

10 CFR 20.2002

**PECO ENERGY**

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

April 6, 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

Gentlemen:

PECO Energy Company (PECO Energy) hereby submits information supporting an application for approval of proposed procedures for disposal of slightly contaminated material in accordance with 10 CFR 20, Subpart K, Section 2002.

Information describing the proposed disposal method and the application in accordance with 10 CFR 20.2002 are contained in Attachment 1. Attachment 2 contains a detailed analysis and supporting calculations.

A similar application has been recently approved for Indiana Michigan Power Company, Donald C. Cook Nuclear Power Plant, as noticed in the Federal Register on October 31, 1994 (FR 54477) and November 21, 1994 (FR 60024).

We request that the information supporting an application for LGS Units 1 and 2, in accordance with 10 CFR 20.2002, be approved by September 1995.

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

Very truly yours,

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

Attachment

cc: T. T. Marshall, Administrator, Region I, USNRC (w/ attachment)
N. S. [unclear], USNRC Senior Resident Inspector, LGS (w/attachment)
R. R. Javati, PA Bureau of Radiological Protection (w/attachment)

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ATTACHMENT 1

LIMERICK GENERATING STATION
UNIT 1 AND UNIT 2

DOCKET Nos.
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"Information Supporting Procedures for Disposal of Slightly Contaminated Material"

Supporting Information - 5 Pages

PECO Energy Company (PECO Energy), licensee under Facility Operating License Nos. NPF-39 and NPF-85 for Limerick Generating Station (LGS), Units 1 and 2, submits the following information supporting an application for authorization in accordance with 10 CFR 20.2002, which will allow the disposal of slightly contaminated material in a manner not specifically described in 10 CFR 20, Subpart K, Section 2001 "General Requirements." 10 CFR 20.2001(a)(4) states that licensed material may be disposed as authorized under 10 CFR 20.2002 "Method for obtaining approval of proposed disposal procedures."

Discussion

PECO Energy proposes to transfer slightly contaminated material (i.e., soil, sediment and sludges) from the LGS site settling basin, emergency spray pond, and cooling tower basins to a specific area within the LGS Site Restricted Area. This proposal involves minute levels of residual radioactivity that would result in a negligible calculated total dose which will not exceed 0.101 mrem per year to any member of the public, and will not exceed 4.1 mrem per year to workers. By comparison, the average exposure due to natural background for the Limerick-Pottstown, Pennsylvania area is 96 mrem per year. The contaminated materials will be transported to a designated area provided that NRC has approved this 10 CFR 20.2002 application, and the material meets the Pennsylvania Department of Environmental Resources's residual waste requirements. The material will be used as "clean fill" and be placed in an existing area, approximately 1.5 acres, near the site's Low Level Radwaste Storage area, located in the northwest yard of the LGS site. While in this area, the slightly contaminated material will radioactively decay to non-detectable levels. Confirmation of decay will be performed during site decommissioning, and records relevant to this 10 CFR 20.2002 application will be kept in accordance with 10 CFR 50.75(g) "Reporting and recordkeeping for decommissioning planning." The material from the evaluated sources (i.e., settling basin, spray pond, and cooling towers provided they are bounded by the analyzed dose limit) will be placed in the designated area at various times throughout the plant operating life; however, the volume will not exceed a total of 1,120,000 cubic feet.

In order to determine the impact on public health and safety and the environment resulting from this activity, PECO Energy performed the analysis provided in Attachment 2. PECO Energy's evaluation of potential doses to the public incorporated conservative assumptions, including the assumption that all material to be disposed of in this manner would contain radioactive material at an assumed limit which is higher than the currently known levels (See Attachment 2, Figure 1). We have determined, through the analysis contained in Attachment 2, that any contribution to offsite doses would be negligible; worst case concentrations in releases to ground water will not impact onsite or offsite wells; dose rates during handling of this material will be ALARA; and placement of this material in the designated area should not interfere with plant decommissioning and "free release."

(a) Description of Waste and Manner of Disposal

The material removed from the LGS site settling basin, emergency spray pond, and cooling tower basins is composed of soil, sediment and sludges (i.e., flowable solids). The materials are suspended solids which have settled to the bottom of these systems. These suspended solids are concentrated by gravity and settle to the bottom of each system. The material is allowed to buildup within the system until sufficient material is accumulated for disposal or before the system's efficiency is impacted. Normal plant practice for the removal of material from these systems would be to analyze the material for low-level, radioactive content using the lower limit of detection (LLD) for environmental samples, followed by proper disposal if found to contain radioactive material (see Attachment 2, Figure 1). The analysis is performed to detect the presence of any radioactive material resulting from the concentration of plant effluent fallout transported to these systems by system operation (cycling) or storm water run-off. (Reference NRC IE Circular No. 81-07 "Control of Radioactively Contaminated Material")

Currently, PECO Energy has removed and sampled approximately 8,000 cubic feet of material from the oil interceptors and associated site settling basin that receive water from the site drainage collection system. This system collects water from storm water, the water treatment plant floor drains, and parking lot run-off. This material was found to be slightly contaminated at the environmental LLD (See Attachment 2, Figure 1), and is now being temporarily stored on site. Anticipating future volumes of material, and the possibility of contamination, involving the settling basin, emergency spray pond, and cooling tower systems, PECO Energy is proposing to establish an onsite disposal method for this material. This method will be limited to material where radioactive concentrations are bounded by the analyzed dose limit of 0.101 mrem per year to the critical organ of the postulated maximum exposed individual (i.e., infant's liver from ingesting goat milk at the site boundary), and a maximum inhalation (See Attachment 2, Table 1A) dose of 0.0026 mrem per year from the material with a total volume of 1,120,000 cubic feet, anticipating placing not more than 70,000 cubic feet in the designated area in any given year.

The 8,000 cubic feet of material de-sludged from the settling basin was sampled and analyzed to environmental LLD for the principal gamma emitters listed in Table 1. A total of eleven samples were counted. In addition to the naturally occurring nuclides (i.e., Be-7, K-40, Ra-226, and Th-228) statistically positive activities for Mn-54, Co-60, and Cs-137 were also detected. The activity for Mn-54 averaged $1.8 \text{ E-08 uCi/gram (dry)}$, and ranged from 5.0 E-09 to $4.0 \text{ E-08 uCi/gram (dry)}$. Mn-54 was detected in ten of eleven samples. Co-60 activity averaged $1.14 \text{ E-07 uCi/gram (dry)}$, and ranged from 4.0 E-08 to $2.2 \text{ E-07 uCi/gram (dry)}$. The activity for Cs-137 averaged $3.7 \text{ E-08 uCi/gram (dry)}$, and ranged from 3.8 E-09 to $6.0 \text{ E-08 uCi/gram (dry)}$. Co-60 and Cs-137 were detected in all eleven samples. The Cs-137 activity observed was consistent with background levels observed in the Limerick area as a result of fallout from previous weapons testing.

Using the same analytical method described in Attachment 2, the 8,000 cubic feet of material will result in a yearly dose of no more than 0.00042 mrem per year to the critical organ of the maximum exposed individual, and a whole body dose of no more than 0.000013 mrem per year. Therefore, the performed analysis contained in Attachment 2 bounds the sampled settling pond material. This type of analysis will be performed for every future quantity of material removed from the specified locations prior to placing the material in the designated area. The performance of this method and analysis will be controlled by the Radiological Process Control Program.

The manner of disposal will be decay in storage. While in this designated restricted area, the slightly contaminated material will radioactively decay to non-detectable levels.

The material will be transported to the designated area, placed on the existing soil, worked, graded, and seeded with grass (worked to ensure seed growth and graded to reduce mound inclination in order to meet the surrounding ground level).

The designated area is part of the Site Restricted Area and will be monitored by LGS plant security under the existing plant security plan and procedures. Security patrols of the area are performed; however, the frequency of the patrols are random in order not to establish a recognizable pattern. The designated area will also be posted to designate the area boundaries, and prevent unauthorized entrance into the area. The LGS Updated Final Safety Analysis Report (UFSAR) will also be revised to include a description of the designated area, and bounding analysis.

(b) Analysis and Evaluation

Attachment 2 to this request contains the detailed evaluation and analysis performed by PECO Energy. The evaluation assumes radioactive concentrations 10 times the effluent LLD. The radiological impacts considered are as follows:

- 1) Airborne concentrations and doses due to wind borne erosion of the flowable solids. These concentrations were compared to 10 CFR 20 limits, and resulting doses compared to 10 CFR 50 limits.
- 2) Groundwater transport of activity to the nearby Schuylkill River, and transport to well locations.
- 3) Further transport by means of water caused erosion.
- 4) Worst case dose to workers directly over material due to direct shine and inhalation.
- 5) Worst case dose rate for a hypothetical residential use of the designated area.
- 6) Offsite doses due to airborne releases for pathways other than inhalation.

The results obtained from this analysis are as follows. The dose calculations demonstrate that the onsite doses, offsite doses and liquid effluents are within allowable limits. The total dose to the maximum exposed individual was conservatively calculated not to exceed 0.101 mrem per year, which when combined with all other LGS sources of radioactivity, is less than the 40 CFR 190 limit of 25 mrem per year.

(c) Nature of the Environment and Other Potentially Affected Facilities

The designated area is within the restricted area of the plant site, near the on-site radwaste storage pad, west-northwest of the emergency spray pond. The area was a cable lay-down area during plant construction, and is currently covered with soil. The material will be placed in the 1.5 acre area, graded, and seeded with grass seed to prevent wind erosion.

LGS UFSAR sections 1.2.1.5 "Hydrology," 1.2.4.8 "Radioactive Waste Systems," 1.6 "Material Incorporated by Reference," 2.4.2.3 "Effects of Local Intense Precipitation," 2.4.3.4 "Probable Maximum Flood Flow," 2.4.13 "Groundwater," 3.1 "Conformance with NRC General Design Criteria (GDC 61, 63, and 64)," 9.2.6 "Ultimate Heat Sink," 9.3.3 "Plant Drainage Systems," 10.4.5.1 "Circulating Water," 11.4 "Solid Radwaste Management System," 12.1 "ALARA," 12.2.1.7 "Stored Radioactivity," 12.4.3 "Exposures at Locations Outside Plant Structures," and 15.7 "Radiological Release from Subsystems and Components," were reviewed and considered while evaluating this method.

(d) ALARA Controls and Procedures

Exposure to workers would result in a worst case dose rate of 0.041 mrem per hour not to exceed 4.1 mrem per year based upon a worker spending an estimated 100 hours per year in contact with the material. This postulated exposure is conservative; however, the exposure is less than the 10 CFR 20 limit of 5000 mrem per year. Any exposure to workers would be due to contact with the material when it is transported, worked, graded, the area seeded and yearly maintenance of the area (i.e., grass cutting). During the operational phase of the facility, the area will be designated, and posted as settling basin, spray pond and cooling tower sludge storage only, and will not be worked for any other reason than to maintain the area as such. The area will not be considered a radiation area, and will not be posted as such.

The current Limerick radiological environmental monitoring program (REMP) will be utilized to monitor any offsite release of material from this storage area. The REMP includes surface water sampling from two locations and drinking water sampling from four locations. In addition, quarterly well water samples are collected and analyzed from the onsite well used for drinking

water. The results of the REMP analyses will be reviewed to confirm the assumptions and results of the storage area analysis.

In order to control the volume and radiological limits bounding the analysis and this proposed method, records will be kept and updated by plant personnel under the provisions of the LGS Radiological Process Control Plan. These controls, along with the anticipated low level of exposure to workers, ensures ALARA.

Table 1
Comparison of Holding Pond Sludge Radioactivity

Nuclide	Average Activity ⁽¹⁾ uCi/g (dry)	Minimum Activity uCi/g (dry)	Maximum Activity uCi/g (dry)	Average MDA ⁽²⁾ uCi/g (dry)	Environmental LLD uCi/g (dry)	Number of Determinations with Positive Activity
Mn-54	1.8 E-08	5.0 E-09	4.0 E-8	5.0 E-09	1.5 E-07	10 of 11
Co-58	0	-5.0 E-09	5.0 E-09	4.0 E-09	1.5 E-07	0 of 11
Fe-59	0	-1.0 E-08	9.0 E-09	9.0 E-09	3.0 E-07	0 of 11
Co-60	1.14 E-07	4.0 E-08	2.2 E-07	1.1 E-08	1.5 E-07	11 of 11
Zn-65	1.4 E-08	-3.0 E-09	3.0 E-08	1.0 E-08	3.0 E-07	0 of 11
Mo-99	9.0 E-09	-1.0 E-08	3.0 E-08	2.2 E-08	-	0 of 11
Cs-134	6.0 E-09	2.0 E-09	8.0 E-09	5.0 E-09	1.5 E-07	0 of 11
Cs-137	3.7 E-08	3.8 E-09	6.0 E-08	6.0 E-09	1.8 E-07	11 of 11
Ce-141	0	-9.0 E-09	7.0 E-09	5.0 E-09	-	0 of 11
Ce-144	-9.0 E-09	-2.0 E-08	2.0 E-09	2.1 E-08	-	0 of 11

Note: All samples were counted to the environmental lower level of detection for sediment.

(1) Net activity including those activities that were less than the MDA value.

(2) MDA - Minimum Detectable Activity of the sample

ATTACHMENT 2

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"Analysis Supporting Procedures for Disposal of Slightly Contaminated Material"