

50-352

LIMERICK GENERATING STATION UNITS 1 & 2  
ENVIRONMENTAL REPORT - OPERATING LICENSE STAGE  
REVISION 5 PAGE CHANGES

The attached Revision 5 pages and tables are considered part of a controlled copy of the Limerick Generating Station EROL. This material should be incorporated into the EROL by following the instructions below.

REMOVE

INSERT

VOLUME 3

Pages 5.2B-5 to 5.2B-8

Pages 5.2B-5 to 5.2B-8

VOLUME 4

----  
----

Page E100.1-1 & Table  
E100.1-1  
Pages E290.3-1 thru  
E290.14-1

*Cool  
O/AD*      *Rec'd  
w/out  
ltr*

LGS EROL

where:

$DF_i^\beta$  or  $DF_i^\gamma$  = are beta and gamma air dose factors for radionuclide i, mrad/yr per pCi/m<sup>3</sup>, (Ref 5.2-1).

$D_x^\beta$  or  $D_x^\gamma$  = annual beta and gamma air doses at point x; mrad/yr.

$Q_i$  = release rate of radionuclide i, Ci/yr.

$X/Q_{ix}$  = annual average gaseous dispersion factor at point x, sec/m<sup>3</sup> (decayed, see Eq. 1a).

$3.17 \times 10^4$  = number of pCi/Ci per sec/year.

$$\text{units} \\ \text{mrad/year} = \text{pCi/Ci} * \frac{1}{\text{Sec/yr}} * \text{Ci/yr} * \text{sec/m}^3 * \frac{\text{mrad/yr}}{\text{pCi/m}^3}$$

1a.  $X/Q_{ix}$  is decayed using average windspeed for each sector, distance to point of exposure, and  $\lambda_i$  (Sec<sup>-1</sup>) for nuclide i

$$X/Q_{ix} = X/Q_x e^{-\lambda_i t}$$

$$t = \text{travel time to point x} = \frac{\text{Distance of Point X from Source} * 3600}{\text{Average sector wind speed} * 5280}$$

$$\text{units} \\ \text{sec} = \text{ft} * \frac{1}{\text{mile/hr}} * \frac{1}{\text{ft/mile}} * \frac{\text{sec}}{\text{hr}}$$

## 3. Annual skin doses from releases of noble gases

$$D_x^S = \left[ 1.11 * SF * 3.17 \times 10^4 \sum_i Q_i * X/Q_{ix} * DF_i^\gamma * QF \right]$$

$$\left[ 3.17 \times 10^4 \sum_i Q_i * X/Q_{ix} * DFS_i \right]$$

where:

$D_x^S$  = annual skin dose from ground level releases of noble gases at point x,  $\frac{\text{mrem}}{\text{yr}}$ .

$DF_i^\gamma$  = gamma air dose factor for nuclide i, mrad/yr per pCi/m<sup>3</sup> (Ref 5.2-1).

$QF$  = quality factor, 1 mrem/mrad

$DFS_i$  = beta skin dose factor for nuclide i, mrem/yr per pCi/m<sup>3</sup> (Ref 5.2-1).

$Q_i$  = release rate of nuclide i, Ci/yr.

$X/Q_{ix}$  = annual average gaseous dispersion factor at point x, sec/m<sup>3</sup> (decayed)\*.

$SF$  = shield factor for dwellings, 0.7 (Ref 5.2-1).

1.11 = average ratio of tissue to air energy absorption factors.

$3.17 \times 10^4$  = number of pCi/Ci per sec/yr

units  
mrem/yr = pCi/Ci \*  $\frac{1}{\text{sec/yr}}$  \* Ci/yr \* sec/m<sup>3</sup> \*  $\frac{\text{mrad/yr}}{\text{pCi/m}^3}$

\*  $\frac{\text{mrem}}{\text{mrad}}$  + pCi/Ci \* yr/sec Ci/yr \* sec/m<sup>3</sup> \*  $\frac{\text{mrem/yr}}{\text{pCi/m}^3}$

\*NOTE:  $X/Q_{ix}$  is DECAYED using average windspeed for each sector, distance to point of exposure, and  $\lambda_i$  for nuclide i (See Eq. 1a).

QUESTION E100.1

In addition to other requested information, provide a summary and brief discussion, in table form, by section, of differences between currently projected environmental effects (including those that would degrade and those that would enhance environmental conditions) and the effects discussed in the environmental report and environmental hearings associated with the construction permit review. On a similar basis, indicate changes in plant or plant component design, location or operation that have been made or planned since the construction permit review.

RESPONSE

Table E100.1-1 lists plant differences that have been made or planned between the ERCP and the EROL which could be significant relative to environmental impact. Changes in plant or plant component design, location, or operation that have been made or planned since the construction permit review are summarized in FSAR Table 1.3-8.

## SIGNIFICAN

---

<u>ITEM</u>	<u>C</u>
Spray pond	Spray pond con
Radiological monitors	Upgraded instr
Transmission lines	230 kv lines f North Wales an to Plymouth Me constructed
Gaseous waste management system	Changed offgas

---

LGS EROL

TABLE E100.1-1

ENVIRONMENTAL EFFECT CHANGES FROM ERCP TO EROL

<u>CHANGE</u>	<u>REASON</u>	<u>EROL SECTION IN WHICH SUBJECT IS DISCUSSED</u>
eructed	Ensure adequate supply of emergency cooling water	4.1.2, 5.1.2, 5.1.4.3, 5.3.2, 6.1.2.1
entation	Provide greater sensitivity and broader range	6.1.5.2
m Cromby to from Cromby ing will be	Improved transmission reliability	3.9, 10.9
reatment system	Increased reliability and maintainability	3.5.3

LGS EROL

QUESTION E290.3 (Section 2.1.1.2)

How was the site surveyed to determine residency status of the endangered bog turtle?

RESPONSE

The bog turtle, although listed in 1973 Threatened Wildlife of the United States (EROL Reference 2.2-5), is not an officially listed endangered species (personal communication, Linda Harley, Office of Endangered Species, U. S. Fish & Wildlife Service, Washington, DC). However, it is protected by the Pennsylvania Fish Commission.

Surveys to determine the residency status of the bog turtle were made in 1973 for Philadelphia Electric by Radiation Management Corporation, who searched those habitats such as wet meadows and small streams within the Limerick exclusion zone most likely to contain bog turtles. No bog turtles were observed. Searches were also made in conjunction with other monitoring programs such as seine programs, breeding bird surveys, migratory bird surveys, waterfowl surveys, and plant community surveys. Most of these programs were in effect from 1970 through 1976. As a result of these programs, there were one or more biologists in the field almost daily on the Limerick site. During these surveys, reptiles and amphibians were observed, noted, and collected when possible for positive identification.

QUESTION E290.4 (Section 2.1.1.2)

Have any recent surveys been conducted to determine presence of bog turtle? If so, provide specific information on the surveys.

RESPONSE

There have been no surveys since 1973 designed specifically to determine presence of the bog turtle. As noted in the response to Question E290.3, searches were made in conjunction with other monitoring programs through 1976.

QUESTION E290.5 (Section 2.2.1.1.1)

Has any effort been made to determine if plant species present on site may have been designated as threatened or endangered since the plant surveys conducted in 1972 and 1973? Provide any specific information on additional surveys.

RESPONSE

No formal plant surveys have been conducted on the Limerick site since those reported in EROL Section 2.2.1.1.1. However, Radiation Management Corporation (for Philadelphia Electric) has compared the species list in Rare and Endangered Vascular Plant Species in Pennsylvania published by the Western Pennsylvania Conservancy in cooperation with the U.S. Fish & Wildlife Service (Wiegman 1979) with the vegetation on the Limerick site. None of the plants listed in Wiegman (1979) are known to occur on the Limerick site.

QUESTION E290.6 (Section 2.2.1.1.1)

Provide information on the spatial distribution of plant communities in the site vicinity (i.e. within 1 mi) after construction is completed and all disturbed areas are re-vegetated.

RESPONSE

Clearing and excavation of the Limerick site was virtually completed when the vegetation studies reported in EROL Section 2.2.1.1.1 were conducted. Therefore, no significant changes in plant communities after construction is completed, other than natural plant succession, are anticipated. The area identified as pioneer herbaceous plant community in EROL Figure 2.2-1 is primarily occupied by buildings and laydown for construction materials. When construction is completed, these areas will be seeded with grasses and mowed to maintain a permanent herbaceous ground cover. Banks and slopes will be hydroseeded to prevent erosion.

LGS EROL

QUESTION E290.7 (Section 2.2.1.3.1)

Provide information on any additional sightings of the peregrine falcon and bald eagle on site or within the site vicinity (within a 5 miles radius of site) since the May 1978 observations.

RESPONSE

Biologists employed for Philadelphia Electric by Radiation Management Corporation (RMC) have not observed either the bald eagle or the peregrine falcon since May 1978. The RMC laboratory is located on the Limerick site, within the exclusion zone. Biologists observe the area almost daily and would be aware of the presence of bald eagles or peregrine falcons. Both the peregrine falcon and the bald eagle are wide-ranging migrants and could be expected to migrate through the Limerick area irregularly. However, neither is common in Pennsylvania nor are they known to nest in Chester or Montgomery Counties, Pennsylvania.

QUESTION E290.8 (Section 2.2.1.4)

Provide information on the annual wildlife game harvest within the vicinity of the Limerick site. If no data are available, provide information for the county or nearest appropriate wildlife game harvest unit.

RESPONSEQualitative Information

The District Game Protectors familiar with the area indicated that the small game hunting pressure near Limerick was comparable or greater than that in many other parts of Chester and Montgomery Counties. This is partly due to the availability of undeveloped land for hunting within the Schuylkill River corridor. The State Game Land at Linfield, Pennsylvania, approximately two miles from the Limerick site, also provides hunting opportunity. Doves, pheasants, rabbits, and squirrels comprise most of the small game harvest. Some waterfowl hunting occurs near Limerick, especially in Vincent Pool, but more ducks and geese are hunted downstream near Oaks, Pennsylvania. Mallard, wood, and black ducks and Canada goose are the principal species taken. Some crow and woodcock are hunted near Limerick. Ruffed grouse and wild turkey, although not abundant, are taken occasionally in the more heavily forested parts of Chester and Montgomery Counties. Deer hunting was rated as "good" for such an urbanized area. No black bear have been legally harvested in recent years from this area.

Quantitative Information

Selected results from the 1981 Pennsylvania Small Game Harvest Survey are presented in Table E290.8-1. The county level is the lowest geographic unit at which harvest data were compiled. Table E290.8-2 summarizes the annual reported deer kill by various categories for Chester and Montgomery Counties.

## LGS EROL

TABLE E290.8-1

Results of the 1981 Pennsylvania Small Game Harvest Survey for  
Chester and Montgomery Counties (Pennsylvania Game Commission)

<u>Species</u>	<u>Estimate of Number Harvested in 1981</u>	
	<u>Chester County</u>	<u>Montgomery County</u>
Grey squirrel	29,800	27,000
Ringneck pheasant	18,400	30,600
Eastern cottontail rabbit	35,300	60,500
Ruffed grouse	750	300
Woodcock	3,300	3,500
Crow	8,000	28,000
Mourning dove	6,700	6,400
Ducks (combined)	6,700	6,400
Geese (combined)	6,500	11,400

ANNUAL DEER KILL BY VARIOUS

Category	1976	
	C	M
Archery (Antlered)	12	6
Archery (Antlerless)	<u>6</u>	<u>7</u>
Archery Total	18	13
Gun (Antlered)	--	--
Gun (Antlerless)	<u>--</u>	<u>--</u>
Gun Total	--	--
Flintlock	--	--
Highway Mortality	<u>433</u>	<u>298</u>
Total Deer Kill	451	311

(1) Data not readily available are indicated

LGS ERCL

TABLE E290.8-2

CATEGORIES REPORTED IN CHESTER (C) AND MONTGOMERY (M) COUNTIES(1)

1977		1978		1979		1980		1981	
C	M	C	M	C	M	C	M	C	M
17	8	14	12	15	13	--	--	--	--
<u>4</u>	<u>11</u>	<u>3</u>	<u>9</u>	<u>10</u>	<u>10</u>	<u>--</u>	<u>--</u>	<u>--</u>	<u>--</u>
21	19	17	21	25	23	23	22	45	23
199	113	257	138	244	146	254	145	308	146
<u>134</u>	<u>151</u>	<u>250</u>	<u>168</u>	<u>225</u>	<u>250</u>	<u>283</u>	<u>188</u>	<u>282</u>	<u>230</u>
333	264	507	306	469	396	537	333	590	376
--	--	--	--	--	--	--	--	31	12
<u>451</u>	<u>327</u>	<u>451</u>	<u>327</u>	<u>480</u>	<u>292</u>	<u>--</u>	<u>--</u>	<u>485</u>	<u>267</u>
805	610	975	654	974	711	560	355	1151	678

d by --.

LGS EROL

QUESTION E290.9 (Section 3.9.2.5)

What information was used to support the statement that no evidence was found indicating the presence of two endangered species, the southern bald eagle and bog turtle, along the proposed transmission line?

RESPONSE

An investigation conducted for Philadelphia Electric by Radiation Management Corporation in March 1979 of the areas through which the proposed transmission lines will be routed was the basis for the statement that no evidence was found indicating local populations of bog turtle exist nor that the areas investigated are used by the southern bald eagle for nesting purposes.

LGS EROL

QUESTION E290.10 (Section 3.9.2.5)

Identify the erosion control practices to be utilized in the vicinity of transmission towers constructed in sloped terrain.

RESPONSE

At all structure locations where there is a grade, three steps are taken to reduce or prevent soil erosion and sedimentation during transmission line construction as follows:

- a. Intercept and divert run-off water before it reaches the disturbed soil (diversion ditches and terraces).
- b. Control water run-off within the construction area by the use of mulches, vegetative cover, or culverts.
- c. Treat water as it leaves the construction areas by means of filter strips, debris basin, or simple temporary dam impoundment constructed of straw bales to filter the water.

LGS EROL

QUESTION E290.11 (Section 4.1.2)

Provide a copy of the construction erosion and sedimentation control plan.

RESPONSE

The Limerick construction Erosion and Sedimentation Control Plan was submitted to the NRC by letter from E.J. Bradley to A. Schwencer, dated July 9, 1982.

LGS EROL

QUESTION E290.12 (Section 4.2.1)

Provide information on the locations of access roads which will be needed for construction of the Cromby to North Wales and Cromby to Plymouth Meeting 230 kV transmission lines.

RESPONSE

No new access roads are required for construction of the Cromby to North Wales and Cromby to Plymouth Meeting transmission lines. The transmission lines will be installed on existing rights-of-way, permitting the use of existing access roads.

LGS EROL

QUESTION E290.13 (Section 6.1)

Provide a copy of references 6.1-57 and 6.1-58.

RESPONSE

Reference 6.1-57, "An International Standard for a Mapping Method in Bird Census Work Recommended by the International Bird Census Committee", and Reference 6.1-58, "An Evaluation of Winter Bird Population Studies", were submitted to the NRC by letter from E. J. Bradley to A. Schwencer, dated August 12, 1982.

LGS EROL

QUESTION E290.14

Provide aerial photographs of the site and areas within a one-mile radius of the cooling towers.

RESPONSE

Limerick Environmental Report - Construction Permit Stage Figures 2.1.11, 2.1.12, 2.1.13, and 2.1.14 provide aerial photographs of the site and vicinity.