PROTECTION IN A NUCLEAR EMERGENCY

There are 92 nuclear power reactors in the United States producing about one-fifth of the country's electricity. Although the plants usually operate safely, around each is a 50-mile ring that could be heavily contaminated by radiation should a leak occur. We know this because the US Nuclear Regulatory Commission (NRC), the government's regulatory agency, has warned that in a serious accident "*much of any particulate material in a radioactive plume* [will be] *deposited on the ground within about 50 miles of the facility.*"[1] For anyone this close, the consequences could be catastrophic. But protection is available.

History demonstrates that radiation causes cancer, especially in children. That's why all nuclear reactors have complex safety controls and redundant systems designed to contain the danger. But should the unexpected occur, millions of people will need to take radiation-protective measures, including immediate evacuation and the use of potassium iodide (KI). These tablets are the final defense if everything else fails. They block most of the harmful radiation in a power-plant accident and also protect against the kind of radioactive fallout expected from a nuclear weapon. In volume, the tablets cost pennies.

KI works—which is why all nuclear plant workers have the pills and why the NRC distributes them to individuals living near nuclear facilities. But although the cancer danger extends for 200 miles, only those within 10 miles are actually given the pills. This is reasonable, the NRC explains, because "***life-threatening doses*** [of radiation] *would generally not occur"* beyond ten miles.[2]

But this carefully worded statement is grossly misleading. "***Life-threatening***" radiation doses (thousands of REM) do not cause cancer. They kill before cancer can develop. Cancer (especially among children) is caused by doses as low as 3 to 5 REM,[3] a level expected for hundreds of miles downwind in a severe power plant accident, or in the radioactive fallout produced by a nuclear weapon.

The NRC knows this but remains opposed to stockpiling enough KI to protect everyone. Their reasoning, as their own documents describe, is the fear that public efforts to stockpile KI might "*remind people of nuclear reactor accidents*"—while ignoring KI "*implies that the risks are low*."[4] Therefore, to avoid negative publicity, the industry produced a "cost-benefit" study emphasizing "***cure rather than prevention***."[5] Should an accident occur, the public would be partially protected through a strategy of mass-evacuation and "sheltering" which would reduce total exposure, although some children will almost certainly get sick.

Evacuate millions of people? Focus on "**cure rather than prevention**?" **Limit KI distribution** to improve public relations while jeopardizing children's health? These are questionable strategies that put millions of Americans at risk. The objective should be to protect people—not the reputation of the nuclear industry.

KI's value is proven. Limited quantities were distributed following Chernobyl, and "*thousands of measurements*" confirmed that radiation levels among recipients "*were lower than would have been expected had this prophylactic measure not been taken*."[6] The New York Times reported that "*children lucky enough to be given potassium iodide largely escaped harm*."[7]. But thousands of **unlucky** children (those outside the Chernobyl distribution area) developed cancer at epidemic rates due to the unique vulnerability of the thyroid to radiation. In fact, the NRC reported that ten years after the accident "*except for thyroid cancer, there has been no confirmed increase in the rates of other cancers*."[8]

Safety experts were not surprised. The FDA has stated plainly that when used with other common-sense measures *"KI can provide safe and effective protection against thyroid cancer caused by irradiation*."[9] Other groups, such as the American Thyroid Association, the American Academy of Pediatrics, The National Academy of Sciences, the World Health Organization, and many others, all support KI. Our military has a small supply for its own short-term needs, but none for distribution to the public, and there is virtually none in the country's Strategic National Stockpile. It is not clear why our elected authorities willingly permit the public to be left defenseless, or how they would justify this situation if KI is ever needed, but unavailable.

Although the nuclear industry holds that an accident would not pose a threat beyond 10 miles, NRC research punctures this optimism. Multiple government studies[10,11] predict radiation exposures more than 100 times safe levels, and warn that what happened at Chernobyl—where more than 90% of the thousands of childhood cancer victims were located more than 30 miles downwind[12]—could happen here.

Though no method to assure nuclear safety is perfect, having KI for protection is a strategy that has considerable merit. The realistic threats our country faces from nuclear weapons, terrorism, or a reactor failure, clearly indicate that KI is a prudent and good-sense response to real-world dangers. That's why the decision to essentially ignore the tablets should be seriously reviewed.

Current KI policy is based on politics and public relations, not science or medicine. Limiting KI distribution serves no purpose while greatly increasing risk to millions of Americans. Few dispute this. In fact, even a former Chairman of the NRC has admitted that at Chernobyl: "*Evacuation and the use of potassium iodide would have significantly reduced the incidence of thyroid cancer.*" He called the failure to distribute KI to everyone a "*callous disregard by the former Soviet Union for it its people*" and a "*failure of a society to take care of its people*.[13]

Surely America can do better than that.

ANBEX

Radiation Protection

For more information on potassium iodide, see the references cited below or go to www.KIFacts.com. To purchase potassium iodide, go to www.anbex.com. For additional questions, call 727-784-3483. To contact your elected representatives to ask them to support stockpiling KI for everyone, click on the following:

US House of Representative: http://www.house.gov/representatives/find
US Senate: https://www.senate.gov/senators/contact

SOURCES:

[1] US Nuclear Regulatory Commission: *Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants*. Released as NUREG-0654, rev. 2, May 2015, page 6. Available at https://www.nrc.gov/docs/ML1424/ML14246A519.pdf

{2] US Nuclear Regulatory Commission: Ibid: NUREG-0654

[3] US Nuclear Regulatory Commission: NRC NEWS, March 16, 2011

[4] Excerpts from the transcript of a Staff Briefing held November 22, 1983 to senior NRC personnel regarding NUREG/CR-1433 (see below), an NRC study which found that the consequences of a nuclear accident would be much worse than expected. This internal staff document has not been released publicly.

[5] US Nuclear Regulatory Commission: Memorandum to Hugh Thompson, Deputy Executive Director for Operations, from Peter Crane, NRC Counsel for Special Projects, June 16, 1989

[6] US Nuclear Regulatory Commission: *Report on the Accident at the Chernobyl Nuclear Power Station*. US Nuclear Regulatory Commission. Released as NUREG-1250, page 7-8. Available at https://www.nrc.gov/docs/ML0716/ML071690245.pdf

[7] New York Times, June 13, 2002

[8] US Nuclear Regulatory Commission: *Assessment of the Use of Potassium Iodide (KI) As a Public Protective Action During Severe Reactor Accidents*. US Nuclear Regulatory Commission Draft Report for Comment. Released as NUREG-1633, page 15. Note: due to strong criticism by the medical community, this draft document was never released in final form.

[9] US Food and Drug Administration. FDA Talk Paper "*Guidance on Protection of Children and Adults Against Thyroid Cancer in Case of a Nuclear Accident*." December, 2001. Available at http://www.fda.gov/downloads/Drugs/GuidanceComplianceRegulatoryInformation/Guidances/UCM080542.pdf

[10] US Nuclear Regulatory Commission: *Examination of the Use of Potassium Iodide (KI) as an Emergency Protective Measure for Nuclear Reactor Accidents*, Prepared by Sandia National Labs for the US Nuclear Regulatory Commission. Released as NUREG/CR-1433, October, 1980, tables 3 and 4

[11] US Nuclear Regulatory Commission: *An Analysis of Potassium Iodide (KI) Prophylaxis for the General Public in the Event of a Nuclear Accident*. Prepared by S. Cohen & Associates, Inc. for the US Nuclear Regulatory Commission. Released as NUREG/CR-6310. 1994, table 4-8. Available at https://www.osti.gov/scitech/servlets/purl/10120351

[12] US Nuclear Regulatory Commission: IBID: NUREG-1633, pages 16-17

[13] US Nuclear Regulatory Commission, Office of Public Affairs, Vol 21, No. 48, (11/30/2001), from speeches and remarks made by Commission Chairman, Dr. Nils Diaz.

U.S. NUCLEAR REGULATORY COMMISSION

Expected Radiation Dispersion in the Event of a Nuclear Reactor Accident
Results from Two Studies

FROM: NUREG/CR-1433 (Prepared by Sandia National Laboratories for the NRC):
Examination of the Use of Potassium Iodide (KI) as an Emergency Protective Measure for Nuclear Reactor Accidents

Expected Effects of Core-Melt Atmospheric Accidents by Distance
(Combined Tables 3 and 4)

Distance From Reactor (In Miles)	Mean Thyroid Dose (REM) for Exposed Adult	Probability of Thyroid Damage to Exposed Adult
1	13,800	60%
5	6,800	70%
10	3,200	70%
25	1,100	40%
50	380	13%
100	100	3%
150	36	1%
200	16	.5%

NOTE: For children, increase dose and probability of damage by an approximate factor of two

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FROM: NUREG/CR-6310 (Prepared by S. Cohen & Associates for the NRC):
An Analysis of Potassium Iodide (KI) Prophylaxis for the General Public in the Event of a Nuclear Accident

Expected Effects of Core-Melt Accidents with Atmospheric Release
(Table 4-8)

Distance Interval (Miles)	Child Dose (REM)	Adult Dose (REM)	Average Person Dose (REM)
1-5	38,000	9,550	20,000
5-10	14,500	3,600	7,300
10-25	3,450	865	1,800
25-50	575	145	300
50-100	135	34	70
100-150	62	16	32
150-200	38	9	19

NOTE: Nuclear Regulatory Commission Guidelines call for "Protective Actions" (KI) when radiation dose to the thyroid exceeds 3 to 5 REM

TWO HUNDRED MILE ZONES AROUND U.S. NUCLEAR PLANTS

SOURCE: USNRC