CENTRAL FILES

UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION I
631 PARK AVENUE
KING OF PRUSSIA, PENNSYLVANIA 19406

April 14, 1978

Docket Nos. 50-289
50-320

Metropolitan Edison Company
ATTN: Mr. J. G. Herbein
Vice President
P. O. Box 542
Reading, Pennsylvania 19603

Gentlemen:

Enclosed is IE Bulletin No. 78-05 which requires action by you with regard to your power reactor facility(ies) having an operating license or a construction permit.

Should you have questions regarding this Bulletin or the actions required, please contact this office.

Sincerely,

for Boyce H. Grier
Director

Enclosures:
1. IE Bulletin No. 78-05
2. List of IE Bulletins
Issued in 1978

cc w/encls:
J. P. O'Hanlon, Unit 1 Superintendent
R. L. Wayne, QA Manager, Design & Construction
T. Broughton, Safety & Licensing Manager
R. W. Heward, Jr., Project Manager
R. C. Arnold, Vice President, Generation
L. L. Lawyer, Manager, Generation Operations - Nuclear
G. P. Miller, Superintendent
J. L. Seelinger, Unit 2 Superintendent
Gerald Charnoff, Esquire
I. R. Finfrock, Jr.
Miss Mary V. Southard, Chairman, Citizens for a Safe Environment

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Radioactive iodine may be ingested by milk cows after deposition in grazing areas. Radiation exposure to the thyroid gland can result from drinking milk from these cows. A liter of milk consumed daily from a cow grazing five months per year at the nearest dairy farm (1-1/2 miles ESE) would result in a dose to an infant's thyroid of about 9 mrem/yr.

3. Radioactive Materials Released to Receiving Water

During normal operation of the plant, the liquid radwaste effluent will be combined with the forced draft cooling tower blowdown before release into the Susquehanna River. Calculation of radiation doses from radionuclides released into the liquid effluent requires estimating the concentrations of these radionuclides at the point of discharge. A nominal flow rate of 36,000 gallons per minute (80 cfs) for the cooling tower blowdown was used to calculate the liquid radwaste dilution in the discharge canal. The river flow ranges from a low of 1,600 cfs to a maximum flood level of 740,000 cfs with an average annual flow of 34,000 cfs. Thus, an additional factor of 100 was conservatively assumed in order to estimate the effluent dilution after mixing with the river water.

The principal pathways leading to exposure doses to man are drinking water from the river, consuming fish and invertebrates caught in the river, and swimming, boating, and picnicking in or on the shore of the river. Bioaccumulation factors used to calculate doses from fish and invertebrate consumption are listed in Table 11. The doses to individuals resulting from the previously mentioned pathways are calculated using the estimated annual nuclide liquid releases given in Table 6 and dilution factors described above. In addition, it was assumed that each person drinks 1,200 cc of water per day, consumes 20 grams of fish and 5 grams of invertebrates per day, swims 100 hours per year, and goes boating and picnicking on the shoreline for 500 hours per year. A delay of twenty-four hours is assumed between release and consumption. No delay factor is considered for recreational use. The results of the individual dose calculations are summarized in Table 12.

4. Population Doses From All Sources

Values of the cumulative dose to the population from gaseous effluents based on 1970 census figures is listed in Table 13 for various distances from the station. The combined dose to all individuals living within fifty miles of the station (1,868,000) from exposure to radioactive gaseous effluents is estimated to be 9.4 man-rem per year. It was assumed that 10 percent of this total population would be exposed while fishing, boating or picnicking in the immediate vicinity of the plant.

The dose from ingesting fish and invertebrates was estimated by assuming that 10 percent of the total population within a fifty mile radius of the station obtained 25 percent of this intake from the Susquehanna River. Thus, the effective exposed population via this pathway is 47,000. The combined annual population dose via the drinking water, fish, invertebrate, recreation and transportation (of nuclear fuel and solid radioactive waste) pathways is calculated to be 33 man-rem.

The population dose from all of the above pathways is summarized in Table 14.

TABLE 12

ANNUAL DOSES AT EQUILIBRIUM CONDITIONS
TO INDIVIDUALS AT VARIOUS LOCATIONS

LOCATION	PATHWAY	DOSE (MREM/YR) GI TRACT	THYROID	TOTAL BODY
Exclusion Line (2170' ESE)	Cloud	--	0.5	~~3.3~~ 0.25
Residence[1] (2340' E)	Cloud	--	0.3	~~1.8~~ 0.13
Residence[1] (2460' ESE)	Cloud	--	0.4	~~2.7~~ 0.21
Goldsboro (nearest town 1.5 miles W)	Cloud	--	0.06	~~0.5~~ 0.04
Three Mile Island Recreation Area[2] (3500' S)	Cloud	--	0.1	~~0.5~~ 0.04
Shelly's Island (2000' W)	Cloud	--	0.1	~~0.7~~ 0.05
Dairy Farm[3] (1.5 miles E)	Ingestion of milk	--	8.6	--
Susquehanna River	Drinking water	0.009	2.0	0.04
	Fish Consumption	0.06	0.03	0.2
	Invertebrate Consumption	0.02	0.2	0.05
	Swimming	--	--	0.0009
	Picnicking, fishing and boating	--	--	0.003

[1]No shielding was assumed.
[2]Dose calculation assumes an occupancy of 3 months per year.
[3]Dose to a child's thyroid based on consuming one liter of milk daily from a cow grazing five months per year at that particular farm.

TABLE 13

CUMULATIVE ANNUAL POPULATION DOSE AND AVERAGE DOSE
FROM GASEOUS EFFLUENTS TO THE POPULATION UP TO 50 MILES FROM THE STATION

RADIUS (miles)	CUMULATIVE POPULATION	ANNUAL CUMULATIVE DOSE (man-rem)	AV. ANNUAL INDIVIDUAL DOSE FOR CUMULATIVE POPULATION (mrem/yr) *
0-1	580	0.24	0.403
0-2	2,350	0.51	0.215
0-3	9,000	1.0	0.112
0-4	17,300	1.4	0.079
0-5	24,500	1.6	0.065
0-10	136,400	3.4	0.025
0-20	621,300	6.3	0.010
0-30	995,200	8.0	0.008
0-40	1,235,000	8.7	0.007
0-50	1,868,000	9.4	0.005

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* Includes beta-ray contribution