, and storage of the irradiated SNPS fuel is essentially the same as the movement of irradiated fuel using a spent fuel cask that is discussed in UFSAR Section 9.1.4.2.1, "Spent Fuel Cask." The impact of the SNPS fuel and its packaging material on the LGS spent fuel pool criticality is bounded by the fuel pool criticality analysis in LGS UFSAR Section 9.1.2.3.1. Furthermore, the impact of the SNPS fuel decay heat on the LGS spent fuel pool cooling capacity is negligible.

The proposed change does not affect the function or operation of any system or equipment; therefore, the proposed change does not create the possibility of a new or different kind of accident from any accident previously evaluated.

3) <u>The proposed change does not involve a significant reduction in a margin of safety</u>.

The margin of safety established in the UFSAR and maintained by compliance with the Technical Specifications will be maintained. The effect of the SNPS fuel on LGS spent fuel pool cooling capability, storage capacity, and criticality is bounded by existing analyses in the UFSAR as discussed

above. Because the fuel is only slightly irradiated and of a similar design to that used at LGS, the movement of the SNPS fuel does not involve any changes in fuel handling practices, types of fuel handling accidents that need to be considered, or occupational radiation exposure from spent fuel pool operations or fuel transfer. The proposed change does not increase the risk or degree of radiological dose to the general public from that previously evaluated.

The operating limits established in the Core Operating Limits Report (COLR) will be submitted to the NRC as required by TS Section 6.9.1.9 prior to using the SNPS fuel in the LGS reactor cores.

Therefore, the proposed change will not involve a reduction in a margin of safety.

Information Supporting an Environmental Assessment

The proposed changes have been evaluated against the criteria in 10 CFR 51.21 for the identification of licensing and regulatory actions requiring an environmental assessment. We have concluded that the proposed changes do not meet the criteria for categorical exclusion as defined in 10 CFR 51.22(c)(9). Therefore, in accordance with the requirements in 10 CFR 51.30, the following information is provided to support an Environmental Assessment.

1) Need for the Proposed Change

The proposed change is requested because transfer of the SNPS fuel to LGS would benefit PECo and its customers by providing a low cost source of fuel for LGS.

Additionally, the proposed change to the LGS Operating Licenses would benefit the environment and is in the National interest because of benefits that would accrue from the transfer and utilization of the SNPS fuel at LGS. These benefits include: recovery of the available energy from the fuel that might otherwise be lost; reduction in the need to mine and process uranium and fabricate fuel assemblies that would otherwise be required; and, reduction in the amount of spent nuclear fuel that would otherwise require storage and disposal at a Federal high level waste repository. Finally, the transfer of the SNPS fuel to LGS facilitates the decommissioning of the SNPS.

2) Alternatives and Alternative Use of Resources

If the proposed change to the LGS Operating Licenses is not approved, the LGS reactors will continue to operate using new fuel obtained from existing sources. If the proposed change is not approved for the transfer the SNPS fuel to LGS or to another facility, the SNPS fuel will eventually be disposed of at a Federal high level waste repository without the beneficial utilization of the energy in the fuel, or will be reprocessed at an overseas facility for eventual reconstitution into fuel. Compared with reprocessing at an overseas facility, the proposed change would require less resources for transportation, and would avoid expenditure of additional resources associated with the reprocessing activities prior to the beneficial utilization of the energy in the fuel.

Inasmuch as there are no unresolved conflicts concerning the availability or use of alternative resources associated with the proposed change, no further evaluation of alternatives is required.

3) Environmental Impact of the Proposed Action

The approval of the proposed change to the LGS Operating Licenses will result in no significant effect on the human environment. This conclusion considers the potential impact of: normal transport and transportation accidents; the uranium fuel cycle; radioactive effluents; low level radioactive waste; and, occupational exposure.

The impact of the transportation of the slightly irradiated fuel from the SNPS site to the LGS site is minimal. 10 CFR 51.52, Table S-4, "Environmental Impact of Transportation of Fuel and Waste to and from Light Water-Cooled Nuclear Power Reactor," addresses the impact of transporting irradiated fuel and radioactive waste including normal transport and possible accidents. The proposed shipments meet the conditions specified in 10 CFR 51.52(a); and, therefore, the environmental impact of the proposed shipments is as set forth in Table S-4. In any event, the low level of radiation and the substantial elapsed time since the low power operation of the SNPS fuel make the assumptions used in Table S-4 conservative relative to the proposed shipments. Therefore, Table S-4 bounds the environmental impact of the transportation of the SNPS fuel.

The impact of the transfer of SNPS fuel to LGS on the uranium fuel cycle is neutral or positive. The NRC's original evaluation of this impact is documented in NUREG-0974, "Final Environmental Statement related to the operation of Limerick Generating Station, Units 1 and 2," dated April, 1984. NUREG-0974 used 10 CFR 51.51, "Uranium Fuel Cycle Environmental Data -- Table S-3," to assess the effect of the uranium fuel cycle on the operation of LGS Unit 1 and Unit 2. Transfer of the slightly irradiated SNPS fuel to LGS and the subsequent future use of this fuel results in a reduction in total amount of uranium mined and fabricated into fuel and a reduction in the amount of spent fuel that will eventually be stored at a Federal high level waste repository. Therefore, with regard to the uranium fuel cycle, the evaluation in NUREG-0974 remains unchanged.

The impact on the radioactive effluents discharged from the LGS site is neutral whether or not the SNPS fuel is used. The shipment of the SNPS fuel assemblies will meet the packaging and shipping criteria required for shipments of new fuel, so there will be no increase in fuel failure probability due to the shipping process. Specifically, an increase in fuel failures either due to shipping effects on the fuel or the design of the fuel is not likely as a result of the shipping criteria and inspections that will be employed. Finally, no increase in radioactive liquid and gaseous effluents is expected as a result of the receipt, unpacking, and inspection of the SNPS fuel.

The impact of the transfer of SNPS fuel to LGS on the generation of low level radioactive waste will be low. Solid waste in the form of Dry Active Waste (DAW) including fuel assembly packaging materials will be shipped offsite for volume reduction and disposal. The volume of DAW will be minimized, wherever possible, by the re-use of packaging and shipping material for the multiple shipments required to transfer all of the SNPS fuel.

The impact of the transfer of SNPS fuel to LGS on occupational exposure will be within existing estimates for LGS. The slightly irradiated Shoreham fuel will be packaged inside shipping casks designed to handle highly irradiated spent fuel assemblies. The casks will be opened and unloaded while submerged in the LGS cask storage pit, and handling of the slightly irradiated fuel will be the same as handling the highly irradiated fuel during refueling operations. Appropriate actions to maintain exposure as low as reasonably achievable (ALARA) will be taken.

Non-radiological impacts at the LGS site are limited to removal of paving material sufficient to permit wheel clearance on 600 feet of existing rail spur and the replacement of a number of railroad ties. Since the work is minor and the site area was previously disturbed during site preparation and construction, this type of environmental impact has been previously addressed and no further environmental assessment of this activity is required.

Therefore, we have concluded that the NRC does not need to prepare a supplemental environmental impact statement in connection with the issuance of this amendment to the LGS Operating Licenses in accordance with criteria of 10 CFR 51.22(b).

Conclusion

The Plant Operations Review Committee and the Nuclear Review Board have reviewed this proposed change to the Operating Licenses for LGS, Unit 1 and Unit 2, and have concluded that the changes do not involve an unreviewed safety question, do not involve a significant hazards consideration, and do not endanger the health and safety of the public.

ATTACHMENT 2

LIMERICK GENERATING STATION
Units 1 and 2

Docket Nos. 50-352
50-353

License Nos. NPF-39
NPF-85

PROPOSED OPERATING LICENSE CHANGE

List of Attached Pages

License No. NPF-39
Page 1 - For Information Only
Page 3

License No. NPF-85
Page 1 - For Information Only
Pages 3 and 4

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

PHILADELPHIA ELECTRIC COMPANY
DOCKET NO 50-352
LIMERICK GENERATING STATION, UNIT 1
FACILITY OPERATING LICENSE

License No. NPF-39

1. The Nuclear Regulatory Commission (the Commission or the NRC) has found that:

   A. The application for license filed by Philadelphia Electric Company (the licensee) complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's regulations set forth in 10 CFR Chapter I, and all required notifications to other agencies or bodies have been duly made;

   B. Construction of the Limerick Generating Station, Unit 1 (the facility) has been substantially completed in conformity with Construction Permit No. CPPR-106 and the application, as amended, the provisions of the Act and the regulations of the Commission;

   C. The facility will operate in conformity with the application, as amended, the provisions of the Act, and the regulations of the Commission (except as exempted from compliance in Section 2.D. below);

   D. There is reasonable assurance: (i) that the activities authorized by this operating license can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations set forth in 10 CFR Chapter I (except as exempted from compliance in Section 2.D. below);

   E. The licensee is technically qualified to engage in the activities authorized by this license in accordance with the Commission's regulations set forth in 10 CFR Chapter I;

   F. The licensee has satisfied the applicable provisions of 10 CFR Part 140, "Financial Protection Requirements and Indemnity Agreements", of the Commission's regulations;

   G. The issuance of this license will not be inimical to the common defense and security or to the health and safety of the public;

(3) Pursuant to the Act and 10 CFR Parts 30, 40 and 70, to receive, possess and use at any time any byproducts, source and special nuclear material as sealed neutron sources for reactor startup, sealed sources for reactor instrumentation and radiation monitoring equipment calibration, and as fission detectors in amounts as required;

(4) Pursuant to the Act and 10 CFR Parts 30, 40 and 70, to receive, possess, and use in amounts as required any byproduct, source or special nuclear material without restriction to chemical or physical form, for sample analysis or instrument calibration or associated with radioactive apparatus or components; and

(5) Pursuant to the Act and 10 CFR Parts 30, 40 and 70, to possess, but not separate, such byproduct and special nuclear materials as may be produced by the operation of the facility, and to receive and possess, but not separate, such source, byproduct, and special nuclear materials as contained in the fuel assemblies and fuel channels from the Shoreham Nuclear Power Station.

C. This license shall be deemed to contain and is subject to the conditions specified in the Commission;s regulations set forth in 10 CFR Chapter I (except as exempted from compliance in Section 2.D. below) and is subject to all applicable provisions of the Act and to the rules, regulations, and orders of the Commission now or hereafter in effect; and is subject to the additional conditions specified or incorporated below:

(1) Maximum Power Level

The licensee is authorized to operate the facility at reactor core power levels not in excess of 3293 megawatts thermal (100% rated power) in accordance with the conditions specified herein and in Attachment 1 of this license. The items identified in Attachment 1 to this license shall be completed as specified. Attachment 1 is hereby incorporated into this license.

(2) Technical Specifications and Environmental Protection Plan

The Technical Specifications contained in Appendix A and the Environmental Protection Plan contained in Appendix B, both of which are attached hereto, are hereby incorporated into this license. The licensee shall operate the facility in accordance with the Technical Specifications and The Environmental Protection Plan.

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

PHILADELPHIA ELECTRIC COMPANY

DOCKET NO. 50-353

LIMERICK GENERATING STATION, UNIT 2

FACILITY OPERATING LICENSE

License No. NPF-85

1. The Nuclear Regulatory Commission (the Commission or the NRC) has found that:

   A. The application for license filed by Philadelphia Electric Company (the licensee) complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's regulations set forth in 10 CFR Chapter I, and all required notifications to other agencies or bodies have been duly made;

   B. Construction of the Limerick Generating Station, Unit 2 (the facility) has been substantially completed in conformity with Construction Permit No. CPPR-107 and the application, as amended, the provisions of the Act and the regulations of the Commission;

   C. The facility will operate in conformity with the application, as amended, the provisions of the Act, and the regulations of the Commission (except as exempted from compliance in Section 2.D. below);

   D. There is reasonable assurance: (i) that the activities authorized by this operating license can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations set forth in 10 CFR Chapter I (except as exempted from compliance in Section 2.D. below);

   E. The licensee is technically qualified to engage in the activities authorized by this license in accordance with the Commission's regulations set forth in 10 CFR Chapter I;

   F. The licensee has satisfied the applicable provisions of 10 CFR Part 140, "Financial Protection Requirements and Indemnity Agreements," of the Commission's regulations;

   G. The issuance of this license will not be inimical to the common defense and security or to the health and safety of the public;

AUG 2 5 1989

(4) Pursuant to the Act and 10 CFR Parts 30, 40 and 70, to receive, possess, and use in amounts as required any byproduct, source or special nuclear material without restriction to chemical or physical form, for sample analysis or instrument calibration or associated with radioactive apparatus or components; and

(5) Pursuant to the Act and 10 CFR Parts 30, 40 and 70, to possess, but not separate, such byproduct and special nuclear materials as may be produced by the operation of the facility, and to receive and possess, but not separate, such cource, byproduct, and special nuclear materials as contained in the fuel assemblies and fuel channels from the Shoreham Nuclear Power Station.

C. This license shall be deemed to contain and is subject to the conditions specified in the Commission's regulations set forth in 10 CFR Chapter I (except as exempted from compliance in Section 2.D. below) and is subject to all applicable provisions of the Act and to the rules, regulations, and orders of the Commission now or hereafter in effect; and is subject to the additional conditions specified or incorporated below:

(1) Maximum Power Level

Philadelphia Electric Company is authorized to operate the facility at reactor core power levels of 3293 megawatts thermal (100 percent rated power) in accordance with the conditions specified herein.

(2) Technical Specifications

The Technical Specifications contained in Appendix A and the Environmental Protection Plan contained in Appendix B, and hereby incorporated into this license. PECo shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

(3) Fire Protection (Section 9.5, SSER-2)*

The licensee shall maintain in effect all provisions of the approved fire protection program as described in the Final Safety Analysis Report for the facility through Revision 58 and as approved in the SER through Supplement 9, and in the Fire Protection Evaluation Report through Revision 12, subject to the following provisions a and b below:

*The parenthetical notification following the title of license conditions denotes the section of the Safety Evaluation Report and/or its supplements wherein the license condition is discussed.

a. The licensee shall make no changes to features of the approved fire protection program which would decrease the level of fire protection in the plant without prior approval of the Commission. To make such a change the licensee must submit an application for license amendment pursuant to 10 CFR 50.90.

b. The licensee may make changes to features of the approved fire protection program which would decrease the level of fire protection without prior Commission approval after such features have been installed as approved, provided such changes do not otherwise involve a change in a license condition or technical specification or result in an unreviewed safety question (see 10 CFR 50.59). However, the licensee shall maintain, in an auditable form, a current record of all such changes including an evaluation of the effects of the change on the fire protection program and shall make such records available to NRC inspectors upon request. All changes to the approved program made without prior Commission approval shall be reported to the Director of the Office of Nuclear Reactor Regulation, together with supporting analyses, annually.

(4) Physical Security and Safeguards

The licensee shall fully implement and maintain in effect all provisions of the physical security, guard training and qualification and safeguards contingency plans previously approved by the Commission and all amendments and revisions to such plans made pursuant to the authority of 10 CFR 50.90 and 10 CFR 50.54(p). The plans, which contain Safeguards Information protected under 10 CFR 73.21, are entitled: "Limerick Generating Station, Units 1 & 2, Physical Security Plan," with revisions submitted through October 31, 1988; "Limerick Generating Station, Units 1 & 2, Plant Security Personnel Training and Qualification Plan," with revisions submitted through October 1, 1985; and "Limerick Generating Station, Units 1 & 2, Safeguards Contingency Plan," with revisions submitted through November 15, 1986.

D. The facility requires exemptions from certain requirements of 10 CFR Part 50 and 10 CFR Part 70. These include (a) exemption from the requirement of paragraph III.D.2.(b)(ii) of Appendix J, the testing of containment air locks at times when the containment integrity is not required (Section 6.2.6.1 of the SER and SSER-3) (b) exemption from the requirements of paragraphs II.H.4 and III.C.2 of Appendix J, the leak rate testing of the Main Steam Isolation Valves (MSIVs) at the peak calculated containment pressure, Pa, and exemption from the requirements of paragraph III.C.3 of Appendix J that the measured MSIV leak rates be included in the summation for the local leak rate test (Section 6.2.6.1 of SSER-3), (c) exemption from the requirement of paragraphs II.H.1 and III.C.2 of Appendix J,

TABLE S-3—TABLE OF URANIUM FUEL CYCLE ENVIRONMENTAL DATA [1]—Continued

[Normalized to model LWR annual fuel requirement (WASH-1248) or reference reactor year (NUREG-0116)]

[See footnotes at end of this table]

Environmental considerations	Total	Maximum effect per annual fuel requirement or reference reactor year of model 1,000 MWe LWR
Effluents		
SO_x	9.9	From enrichment, fuel fabrication, and reprocessing steps. Compounds that constitute a potential for adverse environmental effect are present in dilute concentrations and receive additional dilution by receiving bodies of water to levels below permissible standards. The constituents that require dilution and the flow of dilution water are: NH_3—60 cfs; NO_x—20 cfs; Fluoride—70 cfs.
NO_x	25.8	
Fluoride	12.6	
Cα	5.4	
Cl	8.5	
Na	12.1	
NH_3	10.0	
Fe	4	
Tailings solutions (thousands of MT)	240	From mills only—no significant effluents to environment.
Solids	91,000	Principally from mills—no significant effluents to environment.
Effluents—Radiological (curies)		
Gases (including entrainment):		
Rn-222		Presently under reconsideration by the Commission.
Ra-226	02	
Th-230	02	
Uranium	034	
Tritium (thousands)	18.1	
C-14	24	
Kr-85* (thousands)	400	
Ru-106	14	Principally from fuel reprocessing plants.
I-129	1.3	
I-131	83	
Tc-99		Presently under consideration by the Commission.
Fission products and transuranics	203	
Liquids:		
Uranium and daughters	2.1	Principally from mining—included tailings liquor and returned to ground—no effluents, therefore, no effect on environment.
Ra-226	.0034	From UF_6 production.
Th-230	.0015	
Th-234	01	From fuel fabrication plants—concentration 10 percent of 10 CFR 20 for total processing 26 annual fuel requirements for model LWR.
Fission and activation products	5.9×10^{-4}	
Solids (buried on site):		
Other than high level (shallow)	11,300	6,170 Ci comes from low level reactor wastes and 1,500 Ci comes from reactor decontamination and decommissioning—buried at land burial facilities. 600 Ci comes from mills—included in tailings returned to ground. Approximately 60 Ci comes from conversion and spent fuel storage. No significant effluent to the environment.
TRU and HLW (deep)	[2] 1.1×10^{5}	Buried at Federal Repository.
Effluents—thermal (billions of British thermal units)	4,060	<5 percent of model 1,000 MWe LWR.
Transportation (person-rem):		
Exposure of workers and general public	2.5	
Occupational exposure (person-rem)	22.6	From reprocessing and waste management.

[1] In some cases where no entry appears it is clear from the background documents that the matter was addressed and that, in effect, the Table should be read as if a specific zero entry had been made. However, there are other areas that are not addressed at all in the Table. Table S-3 does not include health effects from the effluents described in the Table or estimates of releases of Radon-222 from the uranium fuel cycle or estimates of Technetium-99 released from waste management or reprocessing activities. These issues may be the subject of litigation in the individual licensing proceedings.

Data supporting this table are given in the "Environmental Survey of the Uranium Fuel Cycle," WASH-1248, April 1974; the "Environmental Survey of the Reprocessing and Waste Management Portion of the LWR Fuel Cycle," NUREG-0116 (Supp. 1 to WASH-1248); the "Public Comments and Task Force Responses Regarding the Environmental Survey of the Reprocessing and Waste Management Portions of the LWR Fuel Cycle," NUREG-0216 (Supp. 2 to WASH-1248); and in the record of the final rulemaking pertaining to Uranium Fuel Cycle Impacts from Spent Fuel Reprocessing and Radioactive Waste Management, Docket RM-50-3. The contributions from reprocessing, waste management and transportation of wastes are maximized for either of the two fuel cycles (uranium only and no recycle). The contribution from transportation excludes transportation of solid fuel to a reactor and of irradiated fuel and radioactive wastes from a reactor which are considered in Table S-4 of § 51.20(g). The contributions from the other steps of the fuel cycle are given in columns A-E of Table S-3A of WASH-1248.

[2] The contributions to temporarily committed land from reprocessing are not prorated over 30 years, since the complete temporary impact accrues regardless of whether the plant services one reactor for one year or 57 reactors for 30 years.

[3] Estimated effluents based upon combustion of equivalent coal for power generation.

[4] 1.2 percent from natural gas use and process.

49 FR 9352

§ 51.52 **Environmental effects of transportation of fuel and waste—Table S-4.**

Every environmental report prepared for the construction permit stage of a light-water-cooled nuclear power reactor, and submitted after February 4, 1975, shall contain a statement concerning transportation of fuel and radioactive wastes to and from the reactor. That statement shall indicate that the reactor and this transportation either meet all of the conditions in paragraph (a) of this section or all of the conditions in paragraph (b) of this section.

49 FR 9352

(a)(1) The reactor has a core thermal power level not exceeding 3,800 megawatts;

(2) The reactor fuel is in the form of sintered uranium dioxide pellets having a uranium-235 enrichment not exceeding 4% by weight, and the pellets are encapsulated in zircaloy rods;

(3) The average level of irradiation of the irradiated fuel from the reactor does not exceed 33,000 megawatt-days per metric ton, and no irradiated fuel assembly is shipped until at least 90 days after it is discharged from the reactor;

(4) With the exception of irradiated fuel, all radioactive waste shipped from the reactor is packaged and in a solid form;

(5) Unirradiated fuel is shipped to the reactor by truck; irradiated fuel is shipped from the reactor by truck, rail, or barge; and radioactive waste other than irradiated fuel is shipped from the reactor by truck or rail; and

(6) The environmental impacts of transportation of fuel and waste to and from the reactor, with respect to normal conditions of transport and possible accidents in transport, are as set forth in Summary Table S-4 in paragraph (c) of this section; and the values in the table represent the contribution of the transportation to the environmental costs of licensing the reactor.

49 FR 9352

(b) For reactors not meeting the conditions of paragraph (a) of this section, the statement shall contain a full description and detailed analysis of the environmental effects of transportation of fuel and wastes to and from the reactor, including values for the environmental impact under normal conditions of transport and for the environmental risk from accidents in transport. The statement shall indicate that the values determined by the analysis represent the contribution of such effects to the environmental costs of licensing the reactor.

49FR10922

(c) SUMMARY TABLE S-4

SUMMARY TABLE S-4—ENVIRONMENTAL IMPACT OF TRANSPORTATION OF FUEL AND WASTE TO AND FROM ONE LIGHT-WATER-COOLED NUCLEAR POWER REACTOR [1]

Normal Conditions of Transport

	Environmental impact
Heat (per irradiated fuel cask in transit)	250,000 Btu/hr
Weight (governed by Federal or State restrictions)	73,000 lbs per truck, 100 tons per cask per rail car
Traffic density:	
Truck	Less than 1 per day
Rail	Less than 3 per month

Exposed population	Estimated number of persons exposed	Range of doses to exposed individuals [2] (per reactor year)	Cumulative dose to exposed population (per reactor year) [3]
Transportation workers	200	0.01 to 300 millirem	4 man-rem
General public:			
Onlookers	1,100	0.003 to 1.3 millirem	3 man-rem
Along Route	600,000	0.0001 to 0.05 millirem	

Accidents in Transport

	Environmental risk
Radiological effects	Small [4]
Common (nonradiological) causes	1 fatal injury in 100 reactor years, 1 nonfatal injury in 10 reactor years, $475 property damage per reactor year

[1] Data supporting this table are given in the Commission's "Environmental Survey of Transportation of Radioactive Materials to and from Nuclear Power Plants," WASH-1238, December 1972, and Supp. 1 NUREG-75/038 April 1975. Both documents are available for inspection and copying at the Commission's Public Document Room, 2120 L St. NW., Washington, D.C. and may be obtained from National Technical Information Service, Springfield, Va. 22161. WASH-1238 is available from NTIS at a cost of $5.45 (microfiche, $2.25) and NUREG-75/038 is available at a cost of $3.25 (microfiche, $2.25).

[2] The Federal Radiation Council has recommended that the radiation doses from all sources of radiation other than natural background and medical exposures should be limited to 5,000 millirem per year for individuals as a result of occupational exposure and should be limited to 500 millirem per year for individuals in the general population. The dose to individuals due to average natural background radiation is about 130 millirem per year.

[3] Man-rem is an expression for the summation of whole body doses to individuals in a group. Thus, if each member of a population group of 1,000 people were to receive a dose of 0.001 rem (1 millirem), or if 2 people were to receive a dose of 0.5 rem (500 millirem) each, the total man-rem dose in each case would be 1 man-rem.

[4] Although the environmental risk of radiological effects stemming from transportation accidents is currently incapable of being numerically quantified, the risk remains small regardless of whether it is being applied to a single reactor or a multireactor site.

53 FR 43419

§ 51.53 Supplement to Environmental Report.

(a) *Operating license stage.* Each applicant for a license or for renewal of a license to operate a production or utilization facility covered by § 51.20 shall submit with its application the number of copies, as specified in § 51.55, of a separate document, entitled "Supplement to Applicant's Environmental Report—Operating License Stage," which will update "Applicant's Environmental Report—Construction Permit Stage." Unless the applicant requests the renewal of an operating license or unless otherwise required by the Commission, the applicant for an operating license for a nuclear power reactor shall submit this report only in connection with the first licensing action authorizing full power operation. In this report, the applicant shall discuss the same matters described in §§ 51.45, 51.51 and 51.52, but only to the extent that they differ from those discussed or reflect new information in addition to that discussed in the final environmental impact statement prepared by the Commission in connection with the construction permit. Unless otherwise required by the Commission, no discussion of need for power or alternative energy sources or alternative sites for the facility or of any aspect of the storage of spent fuel for the facility within the scope of the generic determination in § 51.23(a) and in accordance with § 51.23(b) is required in this report. The "Supplement to Applicant's Environment Report—Operating License Stage" may incorporate by reference any information contained in the "Applicant's Environmental Report—Construction Permit Stage," final environmental impact statement or record of decision previously prepared in connection with the construction permit.

49 FR 34688

49 FR 34688

(b) *Post operating license stage.* Each applicant for a license amendment authorizing the decommissioning of a production or utilization facility covered by § 51.20 and each applicant for a license or license amendment to store spent fuel at a nuclear power reactor after expiration of the operating license for the nuclear power reactor shall submit with its application the number of copies, as specified in § 51.55, of a separate document, entitled "Supplement to Applicant's Environmental Report—Post Operating License Stage," which will update "Applicant's Environmental Report—Operating License Stage," as appropriate, to reflect any new information or significant environmental change associated with the applicant's proposed decommissioning activities or with the applicant's proposed activities with respect to the planned storage of spent fuel. Unless otherwise required by the Commission, in accordance with the generic determination in § 51.23(a) and the provisions in § 51.23(b), the applicant shall only address the environmental impact of spent fuel storage for the term of the license applied for. The "Supplement to Applicant's Environmental Report—Post Operating License Stage" may incorporate by reference any information contained in "Applicant's Environmental Report—Construction Permit Stage," "Supplement to Applicant's Environmental Report—Operating License Stage," final environmental impact statement, supplement to final environmental impact statement of records of decision previously prepared in connection with the construction permit or operating license.

53 FR 24018

53 FR 24018

§ 51.54 Environmental report—manufacturing license.

Each applicant for a license to manufacture a nuclear power reactor or, for an amendment to a license to manufacture seeking approval of the final design of the nuclear power reactor, pursuant to Appendix M of Part 52 of this chapter, shall submit with its application, as specified in § 50.4, a separate document, entitled "Applicant's Environmental Report—Manufacturing License," or "Supplement to Applicant's Environmental Report—Manufacturing License." The environmental report shall address the environmental matters specified in Appendix M of Part 52 of this chapter, and shall contain the information specified in § 51.45, as appropriate.

54 FR 15372

§ 51.55 Environmental report—number of copies; distribution.

(a) Each applicant for a license to construct and operate a production or utilization facility covered by paragraphs (b)(1), (b)(2), (b)(3) or (b)(4) of § 51.20 and each applicant for a license amendment authorizing the decommissioning of a production or utilization facility covered by § 51.20, and each applicant for a license or license amendment to store spent fuel at a nuclear power reactor after expiration of the operating license for the nuclear power reactor shall submit to the Director of Nuclear Reactor Regulation or the Director of Nuclear Material Safety and Safeguards, as appropriate, forty-one (41) copies of an environmental report, or any supplement to an environmental report. The applicant shall retain an additional 109 copies of the environmental report or any supplement to the environmental report for distribution to parties and Boards in the NRC proceeding, Federal, State, and local officials and any affected Indian tribes, in accordance

53 FR 24018

TRANSPORTATION OF NUCLEAR FUEL AND WASTE

The Nuclear Regulatory Commission (NRC), the Department of Transportation (DOT), and the Federal Emergency Management Agency (FEMA), share Federal responsibility for safety in the transportation of spent fuel. The transportation of radioactive material, including spent fuel, is regulated by DOT and NRC. The NRC is responsible primarily for safe packaging, to ensure radiological health and safety, and for safeguards, to ensure security of designated shipments against sabotage. The NRC regulations for transport are contained in 10 CFR Part 71, Packaging and Transportation of Radioactive Material. Physical protection requirements for certain materials in transport are established in 10 CFR Part 73, Physical Protection of Plants and Materials. DOT is responsible for regulating safe transport during shipment. FEMA is responsible for coordinating Federal and State participation in developing emergency response plans. In addition, Federal assistance for radiological protection in the event of an accident is available primarily through the Department of Energy (DOE). DOE maintains teams of technically-trained nuclear-safety specialists at about 30 sites throughout the country. (DOE approves its own packages that are not used by NRC licensees.)

Primary reliance for safety, in transportation of radioactive material, is placed on the packaging. DOT regulations prescribe general standards and requirements for all packages of radioactive material, and for handling and storage of those packages by carriers. For packages that contain no significant fissile radioactive material and only small quantities of other radioactive materials, DOT's standards and requirements provide adequate assurance of containment and shielding of the radioactive material. Although these small-quantity packages, termed Type A packages, may fail in an accident situation, the radiological consequences would be limited, because of the limited package contents.

When the radioactive content of a package exceeds the small Type A quantity limits, it may only be transported in a Type B package, one which will survive transportation accidents. A Type B package must be designed to withstand a series of specified impact, puncture, and fire environments, providing reasonable assurance that the package will withstand most severe transportation accidents. The NRC engineering staff must independently review its design to verify its accident resistance. Finally, NRC must issue a certificate before a Type B package fabricated from that design can be used to transport radioactive material.

The standards established in the DOT and NRC regulations provide that the packaging shall prevent the loss or dispersion of the radioactive contents, provide adequate shielding and heat dissipation, and prevent nuclear criticality under both normal and accident conditions of transportation. The normal conditions of transport that must be considered are specified in the regulations in terms of hot and cold environments, pressure differential, vibration, water spray, impact, puncture, and compression tests. Accident conditions that must be considered are specified in terms of impact, puncture, and fire conditions.

The authorization to transport licensed material is given in 10 CFR Part 71. Among the general license provisions of 10 CFR Part 71, authorization is given to licensees to transport, or to deliver to a carrier for transport, radioactive material contained within NRC-approved packages. The licensee must comply with all provisions of the general license. Packages used to transport irradiated fuel are NRC-approved packages.

Part 71 establishes the content of applications for package approvals and establishes package approval standards. The approval is based on the application showing that the package design, with the specified contents, meets the performance standards and the general package standards of 10 CFR Part 71. Casks for irradiated fuel must withstand normal conditions of transport and hypothetical accident conditions. The approval typically takes the form of a Certificate of Compliance.

A licensee* who wishes to use a packaging for which NRC has issued a certificate of compliance must have a quality assurance program that satisfies the applicable NRC regulations and that NRC has approved. The licensee must also register with the NRC as a user of a specific packaging and is required to have a copy of the certificate of compliance, packaging drawings, and other documents referenced in the approval, relating to the use and maintenance of the packaging and to the actions to be taken before shipment.

Procedures applicable to the shipment of packages of radioactive material require that a package be labeled with a unique radioactive material label. In transportation, the carrier is required to exercise control over radioactive material packages, including loading and storage in areas separated from persons, to limit the aggregation of packages, and to limit the exposure of persons.

The procedures the carrier must follow in case of an accident include: notification of the shipper and DOT; isolating any spilled radioactive material from personnel contact, pending disposal instructions from qualified persons; and holding vehicles, buildings, areas, or equipment from service or routine occupancy until they are cleaned to specified values. Radiological assistance teams are available, through a Federal interagency program, to provide equipment and trained advisory personnel, if necessary, to help manage accidents involving radioactive materials.

DOT has requirements for radioactive material shipments, concerning both highway routing and driver training. Under the DOT rule, shipments made by truck should generally follow the most direct interstate route and are required to avoid large cities if an interstate bypass or beltway is available. States are permitted to designate alternate routes when those routes are demonstrably as safe as the routes specified in the rule. As a related matter, NRC regulations require timely notification of the governor

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*"License" means a person who is authorized to conduct activities under a license or construction permit issued by the Commission (10 CFR 2.4).

(or his designee) of any State, before transport of potentially hazardous nuclear waste, including spent fuel, to, through, or across the boundary of the State. NRC also approves routes for the shipment of spent fuel, but solely to address concerns regarding potential deliberate acts to seize or damage the shipment. Physical security requirements to prevent such acts include, but are not limited to: driver and escort training, armed escorts through densely populated areas, transport immobilization features, and plans to deal with contingencies.

No other agencies are involved in the review of the transportation plans for irradiated fuel shipments. NRC licensees planning to ship irradiated (spent) fuel are required to submit proposed routes for such shipments to the NRC for approval, from a safeguards standpoint, before the use of a given route. For highway shipments, the licensee must propose a route that conforms with DOT's routing rules contained in 49 CFR 177.825(b). These requirements designate the use of the Interstate System of highways and available city beltways as the primary roadways for spent fuel shipments.

Studies indicate that approximately 3 million packages of radioactive materials are being shipped in the United States each year. Within the limitations of the regulatory standards, radioactive materials may be safely transported in routine commerce, using conventional transportation equipment.**

Emergency response efforts for transportation accidents involving radioactive materials are led by State and local governments. A survey of States' emergency response capabilities was updated in 1989 and published as NUREG/CR-5889. The survey consisted of a self-assessment performed by each state. The survey shows that overall the States' consider their emergency response strategies and field capabilities effective.

NRC's role in responding to accidents involving the transportation of radioactive materials is mainly one of providing assistance to the State and local responders. A general policy statement published in the FEDERAL REGISTER on March 29, 1984 (49 FR 12335) defines the actions to be taken by NRC in a radioactive materials transportation accident as follows;

1. Contact the designated State agency, as soon as practicable, to ensure that the agency has been informed of the incident;

2. Offer the State technical assistance, advice, and evaluations when the State is initially notified;

3. Make sure that DOE and other affected agencies are aware of the incident;

4. Maintain awareness of the situation until normal conditions are restored;

**Section 201 of the Energy Reorganization Act, as amended by Public Law 94-79, imposes special restrictions on the air transport of plutonium.

5. Provide information on packaging characteristics;

6. Ensure that the shipper (if an NRC licensee) provides complete and accurate information to emergency personnel; and

7. Provide recommendations to emergency response personnel on radiological issues, if requested by the on-scene coordinator or if a need is recognized by NRC personnel.

To ensure continued adequacy of measures required for the public health and safety, NRC reevaluated its regulations on transportation of radioactive materials. During reevaluation, it published a final environmental statement designated NUREG-0170, which included an examination of the transportation of radioactive material by all modes of transport. Considering the information developed, the public comments received, and the safety record associated with the transportation of radioactive materials, NRC determined that its present regulations provided a reasonable degree of safety, and that no immediate changes were needed to improve safety. Nevertheless, NRC continues to study safety aspects of transportation of radioactive materials, to determine where safety improvements should be made.

Sy 93-53

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

EDO Principal Correspondence Control

ACTION

FROM:

DUE: 04/06/93

EDO CONTROL: 0008698
DOC DT: 03/08/93
FINAL REPLY:

Marvin I. Lewis
Phila. PA

TO:

Chairman Selin

FOR SIGNATURE OF: ** GRN **

CRC NO: 93-0228

Murley

DESC:

Q'S RE THE USE OF SLIGHTLY IRRADIATED FUEL FROM THE ABANDONED SHOREHAM PLANT AT LIMERICK

DATE: 03/25/93

ROUTING:

Taylor
Sniezek
Thompson
Blaha
Knubel
TTMartin, RI

ASSIGNED TO: NRR

CONTACT: Murley

SPECIAL INSTRUCTIONS OR REMARKS:

NRR Rec'd: 3/25/93
NRR Action: [redacted] DRPE/Varga
NRR Routing: Murley
Milhoan
Cody
Crutchfield
Russell
Partlow
Mailroom
12G18

ACTION
DUE TO NRR DIRECTOR'S OFFICE
BY 4/1/93

93-53

OFFICE OF THE SECRETARY
CORRESPONDENCE CONTROL TICKET

PAPER NUMBER: CRC-93-0228 LOGGING DATE: Mar 23 93

ACTION OFFICE: EDO

AUTHOR: MARVIN LEWIS
AFFILIATION: PA (PENNSYLVANIA)

ADDRESSEE: CHAIRMAN SELIN

LETTER DATE: Mar 8 93 FILE CODE: IDR-5 SHOREHAN

SUBJECT: Q'S RE THE USE OF SLIGHTLY IRRADIATED FUEL FROM THE SHOREHAM NUCLEAR POWER PLANT

ACTION: Direct Reply

DISTRIBUTION: OCA TO ACK

SPECIAL HANDLING: NONE

CONSTITUENT:

NOTES:

DATE DUE: Apr 6 93

SIGNATURE: . DATE SIGNED:
AFFILIATION:

Rec'd Off. EDO
Date 3/24/93
Time 3:30 pm

EDO --- 008698
93-0561/-A-00