March 2, 1991

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

FROM: Peter Crane
Counsel for Special Projects

SUBJECT: POTASSIUM IODIDE DPO

Robert Bernero, the Director of NMSS, kindly sent me a copy of the February 26, 1991 memo in which he addressed, in his words, "the residual part" of the Differing Professional Opinion on potassium iodide which I filed on June 16, 1989. Reading his lucid analysis of the substantive issues involved, I see considerably more to agree with than to disagree with. For example, he and I agree that a meaningful cost-benefit analysis of the use of potassium iodide for thyroid protection after nuclear accidents must take account of three quite distinct classes of radiation-caused thyroid illness: benign nodules, non-fatal malignancies, and fatal malignancies. We agree also that the costs of illness go far beyond the dollar costs of medical treatment, and that prior staff analyses have failed to take proper account of these costs. Furthermore, we agree that from a cost-benefit viewpoint, many aspects of our current emergency planning requirements would not pass muster.[1]

Yet I cannot agree with all parts of Mr. Bernero's memorandum.[2] My charge that the staff misled the Commission was

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[1] In making the point that other emergency planning measures would not pass the test of cost-benefit analysis, I was not arguing against the usefulness of cost-benefit analysis as a technique. Rather, I was arguing that if one rejects KI on cost-benefit grounds, without further explanation, the ordinary reader is likely to assume that those emergency planning measures which the NRC does require would meet the test of cost-effectiveness. In reality, if a serious reactor accident with offsite releases is likely to occur only once every 100,000 reactor years, as the staff estimates, then little in the emergency planning area is cost-effective. The ACRS and OPE, when the issue of KI was before them in the early 1980's, made the same point: that the NRC staff's arguments against the cost-effectiveness of KI were in fact arguments against the cost-effectiveness of emergency planning generally.

[2] Mr. Bernero appears not to have received my memo to the DPO panel of July 25, 1989 (a copy of which went to you). Probably as a result, he seems to be under the mistaken impression that I favor predistribution of KI. In that memo, I wrote: "I see innumerable

not based on the deficiencies I saw in the staff's approach, as Mr. Bernero surmises, but rather on what was said to the Commission and the public in the briefing of November 22, 1983. That transcript speaks for itself; I will not rehash all the points I made about it in my DPO. Let me make just one point, and make it bluntly: when Roger Blond told Chairman Palladino that "the surviving question is not the question, and that's the piece that really should also be emphasized" (Transcript at 63), his statement was hogwash. In truth, as Mr. Bernero's memorandum recognizes, survival is the question for a significant fraction of the persons who develop thyroid nodules as the result of exposure to radiation. Some 40% of those nodules will be malignant, and Mr. Bernero estimates that 6% of the malignancies will prove fatal. (I agree with him that 6% is a more realistic figure than the 10% used in the staff's earlier analyses.) A fatality rate of 2.4% of all thyroid nodules may seem small, but it is not negligible; and as Mr. Bernero recognizes, non-fatal thyroid cancer is not without impacts on the patient's life.

The person who listened to Mr. Blond that day would have come away with the impression that the worst thing to be encountered, if radiation led to thyroid illness, was a "nodule," removal of which would entail "a few days' loss." Mr. Blond said: "If the cost of averting one nodule is on the order of $20,000, that's the cost that will be represented by the medical treatment and the loss of productivity of an individual if he had a thyroid nodule." (Transcript at 51.) At no time did Mr. Blond or anyone else volunteer the fact that two-fifths of those nodules would be malignant, or that some of the malignancies would prove fatal. The $20,000 figure, it turned out, referred not to nodules generally (as the hearer was bound to assume), but rather to the costs associated with a harmless, benign nodule. Analytically, this is as though someone attempted to prove that airbags are not cost-effective by offering statistics on "accidents" without mentioning that all accidents resulting in death or serious injury have been excluded from the data base.

Perhaps Mr. Blond, if challenged, would say that by "survival" he meant immediate survival. (Thyroid exposure alone is not going to kill anyone in the immediate aftermath of an accident.) But that is not what he said. To state that surviving is "not the question" creates the false impression that persons who develop radiation-caused thyroid disease will never have to worry about whether they will survive. In fact, all that can honestly be said is that in the event that a person is exposed to radiation after a nuclear accident, and does not receive a timely dose of potassium iodide, a number of years will

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probems with predistribution of potassium iodide. This differing professional opinion is directed solely to the merits of stockpiling."

probably elapse before thyroid disease capable of putting his or her survival in question can develop; and that if such disease does occur, the odds of the patient's survival will be quite high.

It is impossible for me to believe that Mr. Blond was unaware that his words would have the tendency to mislead (the word is used in the sense of "delude"), for he was the author of SECY papers and analyses that made clear that the health problem to which KI was directed was not just benign nodules, but also malignancies, some of which would be fatal.

It may be objected that the Commission had received a thick staff paper, SECY-83-362, which included the information that a certain percentage of the nodules resulting from an accident would be malignant, and that some of those would be fatal. Thus, it could be argued, the staff paper cured any inaccuracy in the briefing. The problem with that argument is that it assumes that the Commissioners had read the staff paper in advance of the meeting. The staff must have known, however, that Commissioners do not always have the opportunity to read background materials in advance of briefings.[3] In this case, the divergence between the written paper and the oral briefing is so substantial as to suggest that the Commissioners were assumed to be unfamiliar with the details of the staff paper.

It may also be objected that after the Office of General Counsel pointed out that the $20,000 figure referred only to the costs associated with a benign nodule, the staff, in a memo to the Commission from the Executive Director for Operations, acknowledged that if fatalities were factored into the analysis, the figure would rise to $100,000. Thus, it might be argued, this correction was sufficient to remedy the flaws in the briefing. The problem with that argument is that this correction was given only to the Commissioners, not to the public. If the information presented at the briefing was so flawed that the EDO felt obligated to advise the Commissioners of that fact, then the public, which had received the same misinformation, also deserved to be advised. It never was.

Finally, it may be argued (and Mr. Bernero's memo seems to take this position) that even if the Commission had been given completely accurate information, and analyses free from any flaw,

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[3] Compare the comment of Mr. Sniezek, Deputy EDO, writing to the Executive Director for Operations in an October 18, 1990 memorandum dealing with the briefings given to the Commission on the restart of the Pilgrim plant: "It was a mistake for senior managers not to have counselled the staff that they must 'assume the Commission does not have a high level of subject area knowledge when the staff makes presentations to the Commission.'"

the same bottom line result would have been reached -- i.e., that potassium iodide is not cost-effective -- and that any error on the part of the staff, whether inadvertent or deliberate, is therefore harmless. I would disagree, for at least two reasons.

First, the question is not merely one of the bottom line -- whether KI is or is not cost-effective -- but also of degree. The panel which reviewed my DPO found that the staff's earlier cost-benefit analysis was in error by about two orders of magnitude, and that while costs still exceeded benefits, the ratio of costs to benefits might be in the range of integers. (There are serious flaws in the DPO panel's own approach to measuring costs and benefits, but that is beside the point here.) A state mght not think twice about stockpiling KI if assured that costs exceed benefits by a ratio of 500 to 1; it might look more closely at the issue if told that the ratio is closer to 5 to 1.

Second, the process by which the bottom line is reached is just as important as the bottom line itself. In this case, if one concludes that KI is not cost-effective, it makes a difference whether one reaches that conclusion on the basis that (a) the health problem that KI can avert is a trivial illness, involving no more than "a few days off," or (b) though radiation-caused thyroid disease will be malignant in 40% of cases, and fatal in 2.6% of cases, the unlikelihood of an accident, the difficulty of getting KI to the affected population in time, the fact that KI protects only a single organ, and the cost of establishing a KI stockpile, combine to make it not worth while as a protective measure. Position (b), though I do not agree with it, is logically defensible; position (a) is not, for it is at odds with the facts. Since the NRC told the public (a) in 1983, I believe it has an obligation to correct the record in a straightforward manner, whether or not its bottom line position on the cost-effectiveness of KI has changed.

In sum, the question which I think must be answered -- as I have made clear repeatedly since June 16, 1989 -- is this: would a Commissioner or a member of the public who attended the briefing of November 22, 1983, have come away from that briefing with a substantially accurate view of the gravity of radiation-caused thyroid illness, and consequently with an adequate basis on which to judge the desirability of taking measures to prevent such illness? I would answer that question in the negative.

cc: Robert M. Bernero