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

SEP 27 1991

Mr. Alan Morris, President
Anbex, Inc.
113 Morris Ave.
Denville, NJ 07834

Dear Mr. Morris:

This is in response to your July 1, 1991 letter to Dr. Selin expressing concerns regarding NRC's current potassium iodide (KI) policy.

I have been apprised of your recent telephone discussions with NRC's Task Manager for this issue, and with an NRC attorney who has been concerned with this issue for several years. I have also been told of the telephone conversations you had with our contractor who is currently reassessing this issue, and I thank you for the valuable information you made available to him concerning costs and availability of packaged KI tablets.

As you already know from the aforementioned conversations (and as noticed in the Federal Register on September 28, 1990, cf. 39768), NRC is currently sponsoring a reassessment of the cost-benefit studies regarding KI use to update the current bases for the Commission's policy on KI (NUREG/CR-1433, March, 1980). That current basis used severe accident probabilities and consequences from the Reactor Safety Study (RSS, WASH-1400) along with other pertinent data and information that was available in 1980 (for example, the cost and shelf-life of KI and the risks to the thyroid due to internal radioiodine exposure).

The NRC-sponsored reanalysis now underway will reevaluate the quantitative factors affecting KI use; integrate several qualitative factors into the revision; and reexamine and document the costs and benefits of both predistribution and stockpiling of KI. The quantitative factors that have significantly changed since 1980 and will be updated include: best estimates of the probabilities and consequences of severe accidents (e.g., NUREG-1150); estimates of thyroid risk as a result of radioiodine exposure; estimates of health risk to the public due to severe allergic reactions if large numbers of people take KI without medical supervision; and the cost and best estimate of the shelf-life of KI. The reanalysis will also consider qualitative factors including the intangible benefits of preventing a potentially grave illness. Furthermore, to the degree practical, the information now becoming available on the experience from the Chernobyl accident (April 1986) where significant

quantities of KI were administered by Polish and Soviet authorities will be considered.

It is not presently known how the combined effects of these updates will affect the cost-benefit ratio, since there are significant factors that will tend to change the cost-benefit ratio in both directions. For example: inclusion of the costs to ship, package, and store the KI (not previously included among the costs of the KI - only the purchase price of the KI tablets was included) will tend to increase the cost-benefit ratio; but consideration of the qualitative aspects, including the benefits of avoiding thyroid nodules as opposed to merely accounting for the charges for their removal once they occur, will tend to decrease the cost-benefit ratio.

This detailed reanalysis is being coordinated throughout its development with the members of the Federal Radiological Emergency Preparedness Coordinating Committee (FRPCC) and its chair agency, the Federal Emergency Management Agency (FEMA). As you know, the Commission's reanalysis will result in a recommendation to the FRPCC whether or not to change the Federal policy regarding KI. The FRPCC chair agency (FEMA) will coordinate the review of this recommendation, and if appropriate will initiate a revision in this policy.

I hope this letter is responsive to your concerns.

Sincerely,

Original Signed by
Hugh L. Thompson, Jr.
for James M. Taylor
Executive Director
for Operations

*SEE PREVIOUS CONCURRENCE

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POLICY ISSUE
(Information)

October 11, 1991

SECY-91-321

For: The Commissioners

From: James M. Taylor
Executive Director for Operations

Subject: RE-EVALUATION OF POLICY REGARDING USE OF POTASSIUM IODIDE (KI) AFTER A SEVERE ACCIDENT AT A NUCLEAR POWER PLANT

Purpose: To inform the Commissioners that a detailed reanalysis is now underway, as noticed in the Federal Register on September 28, 1990, cf. 39768, to update the current bases for the Commission's policy on KI (NUREG/CR-1433, March, 1980).

Background: The present federal policy regarding the stockpiling of KI was published in the Federal Register on July 24, 1985 by the Federal Emergency Management Agency (FEMA) in its capacity as chair-agency of the Federal Radiological Emergency Preparedness Coordinating Committee (FRPCC). As a FRPCC member, the NRC played a key role in development of that policy through its sponsorship of an analysis examining the cost-effectiveness of KI use on a national basis (NUREG/CR-1433, published in 1980).

The present (NUREG-1433-based) policy consists of voluntary federal guidance to the responsible state and local health authorities, who must decide among available options regarding use of KI by the general public during an actual emergency. The voluntary

Contact: R. Woods
492-3908

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guidance recommends that local authorities consider stockpiling and distributing KI for emergency workers and institution-alized persons, but does not recommend predistributing or stockpiling KI for the general public. The reason for this guidance is that in the event of an accident, protective actions are planned and would be taken for the general public that are capable of reducing whole-body doses, not merely the thyroid gland dose.

The NRC-sponsored, NUREG-1433 analysis used severe accident probabilities and consequences from the Reactor Safety Study (WASH-1400) along with other pertinent data and information that was available in 1980 (for example, the cost and shelf-life of KI and the risks to the thyroid due to internal radioiodine exposure).

Subsequent to the November 1983 Commission meeting during which the Commission was briefed by the staff on NUREG-1433 and the KI policy issue, a staff member from the Office of the General Counsel (OGC) noticed that there were differences between the oral discussion recorded in the transcript of the Commission meeting and the written materials that had been provided to the Commission in advance of the briefing, and that certain information concerning the cost of treating cancerous nodules had been omitted from the oral presentation[1]. This was pointed out to the Commission in a letter from the General Counsel, and the Commission was later provided with additional information by the EDO, OGC, and the Office of Policy Evaluation concerning this point. Thus the Commission was fully informed before reaching its policy decision in May, 1985.

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[1] During the oral discussion, the staff stated that the "benefit" associated with preventing a thyroid nodule was $20,000 per nodule prevented (the avoided medical charge associated with nodule removal). The costs of stockpiling adequate KI were given in terms of several concentric zones around nuclear power plant sites. Using a population-weighted average of those zones, it was calculated that the costs associated with stockpiling adequate KI for the population out to 100 miles from each nuclear plant was $5,100,000-/thyroid nodule prevented. Thus the cost/benefit ratio presented orally during the meeting was $5,100,000/$20,000 = 255. The SECY papers provided to the Commission before the meeting stated that the "benefit" associated with preventing a thyroid nodule was $100,000 (cancers and fatalities, which were not discussed at the meeting, were taken into account in the written material). The costs associated with stockpiling adequate KI were the same in the verbal and written material ($5,100,000), so the written material implied a cost/benefit ratio of $5,100,000/$100,000 = 51.

However, a Differing Professional Opinion (DPO) was subsequently filed raising concerns that the lack of verbal discussion described above could have significantly affected the Commission's perception of the value/impact ratio (and of the qualitative desirability) for KI stockpiling, and could have influenced state and local agencies in formulating their KI policies. Further, the DPO disagreed with several of the quantitative factors that were used in the NUREG/CR-1433 analysis, and raised the concern that "pain and suffering" avoided by preventing thyroid-related illness (instead of merely treating those illnesses once they occur) should be taken into account in making policy decisions regarding a national KI policy.

As part of the NRC's DPO review process, the DPO panel developed a simplified analysis (see Enclosure 1) of the quantitative bases for KI stockpiling policy, which responded to comments in the DPO by revising several factors that were used in the NUREG/CR-1433 analysis. The panel concluded that the results of this analysis did not warrant any change in the Federal Policy. However, in order to take into account all of the issues raised by the DPO, and to incorporate new data currently available for several of the factors used in the analysis, the Office of Research has been directed to perform a detailed update of the Agency's KI policy bases, taking into account both qualitative and quantitative factors.

Issuance of this Commission Paper, and distribution of copies to appropriate state and local agencies through the Office of Governmental and Public Affairs, and by the FRPCC subcommittee on KI through the E-6 Subcommittee of the Conference of Radiation Control Program Directors (CRCPD), is a further response to the DPO since it will provide complete information to affected state and local agencies.

Discussion: The staff has underway a detailed reanalysis of the Agency's KI policy bases. This analysis will reevaluate the quantitative factors affecting KI use, integrate several qualitative factors into the revision, and reexamine and document the costs and benefits of both predistribution and stockpiling of KI.

The quantitative factors that have changed significantly since 1980 and will be updated include: best estimates of the probabilities and consequences of severe accidents (e.g., NUREG-1150); estimates of

thyroid risk as a result of radioiodine exposure; estimates of health risk to the public due to severe allergic reactions if large numbers of people take KI without medical supervision; and the cost and best estimate of the shelf-life of KI. Furthermore, to the degree practical, the information now becoming available on the experience from the Chernobyl accident (April 1986) where significant quantities of KI were administered by Polish and Soviet authorities will be reflected in the detailed analysis.

Several qualitative factors will also be considered including the "pain and suffering" avoided by preventing thyroid-related illnesses instead of merely treating those illnesses once they occur.

It is not presently known how the combined effects of all the updated and new factors will affect the cost/benefit ratio, since there are significant factors that will tend to change the cost/benefit ratio in both directions. For example: inclusion of the costs to ship, package, and store the KI (not previously included among the costs of the KI - only the purchase price of the KI tablets was included) will tend to increase the cost/benefit ratio; but consideration of the qualitative aspects including the benefits of avoiding thyroid nodules as opposed to merely accounting for the charges for their removal once they occur, will tend to decrease the cost/benefit ratio.

The reanalysis is being coordinated throughout its development with the members of the Federal Radiological Emergency Preparedness Coordinating Committee (FRPCC) and its chair agency, the Federal Emergency Management Agency (FEMA).

The reanalysis started in March, 1991 by commercial contract. The staff will use the NUREG/CR report from the analysis (scheduled to become available in April 1992) to write a draft Regulatory Analysis describing the options considered, along with the staff's recommendations and decision rationale. Allowing a reasonable time period for coordination with FRPCC members and incorporation of their comments into the draft recommendations, Commission consideration is projected for Spring, 1993. Following a Commission decision, the NRC's position will be forwarded to FEMA (in its capacity as the chair agency for the FRPCC) for appropriate action.

After that transmittal, FEMA will coordinate final approval of the NRC-recommended policy by the other members of the FRPCC (which will include review by the various state and local agencies). FEMA will then publish a Federal Register Notice stating FEMA's recommended national KI policy on behalf of the FRPCC, and will request public comments on that policy and on the underlying bases for that recommended policy including the NRC contractor's NUREG/CR report and the staff's final Regulatory Analysis.

Summary: The Commission should NOTE that: a detailed reanalysis is now underway to update the current bases for the Commission's policy on KI and copies of this paper will be distributed to state and local agencies concerned with KI policy under a staff transmittal letter (Enclosure 2). The staff projects submission of a draft regulatory analysis, along with recommendations and decision rationale to the Commission for consideration in Spring, 1993.

James M. Taylor
Executive Director
for Operations

Enclosures:
1. Simplified Cost-Benefit Analysis Regarding Stockpiling of KI.
2. Cover letter for transmittal of this paper to interested local and state agencies

DISTRIBUTION:
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Enclosure 1

Simplified Cost-Benefit Analysis Regarding Stockpiling of KI

The following simplified analysis was prepared in 1989 as part of the review of a differing professional opinion (DPO) regarding the cost-benefit of stockpiling potassium iodide (KI). This analysis updated many of the significant quantitative factors involved, taking into account new knowledge gained since the earlier (1980) analysis. Several different cases were considered, as shown in the Cost/Benefit Summary table. The "best estimate" cost was $7,500,000 per year to provide an adequate KI stockpile for the population out to 100 miles from each nuclear power plant, with benefits (in terms of avoided health problems, including nodules, cancers, and fatalities) of $140,000 per year, yielding a cost/benefit ratio of $7,500,000/ $140,000 = 54. All of the other cases considered involved assumptions believed to be less realistic and resulted in cost/benefit ratios down to a lowest value of 6.

1. Using WASH-1400 (Ref. 1), it is estimated that the probability of a large accidental release is about 10^{-5} per reactor-yr.

2. Assume 100 reactors in the U. S.

3. Therefore, the probability of a large release per year somewhere in the U. S. is 10^{-5}/RY x 100 reactors = 10^{-3} per year.

4. From data in the Strip report (NUREG/CR-2723, Ref. 2) a large release is calculated to result in a whole body dose of about 10^{7} person-rem, for a typical U. S. site.

5. From staff experience with preparation of environmental impact statements (EIS), the thyroid dose is about an order of magnitude greater than the whole body dose, for a large release. Therefore, a large release will result in 10^{8} person-rem to the thyroid for a typical site.

6. The average thyroid dose is then:

   10^{8} person-rem/release x 10^{-3} release/yr = 10^{5} person-rem\yr.

7. The above estimate is based upon the release fractions of WASH-1400, which estimated releases averaging 50% of the core iodine inventory for core-melt atmospheric releases (equivalent to core-melt with early containment failure). NUREG-1150 (Ref. 3) has estimated that such releases would be lower and would average about 10 to 20% of the core iodine inventory. This is about a factor of three lower. Consequently, using the NUREG-1150 release fractions, which are based upon the best available research information to date, the average thyroid dose is estimated to be:

   $1/3 \times 10^{5} = 3.3\times10^{4}$ person-rem/yr.

8. WASH-1400 used risk coefficients of 334 thyroid nodules per 10^{6} person-rem, 200 of which were benign thyroid nodules and 134 of which were

thyroid cancers. WASH-1400 also assumed that 10% of the cancers would result in fatalities. The thyroid cancer risk coefficient of WASH-1400 (134 thyroid cancers per 10^6 person-rem) is no longer considered valid. Instead, the values given in NCRP Report No. 80 (Ref. 4), namely, 74 thyroid cancers per 10^6 person-rem to the thyroid is regarded as the best available data.

9. Then, using risk coefficients of 200 benign thyroid nodules/10^6 person-rem, and 74 thyroid cancers/10^6 person-rem (with 10% of the cancers resulting in fatalities), the average number of health effects per year becomes:

   200 benign nodules/(10^6 person-rem) x 3.3×10^4 person-rem/yr = 6.6 benign nodules/yr, plus

   74 thyroid cancers/(10^6 person-rem) x 3.3×10^4 person-rem/yr = 2.44 thyroid cancers/yr,

   and 10% of the cancers are predicted to result in fatalities (0.25 fatalities per year).

10. In addition to these health effects, hypothyroidism must also be considered. From information taken from NUREG-CR/4214 (Ref. 5), the risk coefficient for hypothyroidism is 17 cases per 10^6 person-rem to the thyroid, with a threshold dose for occurrence of 1000 rad.

11. Since hypothyroidism has a relatively high threshold for occurrence, it will occur over a limited area. NUREG-CR/1443 (Ref. 6) presents data showing that the average thyroid dose for a core-melt atmospheric release is equal to or greater than 1000 rem out to about 25 miles from the reactor. Since the analysis in NUREG-CR/1443 made use of WASH-1400 release fractions, the average doses should be reduced by about a factor of three to be in agreement with the results of NUREG-1150. With this correction, thyroid doses equal to or in excess of 1000 rem would be confined, on average, to distances of about 10 miles from the reactor.

12. Using demographic data from NUREG-0348 (Ref. 7), the average population within ten miles of a U. S. reactor is 37,000 (1970 census). Adjusting for the 1980 census, this is estimated to be 40,000 persons.

13. The average number of cases of hypothyroidism per year can now be estimated. Given a large release, the average dose in the region from the reactor out to 10 miles is expected to be about 2000 rem to the thyroid (using data from Ref. 6 and adjusting for the reduced release fractions of NUREG-1150, Ref. 3). Although the average population within 10 miles is 40,000 persons, only a small fraction would be exposed to the plume of a release. Generally, estimates are that no more than about 3 sectors, each comprising 22.5 degrees, would be exposed to the plume. Since there are a total of 16 such sectors, the affected population is:

    3/16 x 40,000 = 7500 persons.

The total population dose is 7500 persons x 2000 rem = 15×10^6 person-rem and the number of cases of hypothyroidism, given a large release, is:

$17/(10^6$ person-rem$) \times 15 \times 10^6$ person-rem = 255 cases.

Since the probability of a large release is 10^{-3} per yr, the average number per year is:

255×10^{-3} = 0.26 cases/yr hypothyroidism.

[Actually, this is likely an overestimate. If a timely evacuation is carried out, the number of persons exposed would be much lower. Although this is difficult to estimate with precision, item 15 provides an approximation of the effect of protective measures].

14. Taking values [Ref.8] of $25,000 for the cost of treatment for benign nodules, $50,000 for the cost of treatment of thyroid cancers (non-fatal), $50,000 for the cost of treatment for hypothyroidism, and $1,000,000 for the cost of a cancer fatality, the average costs per year become:

6.6 x $25,000	= $165,000 (benign nodules)
2.19 x $50,000	= $109,500 (non-fatal cancers)
0.25 x $1,000,000	= $250,000 (cancer fatalities)
0.26 x $50,000	= $13,000 (hypothyroidism)
Total	= $537,500 per year.

15. The number of thyroid health effects predicted and the associated costs to society shown above assume that <u>no</u> protective measures are taken to reduce or avoid such exposures. However, a range of protective measures (other than use of KI), including evacuation, sheltering and avoiding the consumption of contaminated food and water, are included in emergency plans and would likely be taken, and would significantly reduce radiation exposure not only to the thyroid gland but to other body organs as well. Consequently, the thyroid costs shown above are significantly overestimated, probably by a factor of from two to ten. Using a factor of two reduction, the total thyroid costs to society (assuming other protective measures) are estimated to be approximately 1/2 x $537,500/yr = $270,000/Yr.

16. Timing is critical in the effectiveness of KI as a blocking agent. For a blocking effectiveness of 50% to be achieved, KI must be given to individuals no later than about 2 hours after the release of iodine begins. If KI is not given until 4 hours after intake of radioiodine, then its effectiveness is sharply reduced to between about 10 and 30% blocking. It is difficult to quantify the time delay associated with stockpiling. If KI is available to evacuees at relocation centers and other places within 3 to 4 hours after accident initiation, <u>and</u> if accident releases occur primarily after several hours warning, then this may be effective. For fast-acting scenarios, this may not be the case. Overall, it is estimated that stockpiling will result in a time delay

sufficient to reduce the blocking effectiveness to 50% of what it would be if each individual had KI in this possession prior to an accident (predistribution). Using a factor of two reduction, the total costs to society of NOT stockpiling KI, i.e., the annual benefits of stockpiling KI are estimated to be 1/2 x \$270,000/Yr = \$140,000/yr (approx.).

17. Assume that KI is to be stockpiled at a number of locations throughout the U. S. and is to be distributed to the affected populace after an accident and that the number of locations is sufficient that KI could be distributed to the general public within a few hours after an accident.

18. Representatives of the American Thyroid Association have stated (Ref. 9) that clinically significant thyroid disease appears unlikely to result from individual thyroid exposures of less than 100 rads. To provide an added measure of protection for children and pregnant women, however the authors of Ref. 9 suggest a radiation dose of 50 rads to the thyroid as a threshold for iodine blockade for this group.

19. Based on thyroid dose vs. distance data presented in Ref. 6 Table 3, (and with correction for NUREG-1150 reductions) doses in excess of about 50 rad for a child would be expected at distances up to about 100 miles from a reactor in the event of a large accidental release.

20. If KI is to be distributed to children and pregnant women in an emergency, it is not likely that it could practically be withheld from the general population. It is therefore assumed that KI will be stockpiled in sufficient quantities to be distributed to the general population within 100 miles of a nuclear power reactor.

21. It is estimated (Ref. 8) that 67 percent of the U. S. population resides within 100 miles of a nuclear power plant. Using 1980 census data, KI must therefore be stockpiled for $0.67 \times 226 \times 10^6$ persons = 151×10^6 persons.

22. Ref. 10 indicates that in a reactor emergency, KI will be taken for a minimum of several days and for a maximum of ten days. Assuming stockpiling for a minimum of three days, with a usage of one KI tablet per day, the number of KI tablets to be stockpiled is $151 \times 10^6 \times 3 = 453 \times 10^6$.

23. The cost of KI is taken as \$0.05 per tablet (Ref. 8). The actual costs are likely to be higher, since this reflects only the cost of KI tablets in bulk. Not only have warehousing, distribution and inventory control costs been neglected, but the need for rapid distribution at the time of an accident would suggest that KI tablets should be pre-packaged in readily dispensable individual packets containing 3 tablets each. The cost of such packaging has also been neglected.

24. The cost of stockpiling KI then becomes 151×10^6 persons x 3 tablets/person x \$.05 /tablet = $\$2.27 \times 10^7$.

Since the tablets should be replaced every 3 years (Ref. 10) the annual cost of stockpiling KI is one-third of this, or $7.5 x 10^6/yr.

25. The cost/benefit results are summarized below:

Cost of KI = $75 x 10^5/yr (from item 24).

Benefit of KI = $1.4 x 10^5/yr (from item 16, using a best estimate blocking value of 50%, and assuming other protective measures).

(Cost of KI)/(Benefit of KI) = 75/1.4 = 54

26. Additional calculations displaying the sensitivity of the benefits of KI to the assumptions used are shown on the following page.

Conclusion: Stockpiling of KI is not cost beneficial. The above assessment indicates that the costs of stockpiling KI are approximately fifty times higher than the benefits.

Cost/Benefit Summary
for Stockpiling KI

C = Cost of KI = $75 x 10^5/yr (from Item #24 above)

B = Benefits (given below)*

	50% Blocking[1]	[C/B]	100% Blocking[1]	[C/B]
Using NUREG-1150 release fractions:	$1.4 x 10^5/yr	[54][2,3]	$2.7 x 10^5/yr	[28][2]
	$2.0 x 10^5/yr	[38][4]	$4.0 x 10^5/yr	[19][4]
Using WASH-1400 release fractions:	$4.1 x 10^5/yr	[18][2]	$8.0 x 10^5/yr	[9][2]
	$6.0 x 10^5/yr	[13][4]	$12.0 x 10^5/yr	[6][4]

* All benefits shown would be increased by a factor of two if no other protective actions (evacuation, sheltering, food interdiction) are taken.

(1) "50% Blocking" means KI administration is delayed too long after a severe release to enable maximum I-131 blockage - only half of the maximum blockage (shown in the "100% Blocking" column) is assumed in the "50%" column.

(2) Using the thyroid cancer risk estimates given in NCRP Report No. 80 (presently considered the most accurate value).

(3) This is the current best estimate. This case, with NUREG-1150 release fractions, 50% blocking effectiveness, thyroid cancer risk estimates taken from NCRP Report No. 80, and with other protective actions (evacuation, sheltering, food interdiction) assumed to have been taken, is currently considered to be the most realistic among the several cases presented in this simplified study. A more rigorous NRC-sponsored study to better quantify several uncertainties is now underway.

(4) Using the thyroid cancer risk estimates of Wash-1400, rather than those given in NCRP Report No. 80. See Note A for further details.

Note A - Risk of Thyroid Cancer

Wash-1400 used a risk coefficient of 334 thyroid nodules per 10^6 person-rem (to the thyroid). WASH-1400 also assumed that 60% of the nodules produced were benign, 40% were cancerous, and that 10% of the cancerous nodules (4% of the total nodules) would result in fatalities. The WASH-1400 risk coefficient for thyroid cancer is therefore 0.4 x 334 or 134 thyroid cancers per 10^6 person-rem (thyroid).

This value was re-examined on light of recent information that was unavailable to the authors of SECY-83-362. Two sources were used. The first was a Swedish study by Holm, et. al. "Thyroid Cancer after Diagnostic Dose of Iodine-131: A Retrospective Cohort Study", reported in the Journal of the National Cancer Institute, Vol. 80, No. 14, September 21, 1988. The second

source was "Introduction of Thyroid Cancer by Ionizing Radiation," National Council on Radiation Protection and Measurements (NCRP), Report No. 80, March 30, 1985. Holm studied 35,074 patients in Swedish hospitals receiving doses of I-131 and included a 20 year follow-up. the average thyroid dose per patient was stated to be 50 rads. The collective population dose was 35,074 x 50 = 1.75 x 10^6 person-rad. The total number of thyroid cancers observed in this study was therefore 29 thyroid cancers/10^6 person rem, or about a factor of four less than that used in Wash-1400.

NCRP Report No. 80 gives an absolute thyroid cancer risk of about 72 to 74 cases per 10^6 person-rad. This value is stated to be based on population studies of North Americans exposed to external radiotherapy in childhood. This risk estimate is also considered to be applicable for thyroid doses in the range from 6 to 1500 rads. This value is about a factor of two less than that used in WASH-1400.

References

1. U. S. Nuclear Regulatory Commission (USNRC), "Reactor Safety Study - An Assessment of Accident Risks in U. S. Commercial Nuclear Power Plants," WASH-1400 (NUREG/75-014), October 1975.

2. D. R. Strip, "Estimates of the Financial Consequences of Nuclear Power Reactor Accidents", Sandia National Laboratories, NUREG/CR-2723, September 1982.

3. USNRC, "Severe Accident Risks: An Assessment for Five U. S. Nuclear Power Plants", Second Draft for Peer Review, NUREG-1150, June 1989.

4. National Council on Radiation Protection and Measurements (NCRP)," Induction of Thyroid Cancer by Ionizing Radiation", NCRP Report No. 80, March 1985.

5. S. Abrahamson, et. a.., "Health Effects Models for Nuclear Power Plant Accident Consequence Analysis", Part II: Scientific Bases for Health Effects Models, Sandia National Laboratories, NUREG/CR-4214, May 1989.

6. D. C. Aldrich, R. M. Blond, "Examination of the use of Potassium Iodide (KI) as an Emergency Protective Measure for Nuclear Reactor Accidents", Sandia National Laboratories, NUREG/CR-1433, March 1980.

7. USNRC, "Demographic Statistics Pertaining to Nuclear Power Reactor Sites", NUREG-0348, October 1979.

8. NRC staff estimate.

9. D. V. Becker, et. al, "The Use of Iodine as a Thyroidal Blocking Agent in the Event of a Reactor Accident", Journal of the American Medical Association, Vol 252, No. 5, August 1984.

10. D. V. Becker, "Physiological Basis for the Use of Potassium Iodide as a thyroid Blocking Agent-Logistic Issues in its Distribution", Bulletin of the New York Academy of Medicine, Second series, Vol. 59, No. 10, December 1983.

Enclosure 2

TO: State Emergency Preparedness Officials

FROM: Carlton C. Kammerer, Director
State Programs
Office of Governmental and Public Affairs

SUBJECT: ATTACHED STAFF PAPER TO THE NUCLEAR REGULATORY COMMISSION, "RE-EVALUATION OF POLICY REGARDING USE OF POTASSIUM IODIDE (KI) AFTER A SEVERE ACCIDENT AT A NUCLEAR POWER PLANT"

The subject paper is provided to inform you that a reassessment of present policy regarding stockpiling potassium iodide (KI) tablets for use by the general public during a nuclear power plant emergency is currently underway. The present policy consists of voluntary federal guidance to the responsible state and local health authorities, who may then decide among available options regarding the use of KI during an actual emergency. The voluntary guidance recommends that local authorities consider stockpiling and distributing KI for emergency workers and institutionalized persons, but does not recommend pre-distributing or stockpiling KI for the general public.

As the paper and its enclosed analysis make clear, new information and analysis results that have become available since 1985 (when the present policy was recommended by the NRC and by FEMA) have not indicated the need for any immediate recommendation to change that policy.

However, if any state or local agency is contemplating or has underway a KI policy reassessment, that agency should be aware of the reassessment described in this paper, because its results may be of use in the development of such state or local reassessments.

We will distribute the results of our reassessment as soon as they become available. The NRC staff will also distribute the results through the E-6 Subcommittee of the Conference of Radiation Control Program Directors (CRCPD).

Carlton C. Kammerer, Director
State Programs
Office of Governmental and Public Affairs

Enclosure:
NRC-Staff Memo to The Commissioners, "Re-Evaluation of Policy Regarding Use of Potassium Iodide (KI) After a Severe Accident at a Nuclear Power Plant".