OHIO DEPARTMENT OF HEALTH 53 FR 38865 July 29, 1948



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GEORGE V. VOINOVICH

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September 16, 1998

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A. Rohseni

Mr. John C. Hoyle Secretary of the Commission U.S. Nuclear Regulatory Commission Washington, DC 20555-0001

ATTENTION: Docketing and Services Branch

Dear Mr. Hoyle:

Subject: Comments by Dr. Ernest L. Mazzafferri, M.D. to Draft NUREG-1633, "Assessment of the Use of Potassium Iodide (KI) As a Public Protective Action **During Severe Core Accidents."**

The attached set of comments are being forwarded to you on behalf of Dr. Ernest L. Mazzaferri, M.D. These are being forwarded in response to the USNRC request for comments, published in the Federal Register, Notice 63FR38865, dated July 20, 1998.

Dr. Mazzaferri is Professor of Internal Medicine and Physiology, Chairman of Internal Medicine, The Ohio State University, Department of Medicine. He is a leading expert on thyroid disease and serves on the National Academy of Science committee that reviews data on thyroid effects from U.S. atomic bomb fallout and effluents from federal high-level waste and spent fuel reprocessing facilities. In our view, Dr. Mazzaferri is highly qualified to give expert opinion on this matter; and therefore, we solicited his comments to the draft NUREG-1633 by our letter to him, which is also attached, and which asks him to respond to certain questions that we posed to him. Both letters are being forwarded, in order that you may have a complete understanding of the questions posed and Dr. Mazzaferri's response.

Sincerely,

Roger L. Suppes, Chief Bureau of Radiation Protection

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Attachment

Ernest L. Mazzaferri, OSU pc: Deborah L. Arms, ODH, Prevention Harvey B. Brugger, ODH-BRP Frank J. Congel/Aby S. Mosheni, NRC-AEOD

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September 14, 1998

Roger L. Suppes Chief, Bureau of Radiation Protection Ohio Department of Health 246 N. High Street P O Box 118 Columbus, OH 43266-0118

Re: Use of Potassium Iodide by the Public in the Event of a Nuclear Power Plant Accident

Dear Mr. Suppes:

I have reviewed the documents that you sent me concerning an analysis of potassium iodide (KI) prophylaxis for the general public in the event of a nuclear accident. I will try to answer the questions that you posed to me in your letter of August 24, 1998.

The first question you asked me to comment upon was the proposed projected dose level for taking potassium iodide. The Chernobyl accident clearly indicates that the risk of thyroid cancer only focurs in children, mainly those under age 10. After age 15, there was no increase in the incidence of thyroid cancer in adults. The levels of radiation, namely 5 REM in children and 25 REM in adults, is a very conservative estimate that is likely to be below the dose necessary to induce cancer. The data for children, the main population for which preventive therapy should be targeted, probably is around 10 REM and higher.

- 2. I do not think that it is necessary for the entire exposed population to take potassium iodide. The risk is mainly in children under the age of 15 and in pregnant women. I think the risk of ingesting potassium iodide to the remainder of the population would, on balance, equal or exceed that posed by a risk of radiation-induced thyroid cancer caused by I-131.
- 3. The major risk in taking pc.assium iodide is in pregnant women or those who are lactating or breastfeeding. Prolonged use of potassium iodide will cause a goiter for children in either situation. However, the acute use of potassium iodide over one or two days is not normally associated with this problem and would not pose an unduly large risk to pregnant women or those who are lactating. The doses that you mentioned in your memorandum, one-half tablet to babies under one year of age and one 130 mg tablet to children over this age, should not pose a serious risk of thyroid disease in these children. This is exactly the group who will develop thyroid cancer should they be exposed to large doses of radioiodine in the order of 10 RADS or greater to the thyroid gland.

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- There has been some uncertainty in the past as to whether I-131 will induce thyroid cancer. The Chernobyl accident, however, has clearly documented the excess number of thyroid cancers in children following exposure to I-131. The thyroid cancer that has occurred in these children seems to be more aggressive than usual, associated with a large number of pulmonary metastases. This is a serious disease that requires therapy, often for a person's entire life. Accordingly, distribution of potassium iodide to be given to the target population (children and young adults under age 15) clearly outweighs the risks posed to this target group.
- 5. If the government could prevent the ingestion of radioiodines that people were nonetheless exposed to gamma radiation from an explosion, thyroid cancer could still occur in the exposed population. Again, this appears to be greatest in children and young adults.
- 6. Potassium iodide ordinarily inhibits uptake of radioiodines for longer than eight hours, as noted in the figure. It's difficult to project precisely; however, I believe that the potassium iodide dose posed is likely to be beneficial for longer than 24 hours, since it would expand the iodide pool sufficiently to dilute the dose of radioiodine captured by the thyroid gland.
- 7. It probably would be more effective to take two potassium iodide tablets, one each on consecutive days. Given the situation that you describe, I agree that it's unlikely that people under such stressed conditions would be likely to remember to take the drug.
- 8. The side effects of potassium iodide are not likely to occur immediately when the tablets are given. Instead, these are generally long-term effects that occur days to a week after the drug is ingested. I don't think it would be a problem to have someone distributing the drug who is not a trained medical person.
- 9. I do not know the answer to the question that you pose concerning the storage conditions of potassium iodide. I do, however, know that it must be protected from light and stored at reasonable room temperatures. From a practical standpoint, I doubt that most people would remember where their potassium iodide was stored after a several year period.
- I would not recommend that the population at large be given a supply of potassium iodide. Instead, I think that a system should be devised to distribute it to the population should the need arise.

I hope these comments are of some use to you.

Sincerely, Massalin

Ernest L. Mazzaferri, MD, MAC Professor of Internal Medicine and Physiology Chairman of Internal Medicine

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