

PHILADELPHIA ELECTRIC COMPANY

2301 MARKET STREET

P.O. BOX 8699

PHILADELPHIA, PA. 19101

EDWARD G. BAUER, JR.
VICE PRESIDENT
AND GENERAL COUNSEL

(215) 841-4000

EUGENE J. BRADLEY
ASSOCIATE GENERAL COUNSEL

DONALD BLANKEN
RUDOLPH A. CHILLEM
E. C. KIRK HALL

T. H. MAHER CORNELL
PAUL AUERBACH

ASSISTANT GENERAL COUNSEL
EDWARD J. CULLEN, JR.

THOMAS H. MILLER, JR.

IRENE A. McKENNA
ASSISTANT COUNSEL

June 21, 1983

Mr. A. Schwencer, Chief
Licensing Branch No. 2
Division of Licensing
U. S. Nuclear Regulatory Commission
Washington, D.C. 20555

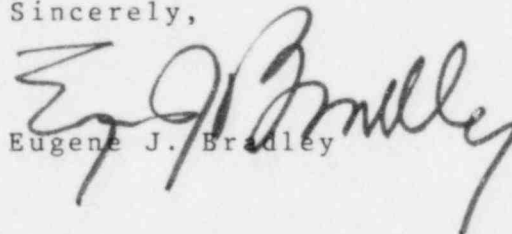
Subject: Limerick Generating Station, Units 1 & 2
Information Request from the Power Systems
Branch

File: GOVT 1-1 (FSAR)

Dear Mr. Schwencer:

Attached is a revised draft response to FSAR Question
410.70. This draft change will be formally incorporated into
the FSAR revision scheduled for July, 1983.

Sincerely,


Eugene J. Bradley

JJH/gra/34

Copy to: See Attached Service List

8306270365 830621
PDR ADOCK 05000352
A PDR

Boal
11

cc:	Judge Lawrence Brenner	(w/o enclosure)
	Judge Richard F. Cole	"
	Judge Peter A. Morris	"
	Troy B. Conner, Jr., Esq.	"
	Ann P. Hodgdon, Esq.	"
	Mr. Frank R. Romano	"
	Mr. Robert L. Anthony	"
	Mr. Marvin I. Lewis	"
	Judith A. Dorsey, Esq.	"
	Jacqueline I. Ruttenberg	"
	Thomas Y. Au, Esq.	"
	Mr. Thomas Gerusky	"
	Director, Pennsylvania Emergency Management Agency	"
	Steven P. Hershey	"
	Charles W. Elliott, Esq.	"
	Donald S. Bronstein, Esq.	"
	Mr. Joseph H. White, III	"
	David Wersan, Esq.	"
	Robert J. Sugarman, Esq.	"
	Martha W. Bush, Esq.	"
	Atomic Safety and Licensing Appeal Board	"
	Atomic Safety and Licensing Board Panel	"
	Docket and Service Section	"

QUESTION 410.70 (Section 9.2.6)

Provide the basis for concluding that the design temperature for the ESW and RHRSW will not be exceeded using only tornado and tornado missile protected structures, systems and components.

RESPONSE

As described in Section 9.2.6, the ultimate heat sink at Limerick is an excavated spray pond with a surface area of 9.9 acres. Four spray networks, each having 50% capacity for shutdown of two units, are provided.

Details of the spray pond excavation and finished grading are shown in Figures 3.8-55, 3.8-56, and 3.8-57. The general arrangement of the spray pond, spray networks, and spray pond pump structure is shown in Figure 9.2-6. The layout of the spray networks is shown in Figure 9.2-7.

As discussed in Section 3.5.1.4, all essential structures, systems, and components related to the ESW system, RHRSW system, and the UHS are protected from the effects of tornadoes and tornado missiles. Protection of the spray networks is provided by location of the network piping and sprays below the surrounding grade and by physical separation of the networks:

- a. In all but the spillway area, the surrounding grade is in excess of El. 260 ft. while the top of the sprays are at El. 258 ft and the spray network piping is between El. 253 ft 05 in. and El. 256 ft 8 in.
- b. The closest branches of adjacent spray networks are separated by 65 ft.
- c. The supply piping to adjacent networks is separated by 215 ft.
- d. The networks are located at a minimum distance of 72 ft from the edge of the pond.

The use of elevational differences and physical separation to provide protection of the spray pond networks from tornado missiles is justified by the following considerations:

- a. Only two spray networks are required for the safe shutdown of both units.
- b. The only active failure that can compromise the operability of a spray network is failure of its supply

valve (HV-57-032A, B, C, or D). These valves may be manually operated to isolate damaged networks or to initiate the use of undamaged networks if their controls or motors are inoperable.

- c. The physical arrangement of the spray networks precludes the possibility that large missiles can damage more than one spray network due to trajectory considerations. Multiple missiles of sufficient energy and distribution to substantially damage multiple networks are unlikely. ① - insert
- d. The loss of some sprays in a network does not result in substantial loss of heat removal capability for the entire network (each network contains 240 spray nozzles).
- e. The design thermal performance of the spray pond is based on conservative design values of initial pond temperature and meteorology as described in Section 9.2.6.4. For all expected conditions, the margin in thermal performance would be considerably greater than the 10% margin demonstrated under design conditions.
- f. Interconnections are provided that allow the use of the cooling towers as a heat sink for ESW and RHRSW systems. Such operation may be initiated from the control room or locally by manual operation.
- insert ②
- g. The loss of more than two spray networks and the coincident loss of the cooling towers due to tornado missiles is unlikely due to physical separation of the cooling towers and the spray pond. The cooling towers are located approximately 600 feet from the nearest portion of a spray network.
- insert ③
- h. Tornado missiles are an insignificant contributor to plant risk because of the low frequency of occurrence of tornadoes in this region (EROL Section 2.3.1.2.2) and the low likelihood of damaging missiles if one were to occur.
- insert ④
- i. Plant procedures will address the various contingent actions available to the operators to deal with degraded UHS conditions.
- * → Substantial time is available for corrective operator actions.

insert ① - Network piping varies in size from the 30" diameter

Supply headers to the 2" diameter piping at the extreme ends of the distribution branches. Network piping wall thickness vary from 0.337" to 0.500".

insert ② - It is unlikely that tornado winds would compromise the heat removal capability of the spray pond networks, or the cooling towers, to the extent that safe shut down of the units would be affected. As described in Section 3.5.1.4, the spray networks have been designed to withstand design basis tornado winds. While not specifically designed to withstand design basis tornado winds, the cooling tower shell and supporting structure have been designed to withstand the following wind loading when either operating or dry:

<u>Elev. above Grade (feet)</u>	<u>wind velocity mph</u>
30	90
150	113
200	118
300	125
400	130
500	135

The cooling towers are expected to provide sufficient heat removal capability for the safe shut down of the units even in the event that the tower fill is extensively damaged.

DRAFT

- insert ③ - the likelihood of tornado winds and/or missiles affecting the safe shutdown capability of the cooling towers and spray networks at the same time is quite remote when the above described design factors are considered together with the variation in tornado intensity along its path length and width (NUREG/CR-2944, Tornado Damage Risk Assessment; Reinhold & Ellingwood, Brookhaven Natl Lab, Sept 82)
- insert ④ - Even if the safe shutdown capability of the cooling towers and spray networks were compromised by tornado effects, use of the cooling towers' basins and/or UHS pond in a "cooling pond type" mode would allow substantial time for spray network repair.