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January 4, 1990

MEMORANDUM FOR: Hugh L. Thompson, Jr.
Deputy EDO for Nuclear Materials
Safety, Safeguards, and
Operations Support

FROM: Peter Crane

SUBJECT: PANEL REVIEW OF DIFFERING PROFESSIONAL OPINION ON THE STOCKPILING OF POTASSIUM IODIDE

I have received the report of the review panel that considered my DPO on potassium iodide. The first thing to be said is that the panel has obviously taken the assignment seriously, and has expended considerable time and effort coming up with its reevaluation of the costs and benefits of potassium iodide. Though as described below I believe that the panel has interpreted its charter with undue narrowness, that is not intended as a reflection on the competence or integrity of the analysis that the panel performed.

The panel finds that the ratio of costs to benefits is not 500 to 1 ($10,000,000 to $20,000), as the staff told the Commission in 1983, but perhaps as low as 6 to 1 ($7,500,000 to $1,200,000). It would be still lower but for the fact that (1) NUREG-1150 has reduced, by a factor of three, the estimated amount of iodine released in an accident, and (2) the panel calculates that 150,000,000 doses of KI would have to be stockpiled, a figure that strikes me as probably excessive. The review panel proposes to share this information with the states and other federal agencies.

To interpret the DPO as challenging the accuracy of the cost-benefit analysis in NUREG-CR-1433 is certainly correct. To interpret it as requesting no more than a recalculation of the cost-benefit analysis in that document is in large measure to miss the point, however. I had hoped to prevent just such a misunderstanding by itemizing my concerns in a brief supplementary memorandum to the members of the review panel, dated July 25, 1989.

I don't propose to rehash here everything in the DPO or the July 25 memorandum. Both those documents are in the package sent you by the review panel. Briefly, the crux of the DPO was the contention that the information on KI that was given to the Commission and the public in 1983, and was in part the basis of the Commissioners' policy decision, was baloney. If the panel does not deal with that contention it has only done part of its job.

The review panel states correctly: "A major point of this DPO ... appears to be that previous staff analyses neither explicitly noted nor adequately treated the fact that a fraction of the thyroid nodules produced as a result of an accidental release of iodine could result in cancers, with a small fraction of these predicted to result in fatalities." What I do not see is the panel's explicit finding as to whether this claim was valid. The revised cost-benefit calculation seems to imply agreement with the claim, but at the same time, the panel recommends that current Federal guidance, which among other things refers states and localities to the cost-benefit analysis of NUREG-CR-1433, should remain unchanged. Which is it? If nothing else, any further guidance the NRC puts out on the subject of potassium iodide ought to be clear.

I would also note that the panel's estimate rests on the supposition, derived from the Reactor Safety Study, that a large release will occur no oftener than once every thousand years (assuming 100 reactors). There is no discussion of the error bounds on that estimate -- in contrast to NUREG-CR-1433, which noted (1) that the Reactor Safety Study used error bounds of one-fifth and five, and (2) that the 1978 Lewis Committee concluded that those error bounds were "greatly understated."

The panel offers no satisfactory answer to the point made by the ACRS and OPE in 1983: that if the probability of a large release is so small, not only KI but other aspects of emergency planning -- sirens, drills -- might fail the test of cost-effectiveness. To say that KI is not cost-effective and recommend against it on that basis is to create the misimpression that other kinds of emergency preparedness do pass the cost-effectiveness test.

The panel notes that KI has to be administered before or a few hours after exposure to be useful. That is true; but it should be recalled that, as with the Poles after Chernobyl, some time may elapse between the release from the plant and the arrival of the plume at a particular populated area.

There is one other common sense point that is perhaps too obvious to need stating: that when you are talking about serious disease, a straight dollar-for-dollar balancing of the cost of prevention against the cost of treatment makes no sense at all. The cost-benefit analysis presented to the Commission in 1983 was premised, however, on the contrary notion: that it is not cost-effective for society to spend a penny more than $20,000 to prevent a case of disease that can be treated at a cost of $20,000. But what individual would consider having a serious illness, with someone else paying the bills, to be just as satisfactory as having good health? No one, of course. By the same token, therefore, why is it not reasonable for society to spend more on

preventing 100 cases of cancer than the precise dollar cost of treating those 100 cases if instead of being prevented they are allowed to occur?

Finally, there is a point contributed by Dr. David Becker of the American Thyroid Association, whom the panel consulted as part of their review of the DPO. He observed that if an accident occurs and competent authorities decide that use of KI is not warranted, that decision will have credibility only if there is a stockpile of KI that could be used.

In closing, I would like to go on record as stating that my DPO was handled in a competent professional manner and that the panel carefully addressed the basic technical issues that I raised. Although the panel still concludes that application of KI is not cost effective, I am gratified that the panel's conclusions support my assertion that the staff's prior characterization grossly understated the worth of KI. It is important that this significant change in the staff's technical assessment be reported to the Commission, and I agree with the panel's recommendation that the information developed by the panel be provided to the states and other interested federal agencies. (I assume that the panel contemplates making the information available to the public at the same time.) One means of providing this information would clearly be to revise NUREG-CR-1433, but this might be unduly time-consuming. I would leave it to the judgment of the Commission how best to assure that the record is promptly corrected.

cc: T. Speis
F. Congel
L. Soffer
A. Roecklein

January 5, 1990

Hugh --

Just a followup point to our KI discussion of yesterday. NUREG-0654, the 1980 document establishing the criteria for emergency plans, was based on NUREG-0396, "Planning Basis for the Development of State and Local Government Radiological Emergency Response Plans in Support of Light Water Nuclear Power Plants" (November 1978). That document considered and rejected a cost-benefit approach to emergency planning, by which the cost of emergency planning measures would be balanced against the health effects prevented. (I didn't come across this fact until after we talked or I would have mentioned it.)

So what is the rationale for applying to this single aspect of emergency planning a decision-making approach that has been judged inappropriate for all other aspects of emergency planning?

Peter