



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

NRC PUBLIC
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Docket No. 50-320

AUG 21 1980

The Honorable Bill Goodling
United States House of
Representatives
Washington, D. C. 20515

Dear Congressman Goodling:

I am writing in response to your note of June 23, 1980, to the NRC regarding the letter of June 19, 1980, from your constituent, Geraldine Trust. Ms. Trust expressed concern about the health effects of the TMI-2 accident of March 28, 1979, and purging the reactor building atmosphere.

I am enclosing three documents which address the concerns in Ms. Trust's letter:

1. "Final Environmental Assessment for Decontamination of the Three Mile Island Unit 2 Reactor Building Atmosphere" (NUREG-0662, Vol. 1)
2. "Answers to Questions About Removing Krypton from the Three Mile Island, Unit 2 Reactor Building" (NUREG-0673)
3. "Population Dose and Health Impact of the Accident at the Three Mile Island Nuclear Station" (NUREG-0558)

Several of Ms. Trust's concerns result from misunderstanding and misapplication of certain information and I have addressed them below.

The assumption that venting 57,000 Ci of krypton-85 will result in a whole body 5 mrem dose (and the corresponding extrapolation to a resultant whole body dose from 13,000,000 Ci of noble gases released during the accident) is erroneous. The 5 mrem dose is an annual design objective of Appendix I to 10 CFR Part 50 for maintaining releases of radioactive materials in gaseous effluents from normal operating reactor plants as low as reasonably achievable. The corresponding annual design objective for beta skin dose is 15 mrem. It is not the expected dose resulting from venting 57,000 Ci of krypton-85. As shown in the staff's Environmental Assessment (Reference 1), the reactor building purge is expected to result in a 0.2 mrem whole body dose and a beta skin dose of 11 mrem.

Krypton-85 is not a neutron emitter but is an emitter of beta radiation. A good summary of the physical and chemical characteristics of krypton-85 can be found in Section 7 of Reference 1.

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Ms. Trust also expresses concern about the health effects resulting from venting the TMI-2 reactor building atmosphere. Section 7 of Reference 1 provides a detailed discussion of anticipated health effects and places the risk of this evolution in perspective. As Section 7 shows, the health risks associated with the purge are negligible.

It should be noted that authorization to purge the TMI-2 reactor building was provided by the Commission on June 12, 1980, purging commenced on June 28, and was concluded on July 11. The purge was completed well within the dose design objectives discussed above.

I trust that the enclosed information and above comments adequately respond to Ms. Trust's concerns.

Sincerely,

(Signed) T. A. Rehm

William J. Dircks, Acting
Executive Director for Operations

Enclosures:

1. NUREG-0662, Volume 1, May 1980
2. NUREG-0673
3. NUREG-0558
4. Incoming letter dated 6/23/80

Rep. Bill Goodling

JUN 20 1980

1974 Duell Ct
York Pa 17404
June 19, 1980

It is estimated that 13,000,000 to 15,000,000 curies, consisting mainly of Xenon gas, was vented during the TMI accident in less than fifteen days. Let Ed plans to vent another 57,000 e, consisting mainly of Krypton gas over a period of thirty days. The order limits the whole body dose to 5 millirem. If fifty seven thousand curies vented over thirty days gives us a whole body dose of five millirem, what was the whole body dose of thirteen million curies vented over fifteen days?

$$\frac{57,000 \text{ e}}{30 \text{ days}} = 5 \text{ mr} \quad \frac{13,000,000 \text{ e}}{15 \text{ days}} = ? \text{ mr}$$

$$57,000 \xrightarrow{228} \frac{13,000,000 \text{ e}}{15 \text{ days}} \quad \frac{5 \text{ mr}}{30 \text{ days}} \xrightarrow{2}$$

$$228 \times \frac{57,000 \text{ e}}{30 \text{ days}} = 5 \text{ mr} \times 228$$

$$\frac{13,000,000 \text{ e}}{30 \text{ days}} = 1,140 \text{ mr}$$

$$2 \times \frac{13,000,000 \text{ e}}{15 \text{ days}} = 1,140 \text{ mr} \times 2$$

$$\frac{13,000,000 \text{ e}}{15 \text{ days}} = 2,280 \text{ mr}$$

$$\frac{13,000,000 \text{ e}}{15 \text{ days}} = 2.3 \text{ Rem}$$

The people of TMI were exposed to at least 2.3 rem, along this rough rule of thumb, during the

accident. If the bulk of the thirteen to fifteen million curies was vented over a shorter period of time, say seven days, the figure could be 5 rem or higher. The NRC is currently investigating allegations that the people of TMI were exposed to 10 rems an hour, at times, during the accident.

"Ten rems can damage the lymph nodes and spleen; decrease the bone marrow and blood cells although you do not feel the symptoms!"

Nuclear regulatory commission rules prohibit nuclear plant workers from being exposed to more than 5 rem over the course of an entire year. They also prohibit workers from being exposed to more than 3,000 millirem in a 3 1/2 month period. The general public is prohibited from being exposed to more than 25 millirem over the course of a year.

Original reports stated that the people of TMI were exposed to 2 millirem during the accident. This is ludicrous in light of the fact that 57,000 e will expose us to 5 millirem. Now a German study contends that venting will expose us to cancer causing levels of radiation. I will take my young daughter to Maryland during the venting because I do not trust the NRC or Met Ed to put our health and welfare above financial interests.

The most remarkable thing, besides the accident itself is the lack of information and misinforma-
fed to the public. The obvious

inaccuracies in official statements by the NRC and Met Ed drove me back to my college chemistry books.

Beta particles are electrons that carry a negative charge. They can travel several meters through the air and penetrate 1-2 mm into solid material. Beta particles can damage the skin. If the beta emitter is inhaled the source will be carried to the internal organs and cause severe damage.² Xenon and Krypton are both noble gases and we can't help but inhale them.

Krypton is an example of a neutron emitter.³ Unlike alpha and beta particles, neutrons carry no charge. Neutron emitters are used in Nuclear plants because the neutrons are not repelled by a positive or negative charge and are more likely to hit the nuclei of atoms. The penetrating ability is the same as beta particles.

I assume this is why we were told by the NRC that Krypton is a harmless beta emitter.

Krypton is not harmless as we have been told and being a neutron emitter is probably more dangerous than a beta emitter, because the neutrons will be more likely to hit the nuclei of atoms. Krypton is not the only radioactive element contained in the atmosphere of the reactor, the others are even worse. They are only beginning to detoxify the plant and the Krypton isn't the last they expect us to inhale or ingest.

It is very important to limit the radiation exposure to pregnant women and children because of the

large number of rapidly dividing cells in their bodies. If a damaged cell reproduces itself wildly this can lead to cancer. If the DNA strands of our reproductive gene cells repair themselves incorrectly we will have genetic mutations and birth defects even in far future generations?

There is no safe level of exposure, and there is no dose of radiation so low that the risk of malignancy is zero.

The question is not will there be health effects associated with the accident or venting. The question is how many and how severe?

The NRC said the chance of getting cancer from venting is one in one thousand. About one hundred thousand people live in the 0-5 mile radius. Does this mean we can expect one hundred cancers?

If so what of the accident itself?

We may not be able to determine the health effects for lack of data from years past. The infant mortality study was a joke. If I gave my high school biology teacher a report like that I'd have flunked. The study did not follow the rules of scientific procedure. The study did not compare the infant mortality data from years past to the present data. Instead

the study compared the TMI infant mortality rate to the state rate. The state rate is only an average and of course there are areas of the state where the infant mortality rate is higher or lower than the state rate. In addition the entire city of Harrisburg figures were included in the TMI study. The official

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explanation was that if the Harrisburg figures were not included the Infant Mortality rate for TMI would be significantly lower than the state rate. The state rate is totally irrelevant as are the Harrisburg figures. Red Herringings to reassure the public that nothing serious happened at TMI, I'm not that much of a fool and I maintained a B average in my twelve semesters of college level science courses, closer to an A in fact.

I lived in the 0-5 mile radius of TMI during the accident. My neighbor, who lived 34 ft. closer to TMI, was not surveyed although she suffered a miscarriage in her first trimester soon after the accident, I was surveyed but I delivered a live baby at the same hospital in June 1979.

All data, especially spontaneous abortions, should be correlated for the 0-5 0-10 mile radius of TMI for the years before and after the accident. This data should be plotted on maps to see what significant pattern, if any, emerged. This has not been done. I wonder if Met Ed's financial contribution to the surveys had anything to do with this?

The effects of radiation decrease according to the square of the distance $1/d^2$. If you double your distance from the radioactive source your exposure is reduced to $1/4$ of the original exposure. The people who lived closest to the accident were exposed to many times the radiation of those who live five miles away. I understand NRC calculations are based on a 25 to fifty mile radius. It strikes me as absurd.

I note that while the Independent concerned scientists approved venting they also called for evacuation of the zero to five mile radius. This was in addition to venting the Krypton into some kind of container. I'm sure they would not have recommended evacuation unless they thought it was important. The German Study confirms the risk to the population at large. I see no reason to believe the NRC or Mel Ed. They have always said the accident was not serious. I know better, certainly it was more serious than venting 57,000 e.

Radiation exposure is something like Russian Roulette. You never know if a damaged cell will start cancer, until it does, you don't know if its damaged your genes until you have a retarded baby or worse, you just don't know if the neutrons have hit vital cells or not. If you are lucky it won't, if you aren't lucky it will. The NRC is not telling us there is no risk, they don't dare. They are telling us that the risks are acceptable to them. They don't care if three people or one hundred people get cancer, and most likely those people will be babies or young children. Maybe they figure we've already been fried so it does not matter.

If they have nothing to hide why didn't they tell us Krypton was a neutron emitter. Why didn't the NRC scientists answer all questions put to them with answers that jive with chemistry text books. I don't trust them for this reason alone, there has been too much evasion and too many

statements made that were changed only after someone else pointed out that they were wrong.

I'm no expert. I have enough education to ask questions and those questions have not been answered. I'm sure there are many others like me. It has been said that an uninformed public is upset because they don't understand what is going on. Certainly we should be informed in a manner we can understand. It is ~~hard~~ our fault that the information has not been forthcoming from the NRC. Indeed, much of the information we have received has proved to be inaccurate. This is no way for the NRC to win back our trust.

Sincerely yours
Ludlow Timmer

References

- 1, 6, 7, 8
What about Nuclear Energy?
 by Kenneth F. Weaver
 National Geographic - April 1979
- 2, 3, 4, 5
Chemistry by Karen Timmer, M.S.
 A textbook for student nurses.