

Inwin D.J. Bross, Ph.D.
Director of Biostatistics
Roswell Park Memorial Institute
666 Elm Street
Buffalo, N.Y. 14263

8005120196

No opinions here expressed should be construed as reflecting official positions of the administration of
Roswell Park Memorial Institute or of the N.Y. State Health Department.

February 1, 1980

Richard H. Vollmer, Director
Three Mile Island Support
United States
Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Dr. Vollmer:

Thank you for your letter of January 18, 1980, commenting on the entombment option for the damaged installation at Three Mile Island and enclosing a notice of intent for an environmental impact statement dated 21 November 1979.

I can't believe that you mean what your letter says, so I will try to continue this dialogue. For one thing, what you say seems to contradict the last paragraph of the notice.

As I read you, you say in effect: We have rules and regulations that an installation must be neat and tidy before we would permit entombment. To follow these rules we will have to take the radioactivity now in the containment (where it is not harming anyone) and vent it into the atmosphere or dump it into the river (where it will be a serious hazard to the health and safety of the public). We are going to put workers into the containment (where the radioactivity will still be at dangerously high levels after dumping) to tidy things up so that we can, in the end, decide what to do (and probably end up entombing the whole thing). In other words, we are determined to go by the book even if this means we end up with the same concrete mausoleum and, in the process, we waste hundreds of millions of dollars and kill or harm the workers and the citizens of at least three states.

I can't believe it.

The Three Mile Island accident did not go "by the book" and NRC and DOE and everyone else have got to consider solutions which are not in the book. I take your point about heat generation. However, this simply means that there must be a self-contained cooling system (e.g. a piping system) in the concrete for this purpose. As a child in the early 1930's at Boulder Dam, I saw this technology (which is really a part of the process of putting in the concrete). True, there may

Richard H. Vollmer
February 1, 1980
Page 2

have to be additional heat-exchangers here to get the concrete to set properly, but apart from the current NRC regulations (which I hope can be modified to save a few hundred lives) there is no reason to remove the fuel rods. Entombment would be ample protection against this immobilized radioactivity.

My basic points are:

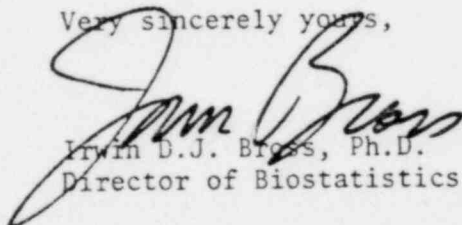
(1) As long as the radioactivity is immobilized in concrete inside the containment it won't hurt anyone. On the other hand, if it is dumped it will vitiate the whole point of the expensive containment and will produce an environmental disaster.

(2) The entombment can be done remote--by machines and not men. Hence, the system can be put in place without serious exposure to workers and at a fraction of the cost of "going by the book".

(3) This NRC offhand dismissal of what should have been the first option considered hardly indicates that clean-up would be "done consistently with the public health and safety, and with awareness of the choices ahead". Instead it shows a "regulatory mentality" which is determined to "go by the book" when the book needs to be rewritten.

From DOE I would expect this (see my enclosed Draft Environmental Impact Statement for the West Valley clean-up). I was hoping for more from NRC. I did, at least, get a coherent and organized statement from you (which I probably wouldn't have received from DOE) so there is at least a basis for dialogue. What I would like to hear from you is that NRC would consider and at least get a preliminary feasibility study on the entombment option (even if it means changing some regulations). I believe Congress would help you if new laws are needed for the changes.

Very sincerely yours,



Irwin D.J. Brass, Ph.D.
Director of Biostatistics

IDJB/mak
Enc.

Irwin D.J. Bross, Ph.D.
Director of Biostatistics
Roswell Park Memorial Institute
666 Elm Street
Buffalo, N.Y. 14263

No opinions here expressed should be construed as reflecting official positions of the administration of
Roswell Park Memorial Institute or of the N.Y. State Health Department.

February 28, 1980

President Jimmy Carter
White House
1600 Pennsylvania Avenue
Washington, D.C. 20500

Dear Mr. President:

Although there is little chance that you will see or hear about this letter, it contains an urgent warning concerning the health and safety of hundreds of thousands of Americans who live downwind or downstream from Three Mile Island.

According to the news reports, the Presidential Commission has recommended venting the radioactive gases at TMI into the atmosphere. This is said to be necessary to get the clean-up started. It is also said that by venting very slowly, the hazards from the gases will be minimal.

The latter statement sounds plausible and statements like this have been made for 25 years, but it is flatly contradicted by the scientific evidence on low-level radiation hazards that is available in 1980 (A). No matter what the rate of venting may be, the total radioactivity vented is the same. What is now clear (see the attached report that summarizes the new findings on this question) is that the amount of genetic damage in the exposed population will be maximized by slow release over an extended period. A brief non-technical scientific explanation for this is appended (B).

The assertion that this venting is necessary is also a serious technical error that derives from the mind-set of federal regulators, not from the technical evidence. There is a technical option which would not require any venting of radioactivity into the atmosphere. It is called "entombment" and with this option all of the radioactivity presently in the containment would remain in the containment. It could not be a danger to the health and safety of persons living in the general area of Three Mile Island. The basic idea of entombment is simply to immobilize the radioactivity in the air and water or elsewhere in the entombment in concrete. In effect, the containment would be partially filled up with concrete by remote-controlled processes.

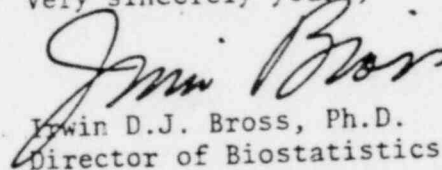
The NRC will not consider this option because the current regulations require a plant to be in good operating condition when it is entombed. TMI is obviously not in such condition. An exchange of letters between NRC and myself (C) is enclosed. It may sound incredible that a federal regulatory agency should take the position that the radioactivity should be vented, dumped into the river, or trucked out, and the health and safety of hundreds of thousands of persons endangered before it is willing to consider the entombment option. Read the letters for yourself and you can see why the Commission was misinformed.

Let me stress that this letter concerns a public health question and that "pro-nuke" vs. "anti-nuke" issues are irrelevant here. The NRC regulation makes sense in ordinary circumstances but not in the TMI accident situation. Entombment is a major option here which should be seriously considered on its own merits and should not be ruled out by fiat.

In terms of costs, it is by far the most economical option. This is true whether the costs are measured in dollars, energy, workers' lives, or residents' lives. I believe it is the only practical option and that it will be the eventual choice. Hence, before an irreversible step such as venting into the atmosphere is taken, a step that is clearly unnecessary with entombment, this option should at least get careful consideration.

I urge you to instruct the Presidential Commission to reconsider its recommendation and to prohibit venting until they have at least taken the trouble to consider the new evidence on low-level radiation hazards. As can be seen from the Abstract for my new report (which is based on an invited lecture given last October in Heidelberg at the Cancer Center), the proposed venting will maximize the risks of cancer and other manifestations of genetic damage to the persons living downwind from TMI.

Very sincerely yours,


Irwin D.J. Bross, Ph.D.
Director of Biostatistics

IDJB/mak

- Attachments: (A) A 1980 Reassessment of the Health Hazards of Low-Level Radiation Hazards.
(B) Why the Cancer Risk-per-Rad is Maximized at Low Doses.
(C) Correspondence with NRC

Abstract

A decade ago the risks of leukemia from exposures to low levels of ionizing radiation were estimated by linear extrapolation from data on persons exposed to much higher levels. In recent years, however, a number of scientific studies have reported excess risks where the data was on persons actually exposed to low-level radiation. The new findings are incompatible with the estimates based on the Linear Hypothesis although these estimates continue to be used in public health. Fifteen studies involving low-level nuclear radiation and ten studies involving diagnostic radiation are listed and briefly described. Most of these studies have positive qualitative findings but a few also have quantitative estimates of risk such as doubling doses. The qualitative findings would be extremely unlikely at the estimated exposure levels (which represent average exposures well under 5 rads or rems) if the extrapolative estimate of over 100 rads of the Federal Interagency Task Force Report were correct. The quantitative estimates from the data on persons exposed to low-level radiation give doubling doses in the vicinity of 5 rads and are also incompatible with the extrapolative estimates. The failure of the Linear Hypothesis to fit the new facts seems to reflect a greater efficiency-per-rad in producing genetic damage for the low-dose range than for the high-dose range.

WHY THE CANCER RISK-PER-RAD IS MAXIMIZED AT LOW DOSES

While at first it might seem surprising that the risk of cancer and other manifestations of genetic damage will be greater on a per-rad basis for low doses extended over a long period of time than for high doses given in a short period, there is now little scientific question that this is actually the case.

This means that the proposed venting of radioactive gases from the Three Mile Island containment in small amounts over a longer period of time is not any safer for those living in the TMI area than an accidental loss of containment of the same amount of radiation. Spreading out a given total dose minimizes the short-term biological effects but actually maximizes the much more serious long-term effects which involve genetic damage.

There is a simple scientific explanation of why the effects are maximized by repeated low-dose exposures. We now know that the immediate cause of radiation-induced cancers is the production of a break-point or damage to the complex biochemical structure of the DNA of human genetic material. As Dr. B.N. Ames recently reported in Science, 204(4393):587-593, 1979:

"Damage to DNA appears to be the major cause of most cancers and genetic birth defects, and it may contribute to aging and heart disease."

There are two steps in the causation of cancer. First, the production of the break-point by the ionizing radiation. Second, the reproduction of this misinformation by cloning of the damaged cell. The misinformation must be reproduced many millions of times before the effects can be seen clinically. This is why low-level radiation effects are subtle and occur many years after the actual exposure.

At low levels of ionizing radiation it is unlikely that there will be a single break point produced in a given cell and extremely unlikely that there will be more than one. However, at high levels of radiation two or more break-points may occur. This heavier damage is likely to be "wasted" for the production of cancer since it may block the reproduction of the damaged cell. In effect, the cancer is caused and cured at the same time.

Because the break-points produced at high doses are "wasted" so far as the production of cancer is concerned, the risk of cancer on a per-rad basis is less at high doses than at low doses. This is not a theoretical point because in the data from the Rochester epidemic of breast cancer produced by high doses of x-ray given for post-partum mastitis this can be seen from the dosage-response curve (JNCI, 60(4): 727-728, 1978). My invited lecture at Heidelberg cites more than 20 scientific reports that support this finding on efficiency of genetic damage per rad.

Hence, the proposed venting of radioactive gases at TMI will not be safe and will actually result in the maximum risk of genetic damage and cancer for the population downwind from the containment.

Irwin D.J. Bross, Ph.D.
Director of Biostatistics
Roswell Park Memorial Institute
666 Elm Street
Buffalo, N.Y. 14263

No opinions here expressed should be construed as reflecting official positions of the administration of
Roswell Park Memorial Institute or of the N.Y. State Health Department

February 28, 1980

President Jimmy Carter
White House
1600 Pennsylvania Avenue
Washington, D.C. 20500

Dear Mr. President:

Although there is little chance that you will see or hear about this letter, it contains an urgent warning concerning the health and safety of hundreds of thousands of Americans who live downwind or downstream from Three Mile Island.

According to the news reports, the Presidential Commission has recommended venting the radioactive gases at TMI into the atmosphere. This is said to be necessary to get the clean-up started. It is also said that by venting very slowly, the hazards from the gases will be minimal.

The latter statement sounds plausible and statements like this have been made for 25 years, but it is flatly contradicted by the scientific evidence on low-level radiation hazards that is available in 1980 (A). No matter what the rate of venting may be, the total radioactivity vented is the same. What is now clear (see the attached report that summarizes the new findings on this question) is that the amount of genetic damage in the exposed population will be maximized by slow release over an extended period. A brief non-technical scientific explanation for this is appended (B).

The assertion that this venting is necessary is also a serious technical error that derives from the mind-set of federal regulators, not from the technical evidence. There is a technical option which would not require any venting of radioactivity into the atmosphere. It is called "entombment" and with this option all of the radioactivity presently in the containment would remain in the containment. It could not be a danger to the health and safety of persons living in the general area of Three Mile Island. The basic idea of entombment is simply to immobilize the radioactivity in the air and water or elsewhere in the entombment in concrete. In effect, the containment would be partially filled up with concrete by remote-controlled processes.

6
copy 4/1/82

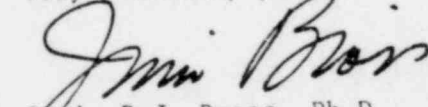
The NRC will not consider this option because the current regulations require a plant to be in good operating condition when it is entombed. TMI is obviously not in such condition. An exchange of letters between NRC and myself (C) is enclosed. It may sound incredible that a federal regulatory agency should take the position that the radioactivity should be vented, dumped into the river, or trucked out, and the health and safety of hundreds of thousands of persons endangered before it is willing to consider the entombment option. Read the letters for yourself and you can see why the Commission was misinformed.

Let me stress that this letter concerns a public health question and that "pro-nuke" vs. "anti-nuke" issues are irrelevant here. The NRC regulation makes sense in ordinary circumstances but not in the TMI accident situation. Entombment is a major option here which should be seriously considered on its own merits and should not be ruled out by fiat.

In terms of costs, it is by far the most economical option. This is true whether the costs are measured in dollars, energy, workers' lives, or residents' lives. I believe it is the only practical option and that it will be the eventual choice. Hence, before an irreversible step such as venting into the atmosphere is taken, a step that is clearly unnecessary with entombment, this option should at least get careful consideration.

I urge you to instruct the Presidential Commission to reconsider its recommendation and to prohibit venting until they have at least taken the trouble to consider the new evidence on low-level radiation hazards. As can be seen from the Abstract for my new report (which is based on an invited lecture given last October in Heidelberg at the Cancer Center), the proposed venting will maximize the risks of cancer and other manifestations of genetic damage to the persons living downwind from TMI.

Very sincerely yours,


Irwin D.J. Bross, Ph.D.
Director of Biostatistics

IDJB/mak

- Attachments: (A) A 1980 Reassessment of the Health Hazards of Low-Level Radiation Hazards.
(B) Why the Cancer Risk-per-Rad is Maximized at Low Doses.
(C) Correspondence with NRC