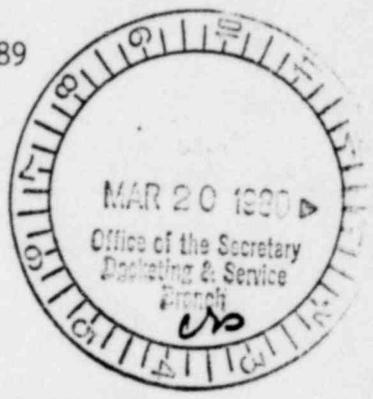


UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the matter of )  
METROPOLITAN EDISON COMPANY )  
(Three Mile Island Nuclear )  
Station, Unit No. 1) )

Docket No. 50-289  
(Restart)



RESPONSE OF THE COMMONWEALTH OF PENNSYLVANIA TO AAMODT INTERROGATORY (SECOND SET)

1. How many hospitals in Lancaster County were participating in the State hypothyroidism screening of newborns in 1977, 1978 and 1979?
  - (a) Provide names of hospitals.
  - (b) Number of births at each.
  - (c) Number of births screened for hypothyroidism.

RESPONSE

1977 - No Program			
July, 1978 start of program		7/1/78-12/31/78	1/1/79-12/31/79
(a)	(b) Live Births for 1978-79	(c) Number of Infants Screened	
Columbia	N/A*	61	163
Ephrata	N/A	296	678
Lancaster General	N/A	1327	2509
Lancaster Osteopathic	N/A	458	N/A*
St. Joseph's	N/A	518	N/A*

\*Not available at this time

2. How many cases of infant hypothyroidism were reported for Lancaster County in 1977, 1978 and 1979?

RESPONSE

1977 - none	1978, July thru Dec.	1979, Jan. thru Dec.
	1	7

- a. Indicate the location of the residence of family of each newborn by township.

800 4140080

RESPONSE

East Hempfield, Lancaster, Upper Leacock, Earl (2), W. Donegal and Bart.

3. What was the level of confidence of Dr. Bodine [sic] in stating to the press the morning of February 21, 1980 that there was no connection between the defects and the TMI-2 accident or an other environmental effect?

RESPONSE

To the direct recollection of Dr. Bouden, she has made no specific statement concerning the defects in relationship to environmental effects other than TMI-2 accident.

4. Were cases with relationship to inheritance and undeveloped thyroid (referred to by Dr. Bodine [sic]) factored out of the data with which the Lancaster data was compared?

RESPONSE

The seven cases for Lancaster County include all cases of neonatal hypothyroidism known to the program.

5. Why is it necessary to take as much as two years to complete a study? (Based on Dr. Tokuhata's statement.)

RESPONSE

Data on the incidence of congenital hypothyroidism in Pennsylvania are available only since July, 1978, when the State began a screening program for this condition. Data collected during this start-up one-half year period (1978) are not as good as that for 1979, thus not suitable for direct comparison. In terms of historical observation in an epidemiological investigation, it would be necessary to continue surveillance at least over the next year (1981). County-by-county comparison will be made between 1980 and 1981 data.

6. Why does Dr. Tokuhata have little confidence that such a study would be reliable? (Based on his statement).

RESPONSE

This question seems to reflect somewhat distorted interpretation of what was said. What was said and meant was inherent difficulties involved in most epidemiologic investigations of this type ("cluster" analysis in relation to complete diagnostic evaluation of cases involved). Epidemiologic inferences are made usually in terms of statistical probability within a given biomedical framework. Since epidemiology is an applied science (not exact science), it is often difficult to draw any definitive conclusions from a single episode depending upon availability of all the necessary input data, including genetic, constitutional, environmental, medical, and other factors. How complete and accurate is radiation exposure data, including radioactive iodine on an individual basis for pregnant women residing in those areas where cases have been identified? There is still considerable disagreement even among professional experts in the field of radiation health, as to the health effects of "low" level radiation. What is the likelihood of our being able to identify all other possible causative factors and being able to measure (quantify) them accurately and completely? Questions of this type are difficult to answer with certainty.

7. Drs. Bodine [sic] and Tokuhata referred to a "dose" to the public from the TMI-2 accident. How was this dose figured?

(a) How was the radioactive iodine measured?

RESPONSE

I was using the term "low" level radiation as quoted from the following public document: Population Dose and Health Effect of the Accident at the Three Mile Island Nuclear Station. (A preliminary

assessment for the period March 28 through April 7, 1979) DHEW-  
May 10, 1979.

8. Since the radioactive iodine in milk was elevated during the TMI accident, was there any need to warn any segment of the public who consume milk in excess of norms?
  - (a) For instance, how much radioactive iodine would an individual who consumed three quarts of milk have ingested assuming the worst possible case, i.e., all milk from the farm with the highest levels of radioactive iodine measured from TMI accident to date?

#### RESPONSE

The highest datum recorded for cows milk in the course of the accident was 20 picocuries per liter (pCi/l) recorded on April 4, 1979 at the farm. Based on this datum and data from other surveillance, it was hardly apparent that warnings to any segment of the population was warranted, considering federal guidance.

FDA guidance issued in the Federal Register of Friday, December 15, 1978 (FR Vol. 43, No. 242) pages 48790 through 48797, suggests a Preventative Protective Action Guide (PAG) of 90,000 picocurie intake to yield a dose commitment to a newborn infant thyroid of 1,500 millirem.\* Milk contamination never approached this value, nor did the data ever suggest it might.

An individual capable of consuming three quarts of milk in one day is highly unlikely to be an infant. The hypothesized individual would need to be an adult or nearly so. This situation places the dose commitment per picocurie intake more than an order of magnitude lower than that for the newborn. The net effect is that an adult could drink more than ten times more milk per day than the newborn infant to accumulate the same

\*Preventative PAG establishes a level at which responsible officials should take protective action to prevent or reduce the concentration of radioactivity in food or animal food.

dose commitment. If the infant was not at significant risk, the adult, even at a higher intake, was less so.

9. How do you reconcile the cumulative effects of radioactive iodine and criteria of 10 picocuries as acceptable over the lifespan of someone who consumes one quart of milk a day from birth, assuming a 70 year lifespan?
- (a) How many years would it take for that person to reach a "dangerous" level of radioactive iodine consumption?

#### RESPONSE

No current guidance suggests a chronic exposure to 10 pCi/l in milk. If, however, one were to consider that consumption of 90,000 pCi/l <sup>131</sup>I by a newborn infant would yield a dose commitment of 1500 mrem, it follows that an intake of 10 pCi/l per day would, over a year, yield an intake of 3650 pCi and a corresponding dose commitment of 61 mrem. Assuming one continues at an intake rate of 1 liter per day for life for 70 years and one's thyroid ceases to be newborn (conservative) at age 10, the total lifetime dose commitment would be  $(10 \times 61) + (60 \times 6.1) = 976$  millirem. If the annual background radiation is taken as 88 mrem per year (local) with the thyroid accepted as being in the whole body, the thyroid would, in 70 years, have accumulated  $(88 \times 70) = 6160$  millirem. The intake of 10 pCi per day and its dose commitment plus the contribution of natural background can be normalized to a background of 102 mrem/year. With the natural background in Denver Colorado being placed at 160 mrem per year, one might look for various thyroidal late effects if 10 pCi/day intake were significant. We have no knowledge of the publication of such data.

Since NCRP Report No. 55 suggests that external radiation may be twice as effective in producing late effects as are internally deposited radio-iodines, one would expect a correspondingly high rate of late effects

in areas having higher external natural background. We have no knowledge of the publication of such supporting data.

Respectfully submitted,

*Karin W. Carter*

KARIN W. CARTER  
Assistant Attorney General

Attorney for  
The Commonwealth of Pennsylvania

March 17, 1980

UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of )  
METROPOLITAN EDISON COMPANY, ) Docket No. 50-289  
(Three Mile Island Nuclear ) (Restart)  
Station, Unit No. 1) )

AFFIDAVIT OF EVELYN S. BOUDEN

Commonwealth of Pennsylvania )  
County of Dauphin ) SS

EVELYN S. BOUDEN, M.D., being duly sworn according to law, deposes and says that she is Director of the Division of Parent, Child and School Health, Pennsylvania Health Department, and that the information contained in Commonwealth's response to Interrogatories Nos. 1, 2, 3 and 4 is true and correct to the best of her knowledge, information and belief.

\_\_\_\_\_  
EVELYN S. BOUDEN, M.D.  
Director  
Division of Parent, Child and  
School Health  
Pennsylvania Department of Health

Sworn to and subscribed  
before me this        day  
of March, 1980.

\_\_\_\_\_  
NOTARY PUBLIC

UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of )  
METROPOLITAN EDISON COMPANY, ) Docket No. 50-289  
(Three Mile Island Nuclear ) (Restart)  
Station, Unit No. 1) )

AFFIDAVIT OF GEORGE K. TOKUHATA

Commonwealth of Pennsylvania )  
County of Dauphin ) SS

GEORGE K. TOKUHATA, Dr. P.H., Ph.D., being duly sworn according to law, deposes and says that he is Director of the Division of Epidemiological Research, Pennsylvania Health Department; and that the information contained in Commonwealth's response to Interrogatories Nos. 5, 6, and 7 is true and correct to the best of his knowledge, information and belief.

GEORGE K. TOKUHATA, Dr. P.H., Ph.D.  
Director  
Division of Epidemiological Research  
Pennsylvania Department of Health

Sworn to and subscribed  
before me this day  
of March, 1980.

NOTARY PUBLIC

UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

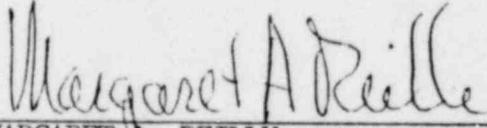
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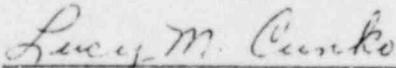
AFFIDAVIT OF MARGARET A. REILLY

COMMONWEALTH OF PENNSYLVANIA )  
COUNTY OF DAUPHIN ) SS

MARGARET A. REILLY, being duly sworn according to law, deposes and says that she is Chief of the Environmental Radiation Division, Bureau of Radiation Protection, Pennsylvania Department of Environmental Resources; that the information contained in Commonwealth's response to Interrogatories Nos. 8 and 9 is true and correct to the best of her knowledge, information and belief.

  
MARGARET A. REILLY  
Chief, Environmental Radiation Division  
Bureau of Radiation Protection  
Department of Environmental Resources

Sworn to and subscribed  
before me this 17th day  
of March, 1980.

  
\_\_\_\_\_  
NOTARY PUBLIC  
Lucy M. Cunko, Notary Public  
My Commission Expires May 2, 1983  
Harrisburg, PA Dauphin County