



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

AUG 9 1978

THE ADMINISTRATOR

Honorable Christopher J. Dodd
House of Representatives
Washington, D.C. 20515

Dear Chris:

This is in further response to your request of November 15, 1977, for review of the report by Dr. E. J. Sternglass, "Strontium-90 Levels in the Milk and Diet near Connecticut Nuclear Power Plants."

Primary Conclusions

1. After careful review of this report, EPA's main conclusion is that the data do not support Dr. Sternglass' contention that operations of the Haddam Neck and Millstone Point nuclear power reactors have contributed to significant levels of strontium-90 and cesium-137 in milk in the vicinity of these reactors. This conclusion is based on the following factors:

a. Any release of strontium-90 from a nuclear reactor would also be accompanied by a proportionate amount of strontium-89. A similar statement can be made about the fallout from nuclear weapons tests but with different proportions. However, judging from the proportions of these two radionuclides observed in the environment, it is apparent that the strontium-90 originated from fallout.

b. Cesium-137 originating from a nuclear reactor should also be accompanied by cesium-134. Since cesium-134 was not found in the environment, it is obvious that the cesium-137 discussed by Dr. Sternglass did not originate from nuclear reactors, but also came from fallout.

In addition, it is significant that Dr. Sternglass did not consider effluent monitoring data from these reactors which would have further demonstrated that environmental levels of strontium-90 and cesium-137 were not due to reactor operations.

2. Furthermore, it is concluded that Dr. Sternglass' extrapolations for radiation dose attributed to strontium-90 in the diet do not have scientific validity. He has made very unrealistic choices of assumptions which lead to exaggerated overestimates of actual radiation doses to the population.

7810140048

Misinterpretation of EPA Data

Dr. Sternglass has misinterpreted EPA's milk monitoring data. The Pasteurized Milk Network, which is part of EPA's Environmental Radiation Ambient Monitoring System (ERAMS), is designed to estimate the average intake of radionuclides in milk consumed by major urban populations in the United States. For this purpose, samples are taken only of pasteurized milk from supermarkets or milk processing plants. Since this milk may have come from long distances to the processing plants, the radioactivity of the processed milk cannot be traced back to the production area or individual farms. Dr. Sternglass has attempted to evaluate data on raw milk from individual farms by comparison with EPA's pasteurized milk data and this comparison is not appropriate. It is well-known that, under normal fallout conditions, the radioactivity content of milk will vary significantly between neighboring farms and even among cattle on a single farm. These variations should not, therefore, be exploited as indicators of contamination from nuclear power reactors.

Complexity of this Review

One further observation should be noted; namely, Dr. Sternglass has brought together a series of data interpretations which seem plausible on casual review, even to technical people. However, on closer look it becomes readily apparent that this report has many misinterpretations which tax even the experts to clarify. Consequently, a scientific rebuttal quickly becomes very technical, and may seem more complicated than the original report.

Our detailed response to your questions is given in the enclosure to this letter. Some of our comments have been discussed with Lisa Kennedy of your staff. If you should desire additional information, you may contact Mr. Raymond Johnson of our Office of Radiation Programs (557-7380).

I appreciate the opportunity to review Dr. Sternglass' report and to respond to your questions.

Sincerely yours,

[s] Doug Costle

Douglas M. Costle

Enclosure

EPA RESPONSE TO QUESTIONS RAISED BY THE
HONORABLE CHRISTOPHER J. DODD ON DR. STERNGLASS'
REPORT "STRONTIUM-90 LEVELS IN THE MILK AND
DIET NEAR CONNECTICUT NUCLEAR POWER PLANTS"

Question

Do you consider the amounts of strontium-90 found in the milk and diet around the Connecticut plants to be unrelated to plant operations? If so, why?

Answer

The available data do not support a conclusion that observed strontium-90 levels in milk are related to operations of nuclear plants in Connecticut. The measured levels of strontium-90 and cesium-137 are clearly the results of fallout from atmospheric nuclear weapons testing. The reasons for our opinion are as follows:

1. On page 2 of his report, Dr. Sternglass indicates that increases in strontium-90 levels in milk from April and May 1976, when the Millstone Plant was shut down for refueling, to higher levels in July 1976, are due to Millstone effluents. If this was true, then these increases should have been accompanied by substantial levels of short-lived fission products such as strontium-89 and iodine-131. Both of these nuclides were either absent or barely measurable. This means that the observed increases in strontium-90 levels in milk were not due to fresh effluent releases during the April-July 1976 interval, but rather were due to aged fission products as fallout from previous atmospheric nuclear weapons tests. This observation is further confirmed by the data which Dr. Sternglass presented in Table 1, i.e. the levels of both strontium-89 and iodine-131 increased dramatically on October 5, 1976, as a result of fresh fallout from the atmospheric nuclear test occurring on September 26, 1976.

2. On page 2 of his report, Dr. Sternglass also notes that strontium-90 levels could not be explained by fallout from nuclear tests because the levels measured in milk by EPA declined in all directions away from Connecticut. Actually, EPA's data indicate for the same time period that higher levels were measured in Boston, Manchester, New York, and Pittsburgh.

3. On page 12, Dr. Sternglass concludes that there is a gradual buildup of strontium-90 around the Haddam Neck and Millstone Plant. We do not agree with this conclusion. The concentrations of strontium-90 in milk for the Millstone, Haddam Neck, and Hartford areas all show a downward trend since the large scale atomic weapons tests ended in the early 1960's.

4. It should be noted that Dr. Sternglass has arrived at his conclusions without considering the following factors:

a. Estimates of maximum concentrations of radionuclides which could occur in milk based on actual plant effluent release data and dispersion of these effluents through the atmosphere using meteorology data.

b. Radionuclides in milk come from grazing of pasture lands and the interval from June-August is when cattle get most of their food from pastures.

c. During the late spring and early summer months, a turnover typically occurs in the upper stratosphere which results in increased fallout of old fission products from previous nuclear weapons tests.

Question

Are levels of strontium-90 taken into account when federally regulated testing of the environment around the nuclear power plants takes place to measure controlled substances? If not, why not?

Answer

Environmental surveillance programs are conducted by the licensee or his contractor, for the purpose of identifying changes in the environment that result from plant operations, such as possible releases of strontium-90. Guidance for radiological environmental monitoring programs is provided in the U.S. Nuclear Regulatory Commission (NRC) Regulatory Guide 4.1, "Programs for Monitoring Radioactivity in the Environs of Nuclear Power Plants" and Regulatory Guide 4.8, "Environmental Technical Specifications for Nuclear Power Plants". Such programs include a preoperational survey instituted two years prior to plant operation. One of the purposes of such a survey is to establish a data base of radionuclide levels and their variations in environmental media. Sampling sites include critical nearby locations, which are most likely to be affected by a plant release, and remote areas which serve as controls. Environmental media which are sampled for strontium-90 include:

- 1) airborne particulates
- 2) soil at the location of the airborne particulate samplers
- 3) surface water
- 4) drinking water
- 5) aquatic sediments and indicator organisms
- 6) milk

The basic data for radiological environmental assessment are obtained from the measurement of airborne and liquid effluent releases at the plant. From this data, the concentrations of radionuclides in environmental media are calculated using environmental pathway and transport models. These calculations are done because the radionuclide concentrations in environmental media are often too small to be detected. Actual measurements on environmental media are then made to confirm the expected levels from calculations.

The environmental monitoring program of Millstone was expanded substantially in 1973. For example, previous data on strontium-90 in milk had been obtained from studies conducted by the Laboratory Division, Connecticut State Department of Health. Under the expanded program, three local and one control dairy farm were identified for sampling on a monthly basis during the grazing season and including the month of February. Two goat farms were also identified for milk sampling. Analysis of data taken before and after 1973 should take into account these changes in the monitoring program.

Question

Are the levels of strontium-90 calculated by Dr. Sternglass accurate? Do the professor's extrapolations, in terms of the total bone and body doses received by the population surrounding the plants, have scientific validity? If not, why not?

Answer

Dr. Sternglass could have calculated levels of strontium-90 on the basis of plant effluent monitoring data, however, he used the results of measurements on environmental media and we believe that data to be accurate. On the other hand, we do not agree with the extrapolations which he made from that data. For example, on page 5 he interprets the data in the 1961 Federal Radiation Council (FRC) Report No. 2 to mean an intake of 200 pCi/day of strontium-90 would result in a maximum individual dose of 1500-1800 mrem/year to the bone (or 500-600 mrem/year to the bone marrow). Our interpretation of FRC No. 2 is that a continuous dietary intake of 200pCi/day of strontium-90 would result in a maximum individual dose of 170 mrem/year or a dose of 50 mrem/year on the average to persons in the general population. This agrees with the value of 64 mrem/year derived from the recent publication of the International Commission on Radiological Protection (ICRP) for a similar exposure. In our opinion, Dr. Sternglass is over-estimated the bone marrow dose by at least a factor of three.

5. On pages 8 through 11, Dr. Sternglass develops a population dose, using a method with which we do not agree. He extrapolates his estimated daily excess strontium-90 concentrations in milk from three dairy farms near the Millstone Plant as though they were the only milk suppliers to the population of New London County in Connecticut and half the population of Rhode Island. It is our opinion that the average concentration of strontium-90 in milk from the actual milk sources supplying the population should be used. This is the approach taken by EPA's Environmental Radiation Ambient Monitoring System (ERAMS), which is designed to estimate the average intake of radionuclides in milk consumed by major urban populations of the United States. For this purpose, samples are taken only of pasteurized milk from supermarkets or milk processing plants. Using the data from ERAMS, Dr. Sternglass notes on page 8 that radionuclide concentrations in milk from Hartford are very closely equal to the average for the United States. These data representing milk actually consumed in the urban area of Hartford, Connecticut, should be used to estimate population doses to residents of Connecticut rather than data on milk samples from only three individual farms.

Additional Comments

1. On page 6, it is stated that strontium-90 bone marrow doses are comparable to those doubling the risk of childhood leukemia and cancer. However, the doubling dose referred to in the report by Dr. Alice Stewart is for total body fetal irradiation and the bone marrow dose from strontium-90 actually represents little exposure to the fetus or other organs. The bone marrow dose used by Dr. Sternglass is applicable to children but not for internal exposure of the fetus.

2. On page 7, he states the average (actually maximum by his calculations) dose from strontium-90 in milk and other food is 500 times larger than the Millstone plant environmental report claims. However, no data on food other than milk is shown in his report. The source of data on "other food" is not given nor are any of the strontium-90 concentrations.

3. In Reference 16, it is implied that FRC Report No. 2 considered an infant bone dose of 7.5 mrem from water intake allowable. While this may be true, many other doses would also be allowable up to 170 mrem/year.

4. In Reference 18, a natural radiation dose equivalent of 84 mrem/year U.S. average and 65 mrem/year average for coastal plain areas like Connecticut is extracted from ORP/SID 72-1, a report by D. T. Oakley. However, in this report detailed data are given for Connecticut, i.e. 92.5 mrem/year average with a range around the State of 81.1 mrem/year to 111.0 mrem/year, up to two times the background selected for the State by Dr. Sternglass.

5. In Table 11, footnote (c), EPA support of a health cost of \$1000 per man-rem for dose to bone is implied. This is an error. EPA has not approved any particular cost for man-rem dose.

United States Senate

Washington, D. C., September 11, 1978

Respectfully referred to

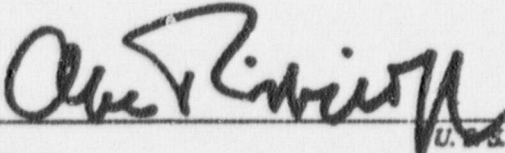
Congressional Liaison
Nuclear Regulatory Commission
Washington, D. C. 20555

I would appreciate having
your comments regarding Ms.
Hannum's attached correspon-
dance.

Thank you.

Please respond to:

Senator Abraham Ribicoff
Suite 337
Russell Senate Office Bldg.
Washington, D. C. 20510



U.S.

Form No. 3

16-48102-8 GPO

GPO : 1977 O - 99-838

-5 8 33

R.D. 5

Lyne Regis

Old Lyme, Ct. 06371

September 2, 1978

Dear Senator Ribicoff:

Belatedly I have learned about the Sternglass report and am enclosing both that and his testimony presented last February at a Congressional seminar on low-level radiation.

I have been seriously concerned right along about the dangers of nuclear power in general and on a personal level about living within such a close radius of three operating nuclear power plants. Now that I have read these reports, I find that my concern has not only been justified but should have been even greater.

There are two issues involved here: one is the actual hazard presented by the nuclear plants; the other is the information gap. If faulty fuel units release excess radioactive material somewhere along the way, the public should know about it. The figures were available; it took Sternglass's sleuthing to uncover them.

My questions are: what now? what can you do? what can I do?

I am tired of Nuclear Utilities defending its vested interest at the expense of all of us and of their sending rosy reports about nuclear power with the electric bills. And it distresses me that our government goes along with the hoax. The government should be protecting all the people, not the nuclear power industry.

Anyone who takes off his or her blinders cannot fail to see that the scientists who are speaking out against nuclear power (such as Sternglass or the Union of Concerned Scientists, etc.) are interested in the survival of the human race.

I repeat: what can we do?

Sincerely,

Hildegard Hannum

P.S. The milk I drink comes from a farm in Norwich. How can I find out if the milk from that particular farm is too dangerous to drink?

POOR ORIGINAL

STRONTIUM - 90 LEVELS
IN THE MILK AND DIET NEAR
CONNECTICUT NUCLEAR POWER PLANTS

By

E. J. Sternglass
Professor of Radiological Physics
Department of Radiology
University of Pittsburgh
Pittsburgh, Pennsylvania 15261
October 27, 1977

The full report with tables is available for \$5.25 from:
National Technical Information Service
5285 Port Royal Road
Springfield, Virginia 22161

order catalog # BNWL - 2284