May 20, 1983

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of	)	
	)	
UNION ELECTRIC COMPANY	)	Docket No. STN 50-483 OL
	)	
(Callaway Plant, Unit 1)	)	

APPLICANT'S MOTION FOR SUMMARY DISPOSITION
OF REED CONTENTIONS 6 AND 16
(PROTECTIVE ACTIONS AGAINST RADIOIODINES &
MESSAGES WITH INSTRUCTIONS FOR LONG-TERM SHELTERING)

Pursuant to 10 C.F.R. § 2.749, Union Electric Company ("Applicant") moves the Atomic Safety and Licensing Board for summary disposition of Contentions 6 and 16 advanced by intervenor John G. Reed. As shown below, summary disposition is appropriate because there is no genuine issue of material fact to be heard with respect to Contentions 6 and 16. Accordingly, Applicant is entitled to a decision in its favor on Contentions 6 and 16 as a matter of law.

This Motion is supported by Applicant's Statement of Material Facts On Reed Contentions 6 and 16 As To Which There

Is No Genuine Issue To Be Heard (Protective Actions Against Radioiodines & Messages With Instructions For Long-Term Sheltering), Applicant's Memorandum of Law in Support Of Motions For Summary Disposition On Emergency Planning Issues ("Memorandum of Law"), the Missouri Nuclear Accident Plan - Callaway ("State Plan"), the Affidavit of Kenneth V. Miller on Reed Contention 6 (Protective Actions Against Radioiodines), ("Miller-6"), the Affidavit of Roger E. Linnemann, M.D. on Reed Contention 6 (Protective Actions Against Radioiodines) ("Linnemann-6"), the Affidavit of Saul Harris on Reed Contentions 6 and 16 (Protective Actions Against Radioiodines & Messages With Instructions for Long-Term Sheltering) ("Harris"), and the Affidavit of Neal G. Slaten on Reed Contentions 6 and 16 (Protective Actions Against Radioiodines & Messages With Instructions For Long-Term Sheltering) ("Slaten-6 & 16"), all filed simultaneously herewith, as well as the pleadings and other papers filed by the parties in the proceeding.

I. Procedural Background

Because of their length, Reed Contentions 6 and 16 are appended to this Motion as Attachment 1. In summary, in Contention 6, Mr. Reed maintains that potassium iodine ("KI") should be administered to local emergency workers and to individuals residing in the plume exposure pathway emergency planning zone ("EPZ"). A detailed explanation of why Mr. Reed

believes the general administration of KI is appropriate is included in Contention 6.

Contention 16 is integrally related to Contention 6 because, while it discusses messages for long-term sheltering, it is aimed at establishing that long-term sheltering is not a protective device that is very useful and that, consequently, KI should be distributed to residents within the EPZ. See Reed's December 14, 1982 Response to Memorandum and Order dated 09 December, 1982, revised response to interrogatories 47, 78 and 79 ("If individuals are placed in a position in which they are damned if they stay in shelter and damned if they leave; they should be told the truth and not deceived in order to cover-up incompetence by planners and/or elected officials"). Mr. Reed does assert in Contention 16 that public messages with instructions for long term sheltering must be included in the offsite plan and procedures. See Attachment 1.

Neither Applicant nor the NRC Staff posed an objection to Contentions 6 or 16, and they were admitted to the proceeding by Board Memoranda and Orders dated December 7, 1982, and February 25, 1983, respectively.

II. Governing Legal Standards

10 C.F.R. § 50.47(b) requires that on-site and off-site emergency response plans for nuclear power plants meet sixteen standards, including the following:

> (10) A range of protective actions have been developed for the plume exposure pathway EPZ for emergency workers and the public. Guidelines for the choice of protective actions during an emergency, consistent with Federal guidance, are developed and in place. . . .

Among the recommended evaluation criteria set forth in NUREG-0654/FEMA-REP-1 (Rev. 1), "Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants," (Nov. 1980) ("NUREG-0654") as means of satisfying the section 50.47(b)(10) planning standard is that plans to implement protective measures for the plume exposure pathway include provisions for the use of radioprotective drugs.1/ NUREG-0654, Section II.J.10.e. This criterion is deemed to be of particular importance for emergency workers and institutionalized persons within the plume exposure EPZ whose immediate evacuation may be infeasible or very difficult. Id.

The purpose of administering KI would be for use as a thyroid-blocking agent in a radiological emergency. When an individual takes KI, radioiodine which might be released from the power plant and inhaled or ingested by the individual is prevented from accumulating in the thyroid. Miller-6, ¶ 4.

1/ NUREG-0654 represents guidance which is not legally binding. See Metropolitan Edison Company (Three Mile Island Nuclear Station, Unit No. 1), LBP-81-59, 14 N.R.C. 1211, 1460 (1981), aff'd, ALAB-698, 16 N.R.C. ___, slip op. at 13-15 (Oct. 22, 1982).

Policy guidance on the administration of KI in the event of a radiological emergency has been provided by a number of federal agencies. Specifically, the Food and Drug Administration ("FDA"), the Federal Emergency Management Agency ("FEMA"), the Nuclear Regulatory Commission ("NRC") and the Environmental Protection Agency ("EPA") have issued statements on this subject. In addition, a policy statement on KI has been proposed by the Federal Radiological Preparedness Coordinating Committee.

In June, 1982, FDA announced in the Federal Register the availabiilty of its final recommendations concerning the administration of KI to the public in a radiation emergency. 47 Fed. Reg. 28158 (June 29, 1982); see Miller-6 at ¶ 6. FDA's recommendations stem from the responsibility of the Department of Health and Human Services, of which FDA is a part, for providing guidance to State and local governments on the use of radioprotective substances (e.g., KI) to reduce the radiation dose to specific organs, including dosage and projected radiation exposures at which such drugs should be used. See 44 C.F.R. § 351.23(f), published in 47 Fed. Reg. 10758, 10761 (March 11, 1982) (FEMA final regulations on allocation of responsibilities among various federal agencies for radiological emergency response planning). The purpose of FDA's final recommendations on KI is to facilitate a national consensus on the use of KI during a radiation emergency and to provide

information and guidance to State and local public health agencies and other persons responsible for formulating emergency response plans for radiation accidents. 47 Fed. Reg. 28158. FEMA has endorsed FDA's guidance on the administration of KI. See December 1, 1982 FEMA Interim Policy Guidance on Potassium Iodide, at 2.

FDA concludes in its final KI recommendations that the risks from the short-term use of relatively low doses of KI for thyroid blocking in a radiation emergency are outweighed by the risks of radioiodine-induced thyroid nodules or cancer at a projected dose to the thyroid gland of 25 rem. FDA therefore recommends that KI in doses of 130 milligrams ("mg") per day for adults and children above 1 year of age, and 65 mg per day for children below 1 year of age, be considered for thyroid blocking in radiation emergencies, but only in those persons who are likely to receive a projected radiation dose of 25 rem or greater to the thyroid gland from radioiodines released into the environment. 47 Fed. Reg. 28158.

FEMA is the organization with primary responsibility in the Federal Government for establishing policies, coordinating federal assistance, and providing guidance to State and local governments on developing, reviewing, assessing, and testing State and local radiological emergency plans. 44 C.F.R. § 351.20(a). The NRC is responsible for reviewing FEMA's findings and determinations regarding the adequacy of State and

local plans and taking into account the overall state of emergency preparedness in making decisions to issue nuclear power plant operating licenses. 44 C.F.R. § 351.21(c) and (d). NRC also specifically is assigned the responsibility of assisting FEMA in providing guidance and assistance to State and local governments concerning the storage and distribution of radioprotective substances and prophylactic use of drugs (e.g., KI) to reduce the radiation dose to specific organs as a result of radiological emergencies. 44 C.F.R. § 351.21(m).

Both the FEMA and NRC staffs have recommended that nuclear power plant licensees as well as State and local governments provide radioprotective drugs for thyroid protection in the event of a nuclear power plant accident for (i) emergency workers and other individuals remaining or arriving onsite during the emergency; (ii) emergency workers within the plume exposure EPZ; and (iii) institutionalized persons within the plume exposure EPZ whose immediate evacuation may be infeasible or very difficult. See Testimony of Brian K. Grimes, Director, Division of Emergency Preparedness, U.S. Nuclear Regulatory Commission, Before the Subcommittee on Oversight and Investigations, Committee on Interior and Insular Affairs, United States House of Representatives, dated March 5, 1982 ("Grimes Testimony") at 1; Miller-6, ¶ 8. In its December 1, 1982 Interim Policy Guidance on Potassium Iodide, FEMA stated that, since the ultimate responsibility for the health of

citizens rests with each state, and since some states do not plan to include KI in their emergency preparedness planning, FEMA is reviewing its guidance, set forth in NUREG-0654, which requires provisions for the use of radioprotective drugs, with the belief that demonstration of an appropriate alternative for institutionalized persons could be acceptable. Nevertheless, FEMA continues to support the use of KI for this purpose.

The FEMA and NRC guidance on KI contained in evaluation criterion J of NUREG-0654 was influenced by the following considerations: (i) the recommended populations to be administered KI are limited in size and would require quantities of KI which could be readily maintained, distributed, administered, and controlled; (ii) these populations have a relatively high probability of being exposed to radioactive airborne releases should an accident occur; and (iii) the medical history of the populations could be established readily, thus avoiding possible side effects to sensitive persons by taking other measures for such persons. Grimes Testimony at 2. None of these considerations applies to the population at large. To date, neither the NRC nor FEMA has recommended the administration of KI to the general public located within the 10-mile plume exposure pathway EPZ.

EPA is responsible for the establishment of Protective Action Guides ("PAGs") for all aspects of radiological emergency response planning, in coordination with appropriate

federal agencies. 44 C.F.R. § 351.22(a). EPA also prepares guidance for State and local governments on implementing PAGs, including recommendations on protective actions which can be taken to mitigate the potential radiation dose to the population. 44 C.F.R. § 351.22(b). In its Manual for Protective Action Guides and Protective Actions for Nuclear Incidents, EPA-520/1-75-001, Sept., 1975 (Revised June 1980), at pages 1.41-1.42, EPA recommends the use of KI as a prophylaxis for emergency workers located in areas possibly involving radioiodine contamination, in accordance with State health laws and under the direction of State medical officials. With respect to the efficacy of administering KI to the general population, EPA notes that this option is still under consideration by government agencies but should not be construed to be the policy of EPA at this time. See Miller-6, ¶ 10.

The Federal Radiological Preparedness Coordinating Committee ("FRPCC") consists of FEMA (which chairs the Committee), the NRC, the EPA, the Department of Health and Human Services, the Department of Energy, the Department of Transportation, the Department of Defense, the Department of Agriculture, the Department of Commerce and any other federal agencies or departments as appropriate. 10 C.F.R. § 351.10(a). The FRPCC assists FEMA by (i) providing policy direction for the program of federal assistance to State and local governments in their radiological emergency planning and preparedness

activities; and (ii) resolving issues relating to the granting of final FEMA approval of a State plan. 10 C.F.R. § 351.11(a).

In an October 7, 1982 proposed federal policy statement on potassium iodide, the FRPCC endorsed the NRC/FEMA guidance on KI distribution for emergency workers and institutionalized individuals. The policy statement reiterates that KI distribution is the responsibility of state authorities, stresses that KI provides merely thyroid protection and is thus a limited protective method to be used in conjunction with sheltering, evacuation or other protective methods, and concludes that the use of KI "should be evaluated by each State or local jurisdiction based on the specific conditions and site environment for each operating commercial nuclear power plant." See Nov. 22, 1982 Memorandum to FRPCC from Richard W. Krimm, Chairman, FRPCC transmitting attached final draft of a proposed federal policy statement on KI prepared by the FRPCC Subcommittee on Potassium Iodide and Mechanical Respiratory Protection.

As FDA has pointed out, making recommendations on the use of KI for the general population in a radiological emergency requires a balancing of risks which are difficult to quantify and are associated with large uncertainties. See FDA Final Recommendations, Potassium Iodide As A Thyroid-Blocking Agent In A Radiation Emergency: Recommendations On Use (April 1982) ("FDA Final Recommendations") at page 5. Included in this balancing are the following health considerations:

- o the risk from radioiodine of thyroid cancer and/or thyroid nodules, as well as hypothyroidism;

- o possible adverse reactions to KI, not anticipated at the administered low doses of KI, including iodide goiter, hypothyroidism, dermatologic and mucous membrane reactions, iodide "mumps" and miscellaneous reactions (e.g., headache, nausea, vomiting, diarrhea), and serum sickness type hypersensitivity and vascular reactions.

See FDA Final Recommendations at pp. 12-22. Also worth considering is the likelihood of a reactor accident resulting in releases of radioiodide high enough to justify the administration of KI, the cost as well as the administrative and logistical difficulties associated with the stockpiling of KI, and the fact that KI can give a false sense of security since it does not reduce the body's uptake of other radioactive material nor provide protection from external radiation. See FDA Final Recommendations at pp. 6-10.

The balancing involved in the establishment of a KI policy is reflected in several recent statements by FEMA and NRC. In addition to reversing its intent to establish a national stockpile of KI, FEMA is now considering whether there is an appropriate alternative to KI being given to institutionalized persons whose evacuation would be infeasible or very difficult. See FEMA's December 1, 1982 Interim Policy Guidance on Potassium Iodide; see also Statement of Richard W. Krimm, Assistant Associate Director, Office of Natural and

Technological Hazards, State and Local Programs and Support, Federal Emergency Management Agency, at October 6, 1982 Atomic Industrial Forum Conference on Radiation Issues for the Nuclear Industry. Because of the perceived greater health risk posed by the whole body dose from a nuclear-reactor accident than by the thyroid dose, the NRC staff has concluded that the value of administering KI to the general public is questionable. Instead, other protective measures -- evacuation or shelter -- could be instituted based on the more critical effects from the whole body dose. These other measures would also reduce the thyroid dose. Grimes Testimony at 3.

In summary, current federal guidance on the administration of KI favors administration of the drug to emergency workers and institutionalized persons within the EPZ for whom immediate evacuation may be infeasible or very difficult, for use as a thyroid-blocking agent in a radiological emergency. This guidance is consistent with the concern expressed in NUREG-0654, evaluation criterion J.10.e about these vulnerable groups. There is no current federal recommendation that KI be distributed to the general public.

In addition to the federal agency consensus on administering KI as a thyroid-blocking agent, several NRC licensing boards have addressed this issue and have found acceptable state policies which are consistent with the federal guidance. The most detailed discussion on the administration of KI as a

thryoid-blocking agent is contained in the second partial initial decision in the Three Mile Island, Unit 1 restart proceeding. See Metropolitan Edison Company (Three Mile Island Nuclear Station, Unit No. 1), LBP-81-59, 14 N.R.C. 1211, 1663-70 (1981), aff'd, ALAB-697, 16 N.R.C. ___ (Oct. 22, 1982).2/ In the Three Mile Island case, the licensing board rejected contentions which would have required the State, contrary to its policy, to distribute KI to the public. In the board's view,

> While the NRC's emergency planning regulations require that a range of protective actions be developed for the public in the plume EPZ (10 CFR 50.47(b)(10)), they do not specifically require that protective actions for the public include the use of radioprotective drugs. Guidance in NUREG-0654 indicates that planning for protective actions should include provisions for the use of radioprotective drugs, particularly for emergency workers and institutionalized persons within the plume EPZ, and that state and local emergency plans should include a method by which the state health department may decide whether to administer radioprotective drugs to the general public during an emergency. The guidance does not impose mandatory requirements which must necessarily be followed in any particular emergency plans.3/

2/ In Pennsylvania, the KI policy limited distribution and use of KI to persons who could not be evacuated quickly, viz., members of the off-site emergency response organizations operating within the EPZ, and the staff and patients or residents of selected institutions within the EPZ. KI would also be available to farmers with livestock, who are treated by the Commonwealth as emergency workers who might not be able to evacuate. Three Mile Island, supra, 14 N.R.C. at 1666 and 1675 n. 214.

3/ The TMI-1 board deemed controlling the March, 1981 Commission directive to the NRC Staff contained in a memorandum

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Id. at 1666-67 (citation omitted).

In approving the Commonwealth's KI policy, the Board noted that it had been developed by the Department of Health, "the state agency most directly responsible for providing for the health of citizens within the State, based on a detailed consideration of a number of factors including the potential for adverse and possibly serious reactions to KI by limited numbers of persons." Id. at 1667. Recognizing that the issue is the public health policy question, the Board stated,

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(Continued)

on thyroid blocking, dated March 26, 1981, from Samuel Chilk, Secretary of the Commission, to William J. Dircks, Executive Director for Operations. In that memorandum the Commission requested that the Staff continue to work with FEMA, FDA, and the EPA to address uncertainties in the use of KI by the general public, along with the possible alternative respiratory protection strategies. The Commission further indicated that the Staff was to continue to work on source term methodology studies then under way, that until the results of those studies are presented, the Commission will make no further decisions regarding the advisability of recommending the stockpiling of KI for the general public, and that, in the interim, the Staff should assure with FEMA that there is appropriate guidance for administration of KI before requiring implementation for certain institutionalized members of the public. The board concluded that this memorandum establishes that use of KI by the general public is not a regulatory requirement and that the Commission has not yet determined whether such use is even advisable. Three Mile Island, supra, 14 N.R.C. at 1667.

Of course, as previously discussed, since that time, NRC has informally confirmed its position that administering KI to the general public is not a regulatory requirement. Grimes Testimony, supra.

> The Board steps lightly in areas such as this one, where the Commonwealth has balanced the risks associated with exposure to radioiodine against factors such as the incidence of allergic and adverse reactions to KI, the logistical problems of KI administration, and the availability of other protective action options, and has made a public health policy decision at the state level not to provide for the distribution of KI to the general public in the event of a radiological emergency. We are also sensitive -- in a general way -- to the present uncertainties as to the amount of radioiodines which would be released in an accident and the toxicity of radioiodine to the thyroid. Even based on our own independent consideration of the cited factors -- particularly the potential side effects and adverse and allergic reactions to KI -- we are not inclined to overrule the Commonwealth's public health policy decision and order that provisions be made for distribution of KI to the general public in the event of an emergency.

Id. at 1669 (citations and footnote omitted).

The conclusion of the Three Mile Island licensing board on the public policy issue of administering KI as a thyroid-blocking agent essentially is reiterated by the San Onofre and Waterford licensing boards. See Southern California Edison Company et al. (San Onofre Nuclear Generating Station, Units 2 and 3), 15 N.R.C. 1163, at 1186, 1230-31, 1242; Louisiana Power and Light Company (Waterford Steam Electric Station, Unit 3), LBP-82-___, 16 N.R.C.____, slip op. at 23-24 (Nov. 3, 1982).

In summary, the federal policy guidance available to States in determining whether and if so, to whom to administer

KI does not endorse the administration of KI to the general public, although the administration of KI to emergency workers and institutionalized persons is recommended. Current NRC decisions on this issue are consistent with federal guidance. Moreover, it is clear from both federal agency guidance and NRC decisions on the issue that this policy decision is a State public health decision which the NRC ought not second guess without ample justification.

III. Argument

The standards governing summary disposition motions in an NRC proceeding are set forth in Applicant's Memorandum of Law. In summary, where, as here, a properly supported motion for summary disposition is made, the party opposing the motion must come forward with substantial facts establishing that a genuine issue of fact remains to be heard. In the absence of such a showing, the movant is entitled to a decision in its favor on that contention as a matter of law.

Applying the foregoing standards to this case, it is clear that Applicant's motion for summary disposition on Reed Contentions 6 and 16 should be granted.

The policy of the State of Missouri with respect to the administration of KI is set forth in the affidavit of Mr. Kenneth V. Miller on Reed Contention 6. Mr. Miller is the Administrator of the Missouri Bureau of Radiological Health

("BRH"), which is that part of the Division of Health within the Missouri Department of Social Services charged with the overall responsibility of directing operations relating to nuclear radiation affecting the environment outside the Callaway Plant exclusion area. Miller-6, ¶ 1. Among BRH's specific responsibilities is the development of State Protective Action Guides ("PAG's"). State Plan, Annex A, BRH Section at page BRH2.

The State of Missouri has decided not to administer KI to the general public in the event of an accident at the Callaway Plant. However, KI will be distributed by the State to specified personnel, including emergency workers, considered to be a greater risk. This policy is based on available federal guidance on KI, as well as the State's understanding of the advantages and disadvantages of KI distribution. Miller-6, ¶ 3.

In his affidavit, Mr. Miller summarizes the current federal guidance on the adminstration of KI as discussed above, id., ¶¶ 5-10, and then compares Missouri's policy with that guidance:

> Consistent with available federal guidance, the Missouri Division of Health will make KI available to state emergency workers and will store KI for distribution to the State Mental Hospital in Fulton, Missouri in the event that institution elects to use it. KI will also be distributed to the county courts, or emergency units designated by the courts, in those areas which might fall within the plume exposure pathway EPZ. In

> the event of an emergency the Division of Health will provide current information regarding projected exposures and will offer guidance on the use of KI. Decisions on whether to administer KI to local emergency workers or to Staff and patients at the State Hospital will be made by local authorities and hospital officials, respectively. They will also be responsible for administering the drug if the decision is made to use it. KI will not be distributed to the general public.

Miller-6, ¶ 11.

The policy of the State of Missouri on the administration of KI is contained in Annex B of the State Plan, which sets forth the State of Missouri PAG's. For convenience, that portion of Annex B concerning radioprotective drugs is appended hereto as Attachment 2. Annex B includes a statement of the State's policy on KI, the basis on which KI will be made available to state workers, the basis on which BRH will advise local organizations that KI administration should be considered, and information about the quantities, storage and distribution of KI. See Attachment 2. This information corresponds with the evaluation criteria of NUREG-0654 on the use of radioprotective drugs during a radiological emergency. See NUREG-0654, criteria J.10.e and J.10.f.

Further indication of the soundness of the Missouri policy on KI is provided by Dr. Roger E. Linnemann in his affidavit on Reed Contention 6. Dr. Linnemann is a medical doctor with particular expertise in the area of radiological health.

Linnemann-6, ¶ 1 and Exhibit "A". In his affidavit, Dr. Linnemann describes, from a public health perspective, the risks and benefits associated with the ingestion of KI. In order to understand these risks and benefits, Dr. Linnemann first summarizes the medical basis for recommending KI ingestion.

Iodine is taken from the blood stream by the thyroid gland and used in the manufacture of the thyroid hormones, Thyroxine and Triiodothyronine, which regulate metabolism. Iodine is normally obtained by an individual through his or her regular diet, e.g., table salt. Linnemann-6, ¶ 3.

If an individual is exposed to radioactive iodine, the body cannot distinguish it from stable (i.e., nonradioactive) iodine and, consequently, will concentrate the radioactive iodine in the thyroid. If a hazardous amount of radioactive iodine is or may be present in the atmosphere, the hazard can be minimized through the administration of stable iodine in the form of KI. The KI will increase the blood pool of available iodine for the thyroid. If an individual has not yet been exposed to radioactive iodine, the KI will effectively block the radioactive iodine from concentrating in the already saturated thyroid. The "blocked" radioactive iodine is then eliminated in the urine. Even if an individual has already been exposed to radioactive iodine, within the first hour after exposure a 130 mg. tablet of KI will block 90% of the uptake.

If KI is administered within four to six hours after exposure, it will block the uptake by 40 to 50%. (KI will have little effect if given more than twelve hours after exposure.) Id., ¶ 4.

Thus, the effectiveness of KI as a radioactive iodine blocker is directly related to the time at which it is administered. If taken in a timely fashion (not too soon or too late), it is highly effective in reducing radioactive iodine exposures to the thyroid gland; conversely, if taken at the wrong time, it can have little or no effect. Id., ¶ 5.

According to Dr. Linnemann, adverse reactions to KI are directly related to the dose and duration of the therapy. KI has been used for the treatment of bronchial asthma and other pulmonary diseases. These patients have been administered doses of 300 to 1200 mg. Cough medication containing over 100 mg. of KI has been given to children. The toxicity reports on KI are related to chronic use, e.g., if administered over a period of years, its use has resulted in the development of hypothyroidism. The risk from a very small dose, e.g., 130 mg., for an emergency situation is very small. On the other hand, there has been no experience with the risks, e.g., allergic reactions, associated with general distribution of KI to the public. Those who have received the drug to date have been under direct medical supervision. Id., ¶ 6.

Dr. Linnemann notes that current federal guidance suggests that KI should be administered to so-called high risk persons -- people unable to evacuate -- in the event of a radiological emergency at a nuclear facility. In Dr. Linnemann's opinion, providing KI to individuals only if they are at risk of receiving a dose of 25 rem or greater is sensible, given what we know about risks associated with radioactive iodine. For example, iodine-131 is given to patients in nuclear medicine departments to obtain function and morphological information concerning the thyroid gland. A thyroid uptake study, to determine how well the gland is functioning, will deliver a dose of 6 to 20 rem to the thyroid. A thyroid scan, used to obtain morphological information, will deliver a dose of 100 to 200 rem to the thyroid. An overactive thyroid (hyperthyroidism) may be treated by administering between 6,000 and 10,000 rem of I-131 to the thyroid. In the numerous follow-up studies that have been performed to ascertain the biological effects of these various doses, there is no evidence of increased leukomogenic or thyroid cancer risk below doses of about 100 rem. Id., ¶ 7.

On the other hand, because of the risks of misuse and loss of KI tablets, the potential for allergic reactions in a large population, the problems associated with the distribution of KI (e.g., shelf life of the drug), and the increasing evidence that following an accident at a nuclear facility, nacent iodine

would be very chemically reactive in a moist environment and would likely plate out and not be released to the atmosphere, it is Dr. Linnemann's view that it is not necessary or prudent to distribute KI to the general public. However, for individuals at greater risk, e.g., emergency workers and institutionalized individuals who are not evacuated, selected distribution of KI is advisable. Id., ¶ 8. Based on the medical and public health costs and benefits associated with the administration of KI, Dr. Linnemann concludes that the Missouri State policy on the distribution of KI represents a sound approach and conforms to the national medical and scientific consensus. Id., ¶ 9.

In summary, with respect to the administration of KI, the State of Missouri public policy on KI conforms to current federal guidance and NRC case law on the use of KI as a thyroid blocking agent, and is a sound medical and public health position. Notwithstanding Mr. Reed's personal opinion to the contrary, there is no material issue in dispute as to the acceptability of the State of Missouri's policy on KI.

Mr. Reed also mantains in contentions 6 and 16 that because of the unavailability of a thyroid blocking agent, and because of the minimal usefulness of ad hoc respiratory protection, the public may be required to shelter for a prolonged period of time. Consequently, Mr. Reed maintains the need for long-term shelter instructions for the public. See

Attachment 1. The affidavits of Mr. Neal G. Slaten and Mr. Saul Harris address Mr. Reed's concerns about prolonged sheltering and ad hoc respiratory protection, respectively.

As a result of a reactor accident which results in a significant atmospheric release of radioactive material, the public may receive radiation doses from three exposure modes. These include: (1) exposure to external radiation as the plume passes; (2) exposure to external radiation from radionuclides deposited on the ground and other surfaces during and after cloud passage; and (3) internal exposure due to radionuclides inhaled from the passing cloud. Thus, protective actions to reduce exposure should be considered for the direct external exposure and inhalation exposure pathway during cloud passage, and for external exposure pathways after cloud passage. (Of course, with respect to radioiodines, the inhalation pathway would be most important.) Slaten-6, ¶ 5; Harris, ¶ 3; State Plan, Annex B, Section A.

Sheltering may be defined as a deliberate action by the public to take advantage of the inherent radiation shielding available in normally inhabited structures by remaining indoors, away from doors and windows, during and after the passage of the cloud released radioactive material. Inherent structural shielding can afford protection against exposure to external sources. Furthermore, the exclusion of a significant amount of airborne radioactive material from the interior of a

structure, either by natural effects or certain ventilation strategies, can reduce the amount of inhaled radionuclides as well. Of paramount importance in addressing Mr. Reed's concerns is the fact that actions taken to effectively shelter would not vary according to the duration of time one expected to stay indoors. Slaten-6, ¶ 6.

The shielding effectiveness of a structure is expressed in terms of a shielding factor, which is the ratio of the dose received inside the structure to the dose that would be received outside the structure. Estimates have been made of shielding for several distinct building types using currently available shielding technology. These include shielding factors for external exposure from cloud passage and external exposure from radionuclides deposited on the ground and other surfaces. The estimates indicate both that a wide range of potential shielding factors is afforded by normally inhabited structures and that basements of both homes and larger buildings offer very effective shielding against radiation. In general, shielding factors from a passing cloud range from a low of 0.1 for a basement to a high of 0.9 for a wood-frame house with no basement. For example, a projected dose of 900 mrem would most likely result in a sheltering recommendation. Sheltering oneself in a wood frame house would reduce this dose to 810 mrem. By moving to the basement, one could reduce this does to as low as 90 mrem. Shielding factors for surface

deposited radionuclides range from a low of 0.001 for a basement of a large building to 0.5 for a wood frame house with no basement. The average shielding factors for the midwest region are 0.5 for a passing cloud and 0.09 for surface deposited radionuclides. Id., ¶ 7.

The effectiveness of sheltering as a protective action over time depends on many factors such as meteorological parameters, plume deposition, type of structure, magnitude of release and duration of cloud passage. Since the release (or cloud passage) duration would generally be within the range of 0.5 to 10 hours, any subsequent protective action taken in addition to sheltering, such as evacuation, would not affect the dose received through inhalation (i.e., after plume passage there is no longer an inhalation pathway of significance). Past this time, deposited radionuclides continue to expose the sheltered individual, although exposure is reduced through structural shielding. Consequently, depending upon the magnitude of the release, the half-lives of released radionuclides, the plume deposition, evacuation protective action guides could eventually be exceeded at some time after plume passage. In such a case, evacuation would be accomplished prior to release or, if not possible, sheltering would be recommended until passage of the plume followed by evacuation as soon as possible. Id., ¶ 8.

The reduction of inhaled radionuclides lessens the risk of health effects from a passing radioactive plume, the duration of which occurs within the range of 0.5 to 10 hours following release. Studies indicate that sheltered individuals receive a reduction of approximately 35% in the dose from inhaled radionuclides. (See Aldrich & Ericson, Public Protection Strategies in the Event of a Nuclear Reactor Accident: Multicompartment Ventilation Model for Shelters, SAND 77-1555, Jan. 1978; Aldrich, Ericson & Johnson, Public Protection Strategies for Potential Nuclear Reactor Accidents: Sheltering Concepts with Existing Public and Private Structures, SAND 77-1725, Feb. 1978.) Id., ¶ 9. Larger reductions would be possible if the ventilation rate was further reduced by tighter building construction, emergency sealing of openings in the structure or by the use of basements. Additional protection against doses from inhalation of radionuclides may be provided by employing a variety of common household items such as towels or handkerchiefs as respiratory filters during cloud passage. Id., ¶ 10.

Thus, sheltering is simply one of a number of protective actions available to BRH to recommend if conditions warrant such action. Instructions for taking shelter, which are stated in a Draft Emergency Broadcast System ("EBS") Message contained in Annex C of the State Plan (appended hereto as Attachment 3), would not vary according to the duration of shelter. Slaten-6,

¶ 6. The decision to initiate a protective action may be a complex process with the necessity to weigh the benefits of taking such action against the risks. State Plan, Annex B, Section A. Because of this, PAG's have been developed to reduce to manageable levels the decisions that must be made to protect the public in the event of a nuclear accident. Id. One of the available protective action options is to advise the public to take shelter. See State PAG's contained in State Plan, Annex B. Such a recommendation would be particularly appropriate where there is a low dosage airborne release, or when there is a higher release but evacuation is not immediately possible. Id.; see also Attachment 4 (EBS announcement). The option of sheltering is not intended to be equivalent to evacuation; rather, it provides another means of achieving the overall objective of emergency response plans: providing dose savings for a spectrum of accidents that could produce off-site doses in excess of PAG's. NUREG-0654, Section I.D, at 6.

Similarly, ad hoc respiratory protection is another alternative means of minimizing internal exposure to radioactive material. The scientific basis for using ad hoc respiratory protection is described in detail by Mr. Saul Harris in his affidavit. Mr. Harris is a health physicist with over 35 years of experience in the field of radiological health. Harris, ¶ 1 and attached Exhibit A.

Ad hoc respiratory protection can be defined as deliberate action taken by the public to take advantage of emergency respiratory protection offered by the use of a common household material as ad hoc respirators. Ad hoc respiratory protection from readily available materials such as fabrics, towels, sheets, etc., has been shown to be effective for both particles (dusts or aerosols), vapors, and radioactive gases including radioiodine. Such inhalation protection would be valid for the public remaining indoors (sheltering) or for brief movement outdoors during passage of a radioactive cloud or plume. In addition, such ad hoc respiratory protection would increase the inherent inhalant protection provided by sheltering within a structure. This protection is afforded either by natural sealing of the building or by certain ventilation strategies which inhibit air and dust movement from the exterior of the building into areas occupied by the public during passage of a released radioactive cloud or plume. Harris, ¶ 4.

The effectiveness of ad hoc respiratory protection is expressed in terms of filter efficiency or penetration of dusts, aerosols or gases through the ad hoc respirator materials. Research into the effectiveness of emergency respiratory protection using common household and personal items has been undertaken for over 20 years, with much of the early work done at the request of the Atomic Energy Commission. Initial research studied some eighteen variations of eight household

and personal items, with military personnel using these materials as respiratory protection expedients in a calibrated atmosphere of particles in an aerosol. These early tests produced results indicating that five variations involving a man's cotton handkerchief, commercially available toilet paper, and a bath towel, had a filtration efficiency greater than 85 percent (meaning that 85% of the particles were not inhaled because of the ad hoc respiratory protection). See Harris, attached Table "A". Resistance to breathing offered by each medium also was evaluated with a few of the variations rejected because of excessive breathing resistance. For maximum protection, the medium needs to be damp but not too wet (see footnote A in Table "A"); however, excessive wetting of the initial test material could increase resistance to breathing, indicating that use of very wet items is not generally practical. In all instances, a good fit on the face, to assure edges were sealed, is essential to obtain maximum effectiveness of the expedient material; however, this is also a limitation applicable to commercially-available respirators. (See 1963 American Industrial Hygiene Association Respiratory Protective Devices Manual, "Household Items for Emergency Use in Civilian Defense," pages 123-126; A.M.A. Archives of Industrial Health, "Emergency Respiratory Protection Against Radiological and Biological Aerosols," Vol. 20, page 91-95, Aug. 1959.) Id., ¶ 5.

Further research conducted by the Department of Environmental Health Sciences, Harvard School of Public Health, has been published as NUREG/CR-2272, Expedient Methods of Respiratory Protection, November 1981, for the U.S. Nuclear Regulatory Commission, and as "Emergency Respiratory Protection with Common Materials, " Am. Ind. Hyg. Assoc. Journal 44(1): 1-6 (1983) by D.W. Cooper, W.C. Hinds, and J.M. Price. In addition, remarks "On the Efficacy of Ad Hoc Respiratory Protection During a Radiological Emergency" were preeented by James A. Martin, Jr., an NRC Staff member, as paper P/50 at the 1981 Annual Meeting of the Health Physics Society, based in part on the data by Cooper, et al. (Harvard University). The Harvard data were also included in a paper presented by D.C. Aldrich at an Electric Power Research Institute symposium on radiological emergency planning held January 12 and 13, 1982 and published in NSAC-50, "Are Current Emergency Planning Requirements Justified," NSAC-EPRI, May 1982. As discussed below, these papers reflect the current state of the art with respect to ad hoc respiratory protection. Id., ¶ 6.

The reports by Cooper and associates were the result of extensive studies of the ability of readily available fabrics to filter aerosols, gases and vapors expected to be emitted in the event of a major nuclear reactor accident using calibrated particles. The results, while somewhat different, were consistent as to the value of ad hoc material from those

obtained earlier. Decreases in particle concentrations by a factor of ten or more were possible from the fabrics tested, when operated at a pressure drop deemed acceptable for breathing comfort. Protection from Krypton-85 by dry fabrics from radioiodine using wetted fabrics (with water or a baking soda solution) was appreciable. Follow-up studies by Harvard University are continuing. Id., ¶ 7.

These test results show that readily available materials can provide substantial reductions in concentrations of particles and certain water-soluble gases and vapors at pressure drops acceptable for respiratory protection during nuclear power plant accident conditions. Leakage around the seal to the face could reduce the protection provided, as noted in the earlier studies, but this problem is associated with the use of commercially available respirators as well.

While neither of the studies specifically address the duration of the protection, the earlier report stated that the dry bath towel and man's handkerchief variations did not appear to have any serious limitations as to the duration of use. The Harvard research did not indicate any significant breathing difficulties could be anticipated by the use of towels or handkerchiefs even when wetted. Comparing these materials with a 3M dust respirator, a half-mask fabric respirator, the authors of the reports felt the masks could be worn for hours without substantial discomfort and the fabrics could be tied or

taped to the face for shorter periods during the passage of a puff or plume, during travel to shelter, or during relocation indicating suitable duration of use during nuclear accident scenario conditions. Id., ¶ 9.

In a qualitative sense, then, these research studies indicate that it would be advisable to cover the nose and mouth during possible exposure to airborne radioactive material following a nuclear reactor accident if the plume is likely to cause airborne concentrations that could result in radiation doses to the public in excess of protective action guides. Further research is underway to quantify this perhaps self-evident statement. As stated by Martin in the abstract for paper P/50, "These studies demonstrate that application by the public of ad hoc shelter and respiratory protection could provide inhalation pathway protection factors (PFs) of ten or more, with shelter providing a PF of two to ten and ad hoc respiratory protection providing an additional PF of three to twenty, or so." Id., ¶ 10. Furthermore, as Martin points out, "these potential PFs are very competitive with that of potassium iodide (KI) for the thyroid, but the former would protect other organs as well . . . . [A]d hoc shelter and respiratory protection could be used to reduce doses in cases where expeditious evacuation would not be feasible...." (emphasis added). Id., ¶ 11.

Thus, following an accident at the Callaway Plant, in accordance with the State PAG's, the public would be instructed in appropriate protective action by appropriate authorities, including when to use ad hoc respiratory protection (if needed at all). A Draft EBS Announcement on personal respiratory protection is contained in Annex C to the State Plan and is appended hereto as Attachment 5. In addition, public information will be sent to residents which contains information about ad hoc respiratory protection. Harris, ¶ 12. Parents would be able to monitor the proper use and comfort of ad hoc respiratory protection by the younger members of the family according to these instructions, with no likelihood that young children could suffocate from the use of ad hoc respiratory protection. Id.

As Mr. Harris suggests, there is no mystery to the concept that ad hoc respiratory protection can be effective in providing inhalation filtering of potentially hazardous airborne material. It is common knowledge that covering the nose and mouth of family members with a damp cloth is an effective ad hoc method of minimizing smoke inhalation during fires. Common sense as well as scientific research dictates that similar action be taken upon instruction by appropriate authorities following the release of significant quantities of airborne radioactive material during a radiological accident at the Callaway Plant. Id., ¶ 13. Ad hoc respiratory protection is

not intended to be a substitute for other more appropriate protective responses, e.g., evacuation or sheltering; it is simply another means of minimizing internal dosage.

IV Conclusion

Because there is no genuine issue as to any material fact, Applicant's motion for summary disposition of Reed Contentions 6 and 16 should be granted.

Respectfully submitted,

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#6. PROTECTIVE ACTIONS AGAINST RADIOIODINE (DRUGS AND EQUIPMENT)

A range of protection actions have not been developed for the plume exposure pathway EPZ for local emergency workers or the public which protect against direct or ingested radiation as is required by 10 CFR, Part 50, Section 50.47(b)(10) and NUREG 0654, II, J, which includes provisions for the use of radioprotective drugs, particularly for emergency workers and institutionalized persons whose immediate evacuation may be infeasible or very difficult. Such provisions must include quantities, storage, and means of distribution (see NUREG 0654, II, J, e).

A. Evacuation is considered the most protective action for members of the public in a radiological accident (SOP, pg. 8-4) but constraints and disadvantages may make it inappropriate, such as arrival of the plume in mid-evacuation, etc. Evacuation is a last resort (SOP, pg. 8-3).

B. Shelter is, therefore, the primary protective action but good protection in a dwelling is limited (EPA-520/1-75-001, 1.6.3.2):

> "- -, shelter provided by dwellings with windows and doors closed and ventilation turned off would provide good protection from inhalation of gases and vapors for a short period (i.e. one hour or less) but would be -- ineffective after about two hours --."

No effective course of action is proposed for sheltering after that period. Use of ad-hoc repiratory devices in lieu of other effective methods of preventing inhalation or ingestion of nuclides such as radioactive iodines for extended periods of time places public health and safety in jeopardy.

(1) Use of potassium-iodide as a protective option by residents in the plume exposure pathway EPZ is rejected in the proposed Off-site Plan, page 9-5, item I.

(2) Potassium-iodide is not provided for optional use by local emergency workers, nor is respiratory protection that meets NRC standards for use in a radiological environment.

(3) Local governments' proposed SOPs state that because of safety, economic and legal considerations, the decision to evacuate should be the protective action of last resort (see SOPs, Proc. #8, 4.3). Of the two options discussed in the SOPs, shelter and evacuation, the State has decided to evacuate rather than issue KI; however, shelter without the benefit of KI is the primary protective action to be considered in an accident involving a release of nuclides from the plant. Pre-school children, pregnant women and all females of child-bearing age who are advised to stay indoors (shelter mode) without KI or respiratory protection are subject to thyroid damage or its destruction in themselves and/or the children in utero.

C. The State of Missouri has refused to provide radioprotective drugs, e.g. prophylactic iodine, for either emergency workers or the general public. The Bureau of Radiological Health has decided that evacuation is a more feasible logistical response for protection against radioiodine than is issue of potassium iodide (KI) (see State of Missouri RERP, page B11, H.).

(1) Radioiodines contribute significant exposure modes to whole body exposures, thyroid exposure and lung exposure (see NUREG 0654, page 18, Table 3).

(2) The principle inhalation dose will be from iodines and particulate material in the plume. Due to the ability of the thyroid to concentrate iodine, the thyroid dose resulting from inhalation of radioiodines may be several times greater than the corresponding whole body external gamma dose that would be received (State RERP, Annex B, C.2).

D. Selection of two options as a range of protective actions without including suitable protective support equipment or chemical prophylaxis to enhance the effectiveness of a selected option over time renders said option to be ineffective under the definition of the two options contained in the SOP, pages 8-3, 8-4, and 8-5.

E. The U.S. Food and Drug Administation has found the use of potassium-iodide (KI) to be safe and effective as a thyroid blocking agent to prevent the uptake of radioactive iodines by the thyroid glands. Since said Federal agency has publically rendered such judgment on the use of KI, it

is felt that said KI should be made an optional defensive measure that the general public can take in a sustained shelter situation to protect against thyroid damage or loss, especially in children/infants. Public warnings on packages/bottles can advise of possible reactions to use of this drug by persons who are allergic to KI (similar to the warnings on cigarettes and patent medicines), if officials are concerned about ingestion of KI by alergenic residents of the EPZ.

F. NUREG 0654, page 63, J. Protective Response, e, states:

> "Provisions for the use of radioprotective drugs, particularly for emergency workers and institutionalized persons within the plume exposure EPZ whose immediate evacuation may be infeasible or very difficult, including quantities, storage, and means of distribution."

Such evaluation criteria is applicable to State and Local governments and indicates that use of KI or similar drugs is a required criteria for a satisfactory plan (see NUREG 0654, page 5, lines 13-15):

> "FEMA and NRC regard all of the planning standards identified herein as essential for an adequate radiological emergency plan."

G. Common sense and reason indicates that a situation such as this is not in the best interest of providing protection for the public health and safety. If a situation precluding evacuation is possible, and shelter phases may exceed two hours (the effective limit of homes -- see SOP, Procedure #8, 5.1.1) and the public is to be afforded protection from radioiodines, KI or some other thyroid protective drug or device must be made available to shelterees.

#16. MESSAGES WITH INSTRUCTIONS FOR LONG-TERM SHELTERING

State and local governments shall provide written messages intended for the public which shall include the appropriate aspects of sheltering, ad hoc respiratory protection, thyroid blocking or evacuation (see NUREG 0654, II, E.7.). Messages contained in the proposed Offsite Plan does not provide for instructions relating to thyroid blocking or respiratory protection if prolonged sheltering is necessitated.

A. Ad hoc respiratory protective devices (handkerchief or towel over mouth and nose, etc.) are known to be less effective than filter-type respirators whose effective life-time under use is from 2 to 3 hours (see EPA-520/1-75-001, Chapter 1, 1.6.3.4, page 1.40, lines 13 & 14) and shelter in buildings suitable for winter habitation (see SOP, Procedure #8, 5.1.1) will provide reasonably good protection for about two hours. Given these facts, reasonably adequate respiratory and thyroid protection is provided if shelter is restricted to two or three hours. In cases of flooding, snow and/or ice on area roads; travel in rural areas of all counties have been curtailed for days. In the event of an accident/release of nuclides, shelter must be considered necessary for as long as two to four days. In such circumstances, residents are placed in a situation wherein they cannot move out of the area and do not have protective

options which insure their safety if they stay. This situation clearly places public health and safety at risk.

B. Instructions in the Offsite Plan and SOPs must be rewritten to include instructions for the provision of long term shelter instructions which are available to residents who will be advised to take shelter versus evacuation in the event of an accident/release of nuclides at the plant.

ANNEX B

NUCLEAR ACCIDENT PLAN

STATE PROTECTIVE ACTION GUIDES (PAG's)

A. INTRODUCTION

In the event of a nuclear incident, a contaminating event could result which may have public health implications over a large area with diverse population densities. A contaminating event includes, but is not limited to accidents at nuclear facilities, transportation accidents, and fallout from nuclear devices under peacetime conditions. If such an incident occurs, an estimate will be made of the radiation dose which affected population groups could receive. This dose estimation is called the projected dose. A protective action is an action taken to avoid or reduce this projected dose when the benefits derived from such actions are sufficient to offset any undesirable effects of the protective action. The State Protective Action Guide (PAG) is the projected dose to individuals in the population which warrants taking protective actions.

The decision to initiate a protective action may be a complex process with the benefits of taking such action being weighed against the risks and most likely be made under difficult emergency conditions with little time available in which to act. PAG's have therefore been developed to reduce to manageable levels the decisions that must be made to protect the public in the event of a nuclear incident. The response for a given situation will be based on the State Protective Action Guides and the spectrum of possible protective action options available at that time.

Protective actions will be based upon measurements provided by trained field monitors using portable GM survey meters with readings taken approximately 3' above the ground surface. Beta vs. Gamma exposure rates will be determined by using GM portable survey meters with readings taken with the probe shield open and closed. Exposure rates may be converted to projected doses using graphs contained in Annex B. Correction factors contained in Annex B will be used as appropriate. To use the graphs, take the gamma exposure rate (MR/hr.), proceed along that line to the projected exposure duration (hrs.). This point is the projected dose (Rem). The projected exposure time will be based upon the estimated duration of release provided by the facility.

For the purposes of the PAG, the residential dwellings located within 5 miles of any fixed nuclear facility are assumed to be wood frame houses with no basements. Using such an assumption will result in the most conservative protection factor (PF) of about 3. This PF will be used to determine (1) whether to recommend sheltering VS. evacuation, (2) whether to continue sheltering, or (3) whether to evacuate. The time it takes to transport is a factor in determining evacuation. Transportation times can be found in each appropriate County evacuation plan.

Application of the Protection Factor to projected dose, as determined by accident assessment personnel utilizing Projected Dose charts in the Annex, shall be the bases for recommended protection actions.

A protective action guide under no circumstances implies acceptable dose. Since PAG's are based on projected dose, they are used only in an after the fact effect to minimize the risk from an event that is occurring or has already occurred. In some situations, protective actions may be indicated at levels lower than the PAG's.

Total Population Exposure

Estimation of total population exposure (in Man-REMS) is clearly a functional responsibility of the Federal Government together with the utility operator. All radiological monitoring data collected by State monitoring teams shall be accumulated at the Forward Command Post, forwarded to the State EOC, and utility EOF, and will be available to government and utility officials.

1. Lifting of Protection Controls

The lifting of controls for protective actions may be justified on the basis of cost savings when the corresponding health risks have been adequately reduced. For example, the costs incurred by the public, state, and local governments in maintaining access control, pasture control, milk control, or food and water control will exceed the risk reduction value of these controls after a certain period of time. At this point, the controls should remain relatively constant with respect to time, while their significance in reducing risk will decrease as the released nuclides are decontaminated, disperse, or decay away.

2. Re-entry

After an evacuation, persons will be allowed to re-enter the area when the risk has been averted or reduced to levels acceptable for members of the general population. However, it may be necessary for certain essential personnel to return before the projected dose is reduced to acceptable guide levels. Recommendations relative to re-entry will be determined on a case-by-case basis and will be based on consideration of the remaining radiation risk and the undesirable effects of continuing protective actions. Re-entry and recovery procedures are established in Attachment 1 to Annex B.

H. RADIOPROTECTIVE DRUGS

1. The Division of Health, Bureau of Radiological Health, will provide Potassium Iodide (KI) for use by state and local emergency workers who may be required to enter the plume exposure pathway EPZ where the projected dose to the thyroid is 25 rem or greater. The Division of Health has decided that evacuation is a more feasible logistical response for protection of the general public against radioiodine than is issuance of KI to a large population of people.

2. As conditions warrant, the Administrator of the Bureau of Radiological Health will advise state emergency personnel working in an affected area that KI will be made available. BRH will advise local emergency organizations when conditions have reached a level where available federal guidance suggests the use of KI. Local emergency organizations will make the decision about whether to make KI available to their emergency workers. The decision to make KI available will be based a cident assessment information such as the expected duration and type of release, areas affected, reaction time available and support logistics will be considered along with projected thyroid dose rates.

3. The Bureau of Radiological Health will acquire sufficient quantities of potassium iodide to support state and local emergency organizations. The quantities to be purchased will be based on the number of emergency workers anticipated to be operating in the risk area in the event of an accident. Quantities purchased will also take into account the administration of one daily dose of 130 mg of KI for a maximum of 10 days per emergency worker.

4. Potassium iodide for state field monitoring personnel will be stored in the Office of the Bureau of Radiological Health under the supervision of the Administrator and will be inventoried annually. It will be distributed from the Forward Command Post under the direction of the Administrator or his representative. Doses will be recorded on the attached Dosage Record Form.

5. Potassium iodide for local emergency workers and for state emergency personnel other than field monitoring teams will be distributed to local government agencies in the areas that might be within the plume exposure pathway EPZ. The local government agencies will be responsible for storing and inventorying annually the KI and for dispensing the KI to emergency workers if the decision is made to use it. Doses will be recorded on the attached form.

6. Potassium iodide will be provided for persons for whom evacuation would not be feasible by state and local emergency personnel under BRH direction as conditions warrant, based on the criteria specified above. Advice regarding the use of KI will be provided to any person who elects to use it, and a dosage record will be maintained.

DRAFT EBS ANNOUNCEMENT

SUBJECT: IN-HOUSE SHELTER
GENERAL INFORMATION

DATE OF RELEASE _____ TIME _____ RELEASED BY _____ (NAME)

TITLE _____

TEXT: ATTENTION, BECAUSE OF THE _____ (COOPER/CALLAWAY) NUCLEAR POWER PLANT INCIDENT NOW UNDERWAY, STATE HEALTH OFFICIALS HAVE RECOMMENDED THAT PEOPLE IN DESIGNATED AREAS NEAR THE PLANT IN MISSOURI (_____) TAKE SHELTER IMMEDIATELY IN THEIR HOMES, SCHOOLS OR PLACES OF BUSINESS.

IF YOU ARE IN THIS AREA, YOU SHOULD FOLLOW THESE SPECIFIC PROTECTIVE SHELTER INSTRUCTIONS.

ONE - IF YOU ARE OUTDOORS, GO INSIDE IMMEDIATELY. ONCE INDOORS, CLOSE ALL WINDOWS AND DOORS. TURN OFF FANS AND AIR CONDITIONERS, AND CLOSE ALL OTHER AIR INTAKES.

TWO - IF YOU HAVE COME IN FROM OUTSIDE, WASH YOUR HANDS AND FACE AS A MINIMUM, BUT PARTICULARLY BEFORE HANDLING OR EATING ANY FOOD. IF POSSIBLE, TAKE A SHOWER USING COOL OR LUKEWARM WATER. WASH ANY ITEMS OF CLOTHING YOU WERE WEARING WHILE OUTSIDE.

THREE - COVER ALL "OPEN" FOOD CONTAINERS

FOUR - DO NOT USE YOUR TELEPHONE UNLESS IT IS ABSOLUTELY NECESSARY. KEEP PHONE LINES OPEN FOR EMERGENCIES.

FIVE - STAY INSIDE UNTIL YOU RECEIVE OFFICIAL NOTICE THAT IT IS SAFE TO GO OUT. STAY TUNED TO YOUR EMERGENCY BROADCAST

STATION FOR LATER INFORMATION AND FURTHER INSTRUCTIONS

INFORMATION.

(REPEAT MESSAGE)

(FOLLOW INITIAL
PROTECTIVE MEASURE)

DRAFT EBS ANNOUNCEMENT

SUBJECT: INITIAL EBS ANNOUNCEMENT
OF GENERAL EMERGENCY
(IN-HOUSE SHELTER RECOMMENDED)

DATE _____ TIME _____ RELEASED BY _____
(OF RELEASE) (NAME)

TITLE _____

TEXT: A GENERAL EMERGENCY HAS BEEN DECLARED AT THE

_____ NUCLEAR POWER PLANT IN _____,
(COOPER/CALLAWAY) (TOWN)

_____ BY OFFICIALS OF THE _____.
(STATE) (NAME OF UTILITY)

THIS EMERGENCY MEASURE HAS BEEN TAKEN BECAUSE OF ABNORMAL OPERATING CONDITIONS WHICH ARE EFFECTING THE LEVEL OF SAFETY WITHIN THE PLANT AND WHICH COULD AFFECT THE LEVEL OF SAFETY IN THE IMMEDIATE VICINITY OF THE PLANT.

STATE AND LOCAL EMERGENCY PERSONNEL FROM MISSOURI (_____) ARE RESPONDING AND MORE INFORMATION FOR THE PUBLIC WILL BE PROVIDED AS IT BECOMES AVAILABLE.

THERE (HAS BEEN A/HAS BEEN NO) SIGNIFICANT RELEASE OF RADIOACTIVITY OFF OF THE PLANT SITE AND AT THE PRESENT TIME, THERE (IS/IS NO) DANGER TO THE PUBLIC.

HOWEVER, AS A RESULT OF THE GENERAL EMERGENCY, FEDERAL REGULATORY OFFICIALS RECOMMEND THAT ALL PERSONS WITHIN A TWO-MILE RADIUS AND FIVE-MILES DOWNWIND OF THE _____
(COOPER/CALLAWAY)

NUCLEAR PLANT, SPECIFICALLY IN _____ COUNTY NORTH OF _____, SOUTH OF _____, AND EAST OF _____, WEST

OF _____ (GIVE LOCAL RECOGNIZABLE BOUNDARIES), TAKE SHELTER IN THEIR HOMES, SCHOOLS, OR PLACES OF BUSINESS. AFTER FURTHER ASSESSMENT BY STATE OFFICIALS, IT HAS BEEN DETERMINED THAT AFFECTED AREAS MAY BE EXTENDED DOWNWIND. IT IS URGED THAT PERSONS WITHIN A 10-MILE RADIUS OF THE PLANT STAY TUNED TO THEIR EMERGENCY BROADCAST STATION FOR FURTHER EMERGENCY INSTRUCTIONS.

(REPEAT MESSAGE)

(NOTE: IF IN-HOUSE SHELTER IS RECOMMENDED, FOLLOW THIS NOTICE WITH PROPER SPECIFIC INSTRUCTIONS AS FOUND IN THE ANNOUNCEMENT.

(ISSUED BY PLANT OR
OR LOCAL GOVERNMENT)

DRAFT EBS ANNOUNCEMENT

SUBJECT: PERSONAL RESPIRATORY PROTECTION
GENERAL INFORMATION

DATE _____ TIME _____ RELEASED BY _____
(OF RELEASE) (NAME)

TITLE _____

TEXT: BECAUSE OF THE EXISTING EMERGENCY CONDITIONS AT _____ NUCLEAR POWER PLANT, STATE HEALTH OFFICIALS ARE ADVISING CITIZENS IN THE AFFECTED AREA NOT TO GO OUTSIDE WITHOUT USING RESPIRATORY PROTECTION DEVICES.

RESPIRATORY PROTECTIVE DEVICES HELP PROTECT YOU AGAINST AIRBORNE RADIOACTIVE PARTICLES.

THE AREA OF CONCERN IS _____ (AND/OR _____) COUNTY, MISSOURI, NORTH OF _____, SOUTH OF _____, AND EAST OF _____, WEST OF _____ (GIVE LOCAL RECOGNIZABLE BOUNDARIES).

IF YOU MUST VENTURE OUTSIDE, BE SURE TO USE SUCH A DEVICE.

YOU CAN EASILY DEVISE A QUICK, EFFECTIVE RESPIRATORY DEVICE BY FOLDING A MAN'S COTTON HANDKERCHIEF TO EIGHT LAYERS AND PLACING IT OVER THE MOUTH AND NOSE.

THE HANDKERCHIEF SHOULD BE DRY AND SHOULD BE HELD SNUGLY IN PLACE AT ALL TIMES. A DRY BATH OR HAND TOWL, FOLDED IN THREE LAYERS IS JUST AS EFFECTIVE.

WHATEVER KIND OF DEVICE YOU USE, REMEMBER THAT TOTAL EFFECTIVE-NESS DEPENDS ON A CONSCIENTIOUS EFFORT TO MAINTAIN A GOOD CLOSE

FIT OVER THE MOUTH AND NOSE. SMALL CHILDREN SHOULD BE ASSISTED IN MAINTAINING SUCH A FIT.

(REPEAT MESSAGE)

RESIDENTS OF THE AFFECTED AREA SHOULD STAY TUNED TO THIS EMERGENCY BROADCAST STATION FOR FURTHER DEVELOPMENTS AND OFFICIAL INSTRUCTIONS.

(GENERAL INFORMATION)