



PECO ENERGY

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

November 15, 1995

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  
Application for Approval of Proposed Disposal Procedures  
Request for Additional Information

Gentlemen:

By letter dated April 6, 1995, PECO Energy Company (PECO) submitted an application for NRC approval of disposal procedures in accordance with 10 CFR 20.2002. By telephone on November 3, 1995 the NRC requested additional information pertaining to the application.

Attachment 1 to this letter provides a restatement of the NRC's request and PECO's response.

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

Very truly yours,

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

Attachment

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

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Attachment 1

LIMERICK GENERATING STATION  
UNIT 1 AND UNIT 2

Docket Nos.

50-352

50-353

License Nos.

NPF-39

NPF-85

Application for Review of Disposal Procedures  
in Accordance with 10 CFR 20.2002

REQUEST FOR ADDITIONAL INFORMATION

3 Pages, 3 Figures, and Calculation LM-526 Enclosed

Request for Additional Information

Limerick Generating Station, Units 1 and 2

Application in Accordance with 10 CFR 20.2002

The following additional information was requested by the NRC by telephone on November 3, 1995.

NRC REQUEST

- 1.a What is the designated disposal site? Provide a legible map of the disposal site with compass direction and scale, that includes local land use (e.g., buildings, nearby residences, wells, etc.)
- 1.b Provide a pathway analysis from point of origin to final destination of the disposed contaminated material (see Figure 5.4, "Potentially meaningful exposure pathways to individuals," FES, 1984)
- 1.c In the application the licensee stated that the disposal volume will not exceed a total of 1,120,000 cubic feet. Please specify how the volume originated and how it will accumulate to this maximum volume. What is the yearly projected volume of contaminated waste?

PECO RESPONSE

- 1.a Figure A.1 of this Attachment provides the requested information. The nearest residence and garden are depicted in the W, WNW, NW, NNW, N, NNE, and NE sectors. The nearest well is assumed to be located at the nearest residence. Ground water movement is to the SW away from the nearest residence and towards the river. Figure A.2 shows a potentiometer contour map for the Limerick Generating Station Site depicting ground water movement.
- 1.b Figure B of this Attachment provides the requested information. The pathway analysis doses are based on the assumptions that the maximum amount of material (1,120,000 cubic feet) at the maximum concentration (specified in the 10 CFR 20.2002 application for all radioactive nuclides routinely searched for by the LGS effluent program) is placed in the designated area.

The occupational dose was calculated not to exceed 3.1 mrem/yr.

The inadvertent intruder dose was calculated as 0.75 mrem/yr. The intruder dose was calculated by assuming an individual circumvents the security fence, cameras and patrols a total of three times per year for a maximum stay of eight hours at the disposal area.

1.b continued The calculated residential inhalation TEDE dose was  $1.82 \text{ E-04 mrem/yr}$ .

The maximum dose to the critical organ (infant's liver; goat milk pathway) was conservatively calculated to be  $0.101 \text{ mrem/yr}$ .

Assuming the material leaches into the ground water or erodes to the river, the maximum permissible concentration as defined by 10 CFR 20, Appendix B would not be exceeded.

The theoretical "residential use" scenario defined by NUREG/1500 resulted in a dose of  $13 \text{ mrem/year}$  following 10 years of decay.

1.c The total site lifetime operational volume is limited to 1,120,000 cubic feet, not to exceed 70,000 cubic feet in any one year. These bounding volumes were estimated based on the perceived soil, sediment, and sludges generated from the LGS settling basin, emergency spray pond, and cooling tower basin and associated systems.

The yearly volume (70,000 cubic feet) is based on the maximum volume of dewatered sludge available to be removed from one cooling tower basin, which is estimated at 68,000 cubic feet.

The operational lifetime volume limit (1,120,000 cubic feet) is based on the estimated yearly volume (70,000 cu. ft.) multiplied by sixteen (16) years. The sixteen year schedule was chosen to conservatively maximize the calculated ground water concentration (See page 7 of calculation No. LM-526, enclosed).

If the limits contained in calculation No. LM-526, Section 3.0 "Design Basis," are reached, an additional 10 CFR 20.2002 application would be required prior to disposal of any material beyond those limits.

#### NRC REQUEST

2. Demonstrating by measurement or calculation, what is the highest total effective dose equivalent (TEDE) to an individual during licensed operation not exceeding the annual dose limit; or using the same analytical method described in the licensee application, Attachment 2, dated April 6, 1995.

#### PECO RESPONSE

The individual most likely to receive the highest dose during licensed operation was conservatively calculated to receive a TEDE dose of  $1.82 \text{ E-04 mrem/yr}$ . The critical organ dose (infant's liver; goat milk pathway) was conservatively calculated to be  $0.101 \text{ mrem/yr}$ . Actual doses are expected to be less.

NRC REQUEST

3. Provide a revised Table 1A using the new Part 20 Appendix limits.

PECO RESPONSE

Enclosed is Revision 2 of calculation No. LM-526 which includes the necessary changes to Table 1A. The only change noted was the limit for Sr-89 which changed from 1E-9 to 2E-10 with no effect on the resulting TEDE dose.

NRC REQUEST

4. Due to the methodology errors that were found in the January 1990 draft of NUREG/Cr-5512, use of methodology is not appropriate. Provide a reanalysis using other available methodology.

PECO RESPONSE

The enclosed calculation No. LM-526, Revision 2 was developed using the revised NUREG/Cr-5512 (October 1992) and draft NUREG/Cr-1500 (August 1994).

NRC REQUEST

5. Provide a discussion on the correlation between the actual sample concentrations and the estimated concentrations to demonstrate that using the actual concentrations would not result in higher doses.

PECO RESPONSE

As discussed in response to request 1.c above, the total bounding operating volume will be 1,120,000 cubic feet, not to exceed 70,000 cubic feet in any one year. This estimated volume is also limited by the activity designated in Section 3.0 of enclosed calculation No. LM-526, Revision 2. Actual measurements (and running totals) of volume and activity will be compared to the established bounding limits contained in the application analysis. As an example, there is currently approximately 8,000 cubic feet of actual material which has been identified for disposal. This actual material was analyzed and compared to the established bounding volumes and activities limits, using the same methodology described in the application. Since the actual volume and activity were calculated using the same methodology and resulted in a lower dose than that identified in the application analysis, this material would be allowed to be placed in the designated disposal area. Each subsequent volume of material would be analyzed in the same fashion.

The above information and following figures and calculations, supplement the information pertaining to the application for NRC review of disposal procedures, submitted by letter dated April 6, 1995.

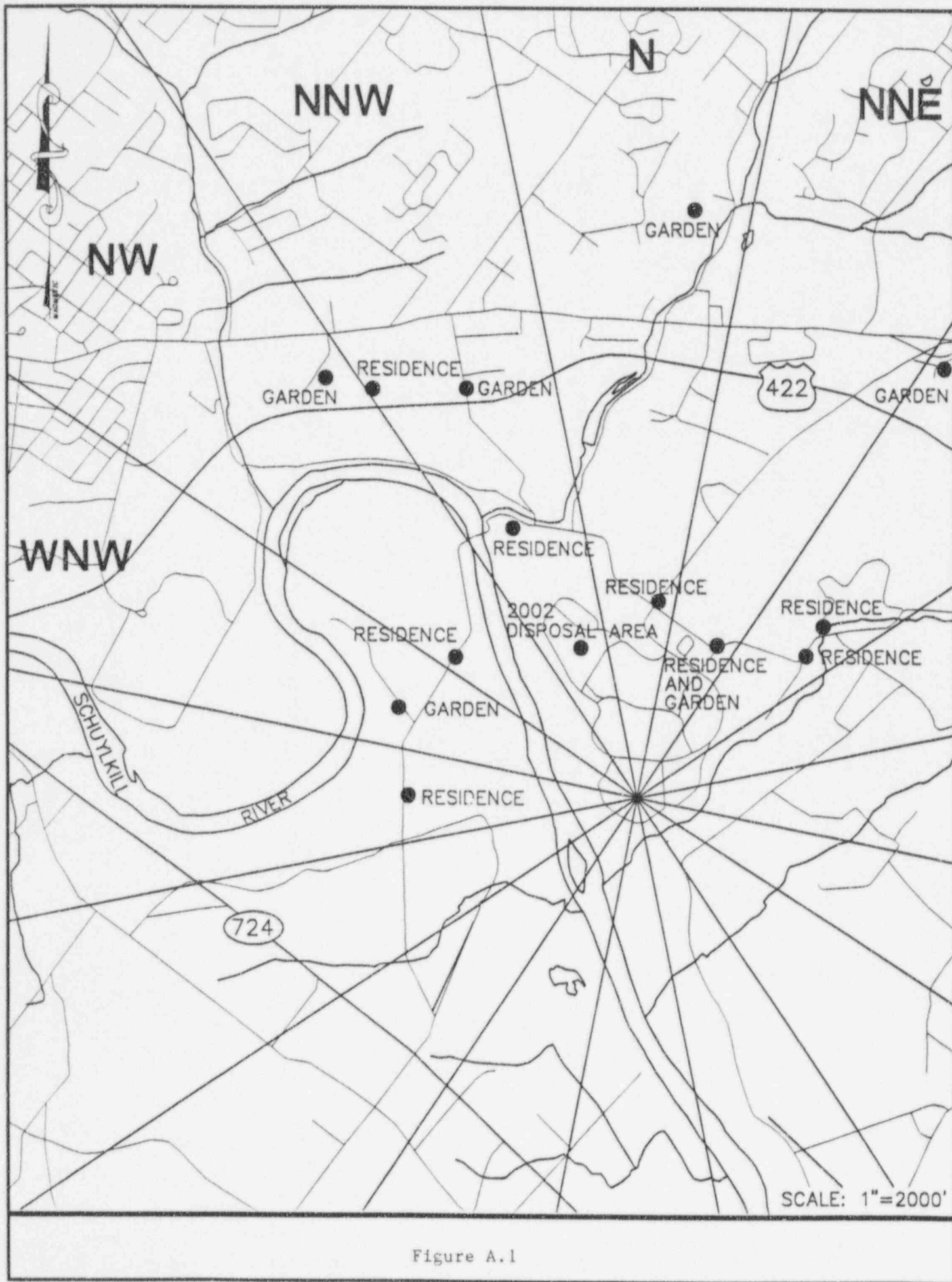
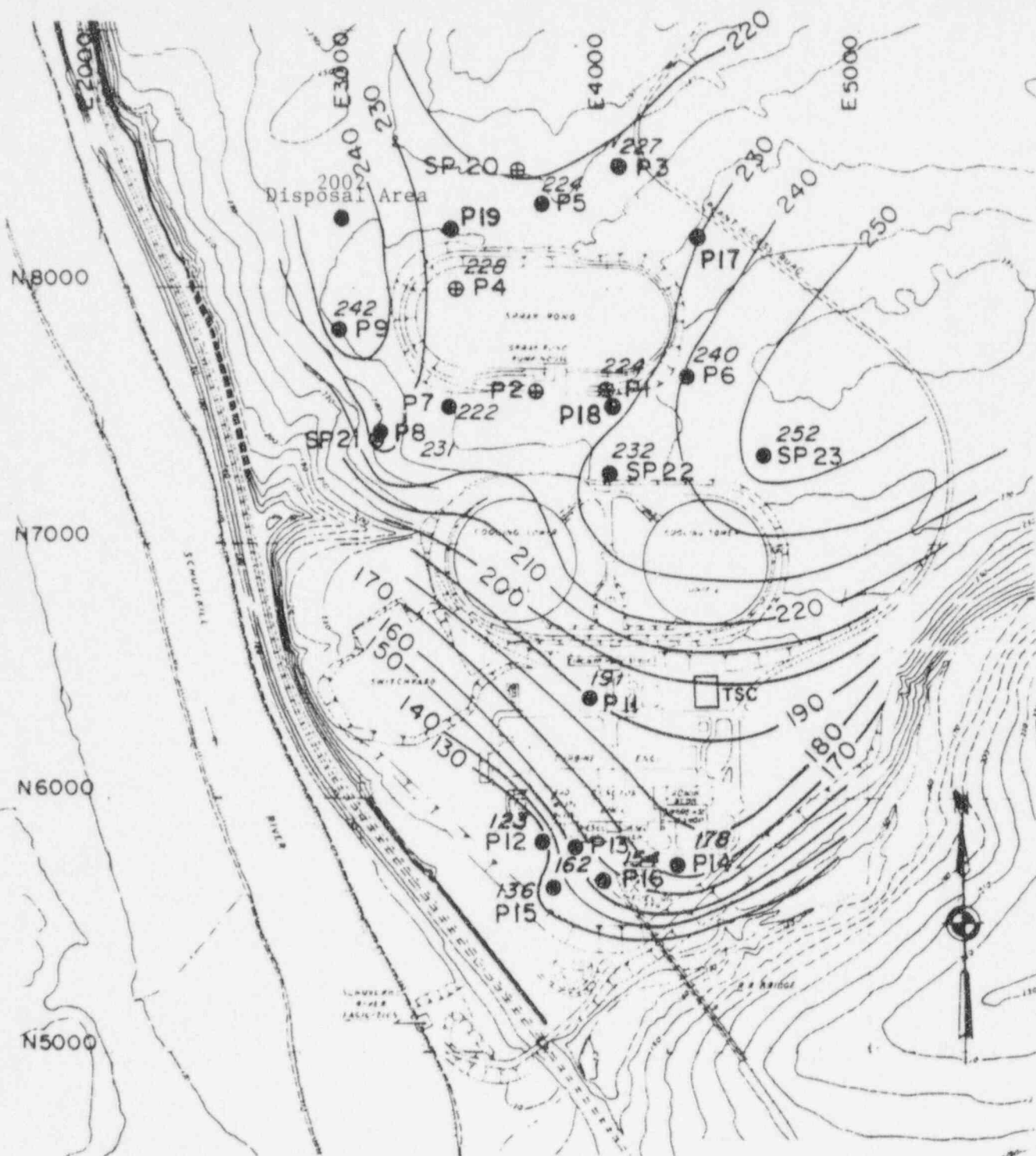


Figure A.1





### EXPLANATION

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● P6

OBSERVATION WELL WITH ELEVATION  
OF WATER LEVEL IN FEET.

— 250 —  
POTENTIOMETRIC CONTOURS IN FEET.

#### NOTE:

WELLS ABANDONED OR  
DESTROYED DURING CONSTRUCTION, SEE FSAR  
TABLE 2.4-21

0 200 400 600 800 1000

SCALE IN FEET

LIMERICK GENERATING STATION  
UNITS 1 AND 2  
FINAL SAFETY ANALYSIS REPORT

OBSERVATION WELLS AND  
POTENTIOMETRIC CONTOURS OF  
WATER TABLE, MAY 25, 1979  
(SHEET 1 OF 2)

2.4-15

REV. 57.02/89

Figure A.2

Figure B

# Potentially Meaningful Exposure Pathways to Individuals as the Result of On-site Disposal of Radioactive Material

