

# Chapter 18

## Trans-Pacific Fallout

### POTENTIAL DANGERS TO AMERICANS

Many strategists believe that if a nuclear war is fought in the next few decades it probably will not involve nuclear explosions on any of our 50 states. Perhaps the first nuclear war casualties in the United States will be caused by fallout from an overseas nuclear war in which our country is not a belligerent. As the number of nations with nuclear weapons increases — especially in the Middle East — this generally unrecognized danger to Americans will worsen. Trans-Pacific war fallout, carried to an America

at peace by the prevailing west-to-east winds that blow around the world, could be several hundred times more dangerous to Americans than fallout from the worst possible overseas nuclear power reactor accident, and many times more dangerous than fallout from a very improbable U.S. nuclear power reactor accident as lethal as the disastrous Chernobyl accident was to Russians.

Fig. 1 is a map showing fallout from a single above ground Chinese nuclear test explosion (“a few hundred kilotons”) on December

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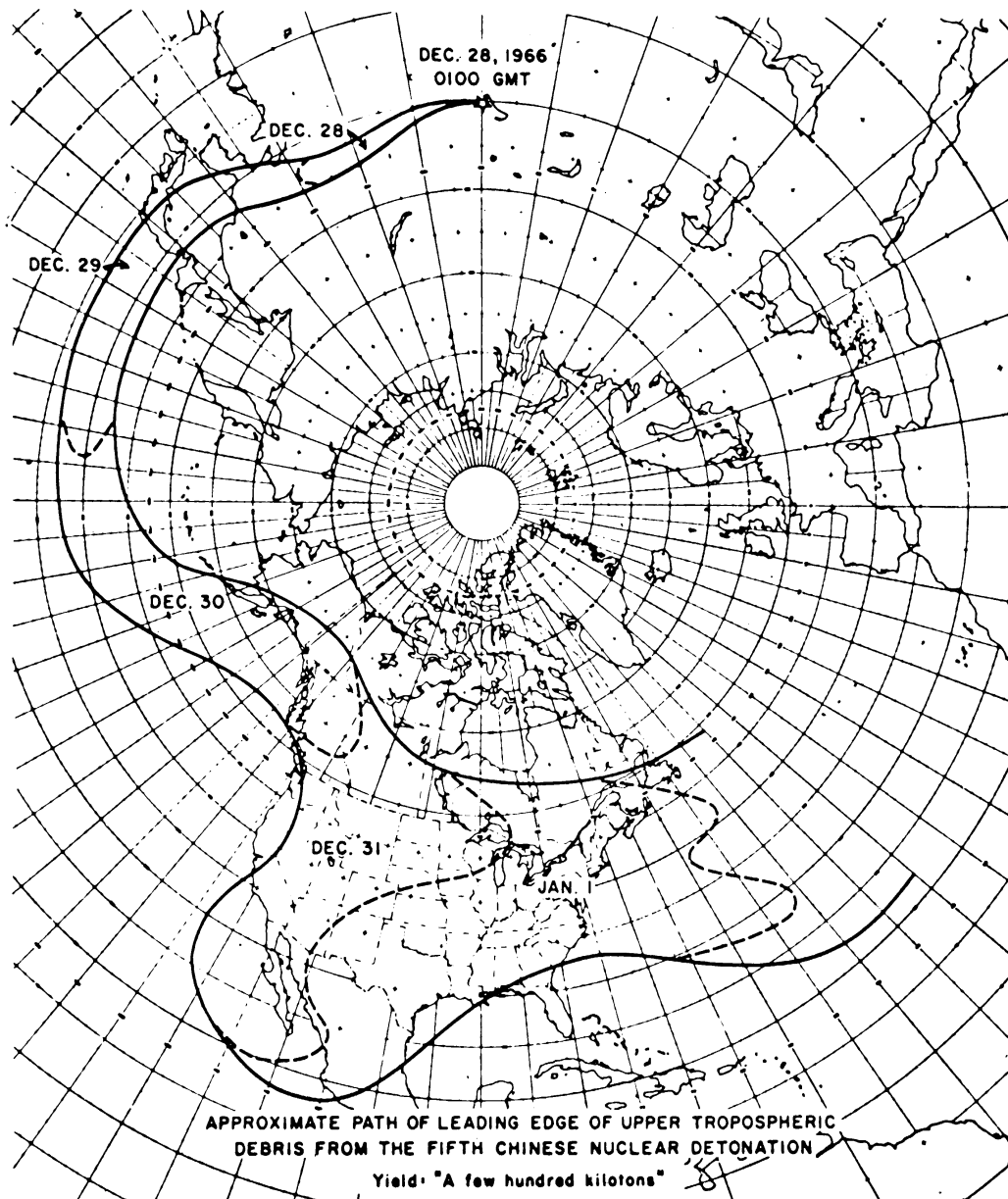


Fig. 1. The Fifth Chinese Nuclear Test was Detonated on Dec. 28, 1966. It “involved thermonuclear material,” and, according to the AEC press release, was a “nuclear test in the atmosphere at their test site near Lop Nor.” As indicated above, by the end of Dec. 31, 1966 the leading edge of its fallout cloud extended as far east as the dotted line shown running from Arizona to the Great Lakes.

28, 1966. It produced fallout that by January 1, 1967 resulted in the fallout cloud covering most of the United States. This one Chinese explosion produced about 15 million curies of iodine-131 — roughly the same amount as the total release of iodine-131 into the atmosphere from the Chernobyl nuclear power plant disaster. (The Lawrence Livermore National Laboratory's preliminary estimate is that 10-50 million curies of iodine-131 were released during the several days of the Chernobyl disaster; in contrast, its estimate of the iodine-131 released during the Three Mile Island nuclear power plant accident, the worst commercial nuclear power plant accident in American history, is about 20 curies.)

Fig. 1 is from an Oak Ridge National Laboratory report, *Trans-Pacific Fallout and Protective Countermeasures* (ORNL-4900), written by the author of this book in 1970, but not published until 1973. No classified information was used in any version of this report, that summarized findings of the unclassified Trans-Pacific Fallout Seminar funded by the U.S. Atomic Energy Commission. This seminar was attended by experts who came from several research organizations and deliberated at Oak Ridge National Laboratory for two days in March of 1970.

Later in 1970 a final draft of this report was submitted to Washington for approval before publication. It was promptly classified. Publication without censorship was not permitted until after it was declassified in its entirety in 1973. None of the recommendations in this pioneering report were acted upon, but many of them are given in this chapter.

The findings and conclusions of the above mentioned 1970 Oak Ridge National Laboratory Trans-Pacific Fallout Seminar, summarized in the 1973 report, were confirmed by a later, more comprehensive study, *Assessment and Control of the Transoceanic Fallout Threat*, by H. Lee and W. E. Strobe (1974; 117 pages), Report EGU 2981 of Stanford Research Institute.

Fallout from the approximately 300 kiloton Chinese test explosion shown in Fig. 1 caused milk from cows that fed on pastures near Oak Ridge, Tennessee and elsewhere to be contaminated with radioiodine, although not with enough to be hazardous to health. However, this milk contamination (up to 900 picocuries of radioactive iodine per liter) and the measured dose rates from the gamma rays emitted from fallout particles deposited in different parts of the United States indicate that trans-Pacific fallout from even an overseas nuclear war in which "only" two or three hundred megatons would be exploded could result in tens of thousands of unprepared Americans suffering thyroid injury.

Unprepared Americans do not have potassium iodide, the very effective prophylactic medication to prevent thyroid injury from radioiodine, and few could get it during the several days that it would take trans-Pacific war fallout to reach the United States. Fortunately, removal of even a cancerous thyroid rarely is fatal to people blessed with modern medical facilities.

Only about 7,500 Americans (people living within a few miles of a nuclear power plant in Tennessee) have been given prophylactic potassium iodide to keep in their homes. No government organization has advised even Americans living near other nuclear facilities to buy and keep any kind of prophylactic medicine to protect their thyroids in case of a peacetime nuclear accident. As expected, official warnings and advice to the public continue not even to mention preparations that individual Americans could make to protect themselves and their families against thyroid injury either from trans-Pacific war fallout deposited on an America at peace, or as a result of war fallout if our country is subjected to a nuclear attack.

The worst danger to Americans from trans-Pacific fallout from a large nuclear war would be the whole-body gamma radiation doses that millions would receive from fallout particles deposited on the ground, on streets, on and in buildings. Protective countermeasures would include both sheltering some pregnant women and small children living in "hot spot" areas of abnormally high rain-out of fallout, and evacuating others. Unless such unavoidably time-consuming and expensive countermeasures were taken, several thousand additional Americans might die from cancer in the following 20 or 30 years. The largest total doses would be received by people who would live normal unsheltered lives for the first month or so after fallout deposition, while the dose rates would be highest.

Several thousand additional cancer deaths would be extremely difficult to detect, if caused by whole-body gamma radiation from fallout deposited nationwide, with these scattered deaths occurring over the 20 or 30 years following a trans-Pacific war fallout disaster. For during these same decades about 15 million Americans normally would die from cancers indistinguishable from those caused by whole-body radiation from war fallout deposited on an America at peace.

An authoritative risk estimate of getting cancer from **low doses** of radiation is given in Report No. 77 (March 15, 1984) of the National Council on Radiation Protection and Measurement, "Exposures from the Uranium Series

with Emphasis on Radon and Its Daughters”:

“The low dose model for total excess cancer mortality is one hundred cases per million people exposed to one rem uniform whole body radiation. This would make the overall risk of cancer to the average individual in the population about one in ten thousand per rem, i.e., if ten thousand persons are exposed to a dose of one rem (one thousand mrem), one excess [fatal] cancer would be expected within the lifetime of the group.”

Many radiation specialists have concluded from studies of the effects of extremely low doses that the above and similar conservative estimates of excess cancer deaths overestimate the number of fatalities likely to result from low radiation doses, such as would be received by millions of Americans from trans-Pacific war fallout.

### **TO PROTECT YOURSELF AGAINST TRANS-PACIFIC FALLOUT, START BY REALIZING THAT:**

- The dangers from trans-Pacific war fallout have been increased by the continuing trend toward deployment of more accurate, smaller, more numerous nuclear weapons, because:

- \* A large nuclear explosion (half a megaton, or more) injects most of its fallout particles and gases into the stratosphere, above the tops of clouds and above the altitudes at which quite prompt removal of contaminants from the atmosphere by scavenging takes place. Very small particles in the stratosphere do not reach the ground before they are blown at least several thousand miles. Most of these tiny particles remain airborne for weeks to years, are very widely dispersed, and are blown around the world several to many times before being deposited. By then the radioactivity of iodine-131 (that has a half life of only a little more than 8 days) is so greatly reduced that it is not nearly as dangerous as is radioactive iodine deposited much sooner with the fallout from smaller weapons of several hundred kilotons, or less, explosive power.

- \* Nuclear explosions smaller than about half a megaton (500 kilotons) inject all or most of their fallout to lower altitudes — within the troposphere, below the stratosphere. Most of such fallout is deposited during the radioactive cloud’s first world-circling trip, when even quite rapidly decaying radioiodine still is dangerously radioactive. This greater danger from smaller nuclear weapons has been proved by numerous measurements of fallout from many nuclear test explosions, both foreign and American.

- The dangers from trans-Pacific fallout produced by peacetime nuclear accidents are not nearly as serious as many Americans have been led to believe. For example, the Chernobyl nuclear power reactor accident injected as much radioactive iodine into the atmosphere as would the explosions of several kiloton-range nuclear weapons totaling perhaps as much as half a megaton in explosive power. But not nearly as much of the radioactivity caused by this reactor accident reached the United States as would reach us from several nuclear explosions in the same area, capable of injecting an equal amount of radioactivity into the atmosphere, because:

- \* The cloud from the steam explosion that blew off the roof and otherwise damaged the Chernobyl reactor building, may have risen quite soon to 20,000 feet or more and was partially blown eastward clear across Asia and the Pacific Ocean. However, the top of the radioactive **smoke** cloud over the Chernobyl power plant, that burned for days, rose only about 3,000 feet above the ground. As a result, much of the airborne Chernobyl radiation stayed at relatively low altitudes where scavenging (removal) of smoke and fallout particles and gasses is most effective and rapid, due to aggregation on cloud droplets, rain-out, and dry deposition. In contrast, almost all of the fallout particles and radioactive gasses from a nuclear explosion are injected much higher, to altitudes where scavenging is less effective; there, the generally prevailing west-to-east winds promptly start transporting very small particles and radioactive gasses (that originate in the mid-latitudes of the northern hemisphere) around the world.

- \* Variable winds for days carried much of the Chernobyl radioactive material northward to Scandanavian countries, then westward and southward to other European countries. The resultant wide dispersal of this fallout allowed time for both scavenging and radioactive decay before a small fraction of these invisible radioactive clouds rose and also were blown eastward by the prevailing high-altitude winds. These west winds carried an extremely small fraction of the radioactive emissions from the burning Chernobyl plant clear across Asia and the Pacific to America.

- The media habitually exaggerate dangers from nuclear accidents, and exploited the Chernobyl disaster. For example, when Dr. Robert Gale, the leading bone marrow transplant specialist who helped save a few Chernobyl victims, first returned from Russia, an Associated Press article quoted him as saying: “I think we can say there are at least 50,000 to 100,000 people

who have had some dose of radiation which might be of long-term concern. There will, unfortunately, be additional casualties. We hope the number will be small." The Rocky Mountain News headlined "100,000 SOVIETS TO SUFFER FROM RADIATION, DOCTOR SAYS". Mary McGroary, the syndicated liberal columnist, also misinterpreted Dr. Gale's risk estimate and misinformed her readers by writing: "He [Dr. Gale] estimated that there could be 100,000 cases of radiation sickness . . .". Such dramatic news items give the impression that 100,000 Russians — not just a small fraction of that number — are likely to suffer sickness or death from the Chernobyl radiation. So additional typical Americans, reading misinformation of this type and knowing very little about statistical evaluations of risks based on probabilities, have had their worst nuclear fears strengthened.

The public's exaggerated fears of extremely small amounts of radiation also are worsened by the media's use without explanations of very small units of radiation measurement, including the picocurie. (The picocurie is used to express the radioactive contamination of milk, water, etc., and is only **one millionth of a millionth** [1/1,000,000,000,000] of a curie.) One episode in which fears of radiation were thus worsened occurred shortly after the invisible fallout cloud from the Chernobyl disaster first reached the United States. Some listeners were frightened when a radio announcer merely stated that milk samples in northwest Oregon showed 118 picocuries per liter of radioactive iodine. Few Americans know that they will not be advised to stop using fresh milk unless its contamination is 15,000 picocuries or more per liter — as specified in the Food and Drug Administration's official, very cautious "Protective Action Guidance", published in the Federal Register of October 22, 1982.

The maximum measured radioactive contamination of milk in the United States by iodine-131 from the Chernobyl disaster was in milk produced by cows grazing on pasture in Washington: 560 picocuries per liter. The much greater potential danger from trans-Pacific war fallout is brought out by the fact that the approximately 300-kiloton Chinese test explosion of December 28, 1966 resulted in worse iodine-131 contamination of milk produced by a cow grazing on pasture near Oak Ridge, Tennessee: 900 picocuries per liter. Even a small overseas nuclear war with only 20 or so kiloton-range nuclear explosions could cause high enough contamination of milk to result in the Government's warning Americans to refrain from using fresh milk. Most Americans would heed this warning and would not drink or otherwise use fresh milk for weeks. In addition, a small overseas nuclear war possibly would cause a few American casualties years to decades later.

## TWO SUMMARY CONCLUSIONS

1. Trans-Pacific war fallout deposited on an America at peace surely would be a disaster, but not an overwhelming one. The economic and psychological impact probably would be more damaging than the losses of health and life.
2. Prudent individuals should make preparations to enable them to use the low cost protective countermeasures described in this book, especially those in Chapter 13. Some of the most effective countermeasures, such as getting enough prophylactic potassium iodide to prevent thyroid damage even if war fallout dangers from explosions in the United States or overseas were to continue for a couple of months, cannot be accomplished after even an overseas nuclear war begins.