# Could Asian Nuclear War Radioactivity Reach North America? (Earthfiles Interview with Arjun Makhijani)

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Red arrow points at India and Pakistan on opposite side of the world from Canada and the United States. The Marshall Islands where the U. S. experimented in the 1950swith many atomic tests is at the far left in the Pacific Ocean. From Marshall Island and Nevada Test Site nuclear explosions, radioactive fallout riding on the prevailing westerly winds reached North Carolina and New York, distances nearly equivalent to the 10,000 to 12,000 miles India and Pakistan are from the west coast of the United States.

**June 4, 2002 Takoma Park, Maryland** – If India and Pakistan strike each other with Hiroshima-sized bombs, how much radioactivity could reach the atmosphere and fall out around the world? That is a question I began asking a week ago and discovered that very little is known about the consequences downwind of such a catastrophe. The National Atmospheric Release Advisory Center (NARAC) at Lawrence Livermore National Laboratory in Livermore, California seemed like it should know. NARAC's public affairs office describes its "primary function is to support the Department of Energy (DOE) and the Department of Defense (DOD) for radiological releases." But when I asked an

information officer there for information about the spread of radioactivity in the atmosphere from a nuclear war in Asia, the answer was, “That information is classified in the interests of national security.” One scientist who wants to talk about potential radioactive fallout and its threat to earth life is Arjun Makhijani, Ph.D., President of the Institute for Energy and Environmental Research (IEER) in Tacoma Park, Maryland. Dr. Makhijani received his doctorate in nuclear fusion studies at the University of California, Berkeley in 1972 and has been head of the IEER since 1988. The institute is non-profit funded mainly by foundations with a goal of independence and being non-partisan. Dr. Makhijani said, “Our goal is to provide the public and policy makers with clear and sound scientific studies on energy environmental security questions. Nuclear war is kind of an ultimate type of environmental catastrophe in my view at least. We try to do it in ways that are clearly understandable so they will be accessible to the public, but technically thorough at the same time.” He surprised me in recounting a recent incident few know about that nearly resulted in a nuclear missile exchange between Russia and the United States. “There was potentially a nuclear war by miscalculation in January 1995 when an American weather rocket was mistaken for a Trident missile by a Soviet radar because it was going towards Moscow and seemed to be that type of rocket. And the black suitcase was sent to President Yeltsin, but he waited, fortunately. Then the trajectory veered away from Moscow and nuclear war was averted. But we could have been at a full scale nuclear war at the time and no one would have known there was even a problem until the first strike.”

He stressed that in terms of a strategic nuclear crisis, the Pakistan and India threat is the worst since the Cuban missile crisis. “In some ways, this is more dangerous in terms of the possibilities of nuclear war because there is an active territorial dispute (over Kashmir) between the two countries. They are sitting eye to eye across the border with more than a million troops and no serious lines of communication right now. Everything is happening through third parties which is very unhealthy because I think these leaders should be talking to each other.”

I asked him if Pakistan and India do exchange nuclear weapons, what might the radioactive fallout be for the Asian region and for North America?

**Arjun Makhijani, Ph.D., President of the Institute for Energy and Environmental Research (IEER), Tacoma Park, Maryland:** “An actual projection of the precise fallout would, of course, depend upon how many bombs were used and the exact sizes of those bombs and none of this information is public. We have some guesses about the arsenals of India and Pakistan. The India arsenal is reputed to be 50-plus warheads made of plutonium and they may be thermonuclear or boosted components. We don’t know.

Pakistani might also have about fifty bombs, but are almost all are certainly made of highly enriched uranium without any plutonium and without any thermonuclear components.

These would generally be bombs of the sizes that were used on Hiroshima and Nagasaki. The fallout effects regionally if they are burst near the surface, close to the ground, could be quite severe to devastating, depending upon exactly how high above the cities they were detonated. If the bombs are detonated very high, the local effects can be low, relatively speaking. The immediate radiation effects would always be severe because there is intense gamma radiation in neutrons and in Hiroshima and Nagasaki, a great many people died of intense high level radioactive doses they suffered in the immediate aftermath of the explosion in the milliseconds after the explosion. So, the more general radioactive fallout

consisting of fission products would contaminate the region pretty severely. It could contaminate the water ways and the milk supply.

Much of our knowledge of what might happen comes from two recent studies from National Cancer Institute and the other from Center for Disease Control. The NIC estimated in its first study published in 1997 of the milk contamination resulting from Iodine 131 in the fall out and it was quite unevenly distributed actually across thousands of miles from the Nevada test site. The most intense hot spots were in Idaho and Montana, even though the testing was in southern Nevada. And this is because of geography and rainfall and weather patterns greatly affect how intense the radioactivity precipitates out of the fallout cloud into the region. The doses to the children in those areas in the immediate aftermaths of those tests sometimes were very high, as high as the most affected children from Chernobyl downwind of Chernobyl.

The milk supply would be contaminated by Iodine 131 in the entire region, not only the south Asian region, but depending on weather patterns, in other parts of Tibet and central Asia and southeast Asia and west Asia – depending on the length of the war, in all directions.

One of the things we know from Chernobyl is it was not a predicted type of nuclear reactor accident in that the fire went on for 10 days. So, the releases occurred over quite a long period of time. What happened as a result of that because of changes in the weather over that 10 day period, there wasn't a single fall out plume from the Chernobyl accident. The fallout actually went in a number of different directions and created problems along more points of the compass than one might have expected from simple projections. That might also be the case if India and Pakistan start fighting a nuclear war. It would depend on exactly how they fought it and how they used the weapons. If things disintegrated politically and weapons were still being used, the whole thing is extremely messy and frightening and not easily amenable to modeling.

**Radioactive Contamination in United States Far From Test Sites in the 1950s**

I can tell you the sort of cumulative doses that have occurred in some children who were most disproportionately affected  children who drank fresh milk because milk was the main pathway for Iodine 131 doses to children. In the worst affected cases in Idaho and Montana, the worst affected children got doses as high as 2000 rads (radian per second) to the thyroid  1000 to 2000 rads. And these are the children in these counties who drank goat milk and lived on farms and there were children like that. Mormons used to raise goats at the time, as I understand. There were also sheep being raised at the time, lots of Basque shepherds lived there at the time. There were across the country children who lived on farms and drank cow's milk and got doses in the tens or up to 100 to 200 rads to the thyroid. These doses pose a significant risk of thyroid disease and thyroid cancer.

The total estimated number of thyroid cancers from the fallout  you can see the extent of the uncertainty from the Nevada Test Site fallout are somewhere between 11,000 and more than 200,000 thyroid cancers.

**The dust storms from China at least 10,000 miles away have reached the Pacific Northwest with a lot of dust. That demonstrates there is a direct sweep of air currents from Asia to North America.**

Yes, we all live under prevailing westerly winds. That's what caused the fallout from Nevada to blow

across the country which was known to meteorologists before the test site was located there. We know from those sets of tests that there were relatively hot spots all over the United States, even in the most eastern part of the United States in North Carolina.

**That would have been from blasts that were at least 5,000 to 6,000 miles away?**

More. Marshall Islands to North Carolina might not be too different a distance than say India or Pakistan to the West Coast of the United States.

**So we do have a precedent for 10,000 to 12,000 miles of radioactivity coming from a blast and falling out at high levels in hot spots in the United States?**

We know from the studies done by the Centers for Disease Control and National Cancer Institute this year the effect on the continental United States of testing done by the United States in the Marshall Islands and by the Soviet Union in Khazikstan and in the northern Arctic islands, that there were hot spots from testing half way around the world in the continental U. S. So, it is possible that a nuclear war in India could result in hot spots as far away as the United States. As I said, these are not hot spots in terms of panic levels of radioactivity, but certainly there have been levels of concern in the United States from testing in the Marshall Islands and the Soviet Union.

These were levels that would be of concern, but not they are sort of panic types of radioactivity to cause evacuation of areas or similar to what would happen if a dirty bomb was exploded in a city or anything like that. Definitely not to be dismissed as irrelevant or insignificant and definitely of concern for the public throughout the world because there would be some fallout everywhere and the amounts would depend upon meteorological patterns and the number of bombs that were used and how they were used.

**If Pakistan and India exchange up to 20 missiles of the Hiroshima/Nagasaki-sized bombs….**

Yes.

**…the estimated diameter of geography that would be decimated is approximately what?**

It would depend upon how these bombs were detonated. From the one study that we know from Princeton University, a very large portion of Bombay tens of square miles would be devastated by a single Hiroshima-type of bomb. So, the direct area that would be incinerated, reduced to rubble and where the population would be completely be devastated would probably be from 20 bombs would be in the hundreds of square miles, if not more. Many hundreds of square miles.

**It’s almost verging on the incomprehensible, isn’t it?**

It is. I think the leaders of India and Pakistan I say this extremely reluctantly I don’t use such harsh terms but they are playing irresponsible brinkmanship with nuclear weapons. I think this is a time when they have to step back from the brink where some type of international monitoring force for preventing across water infiltration is needed and where India has to commit not to cross the line of control. And when they have met before and said, ‘We are going to resolve our differences peacefully, and they are not doing it. They owe it. There is no piece of real estate in the world that is worth reducing vast areas of

the world to rubble and killing millions and millions of people.

There are some Indian militarists who believe because India is so big and has a population of a billion people that India could absorb a couple dozen nuclear bombs from Pakistan and still survive where Pakistan will be completely devastated by the similar number of bombs from India. I think those Indian militarists who think that way are living an illusion. If the main cities in India were destroyed by Pakistani attack, India would cease to exist as a governmental body. Its main technical, financial and industrial and transportation infrastructure would be completely destroyed. A very large portion of water supply systems in large cities could become unusable. Large cities would become impossible to rebuild. India does not currently have the resources to meet the needs of hundreds of millions of its own people. And if its main cities where the financial resources and industrial resources were devastated, I think the disaster on the entire region would be truly  India would not exist in anything resembling its current form if there were a nuclear war, even if most of its people continued to live afterwards.

**Radioactive Monitoring in United States**

**What is the best advice to Americans if radioactive fallout were reported in the United States?**

Don’t panic, first of all. For a lot of different reasons unconnected with India and Pakistan, the capability of local emergency responders to measure radiation in the air and water and food needs to be developed because of the possibility of terrorists using dirty bombs or contaminated water supplies or food.

**So this is a vulnerability now in the United States since we don’t have enough trained radiological teams?**

There are some, but a large part of the problem is that most of the trained force outside of the nuclear power industry lies in the Dept. of Energy which makes nuclear weapons and the Dept. of Energy’s record in health and environment in my opinion has been quite poor. they have lots of good people on the inside. They have lots of competent scientists and technicians on the inside. But their overall trustworthiness and the amount the public would trust is quite different from say the Centers for Disease Control. If CDC says something, the public is likely to trust it, but if the Dept. of Energy says, ‘Don’t worry, the levels of radiation are small.’ The public is unlikely to trust it because it has not shown itself to be worthy of that trust before. They have the same press release whether things are serious or not serious.

I think the United States needs to develop some capability that is independent of the nuclear weapons and nuclear power industry to deal with radiation contamination issues. And I think the India and Pakistan crisis is just one more reason for the U. S. to do it.”

**During Monsoons, Europe to the Northeast Could Receive Radioactive Fallout**

This is a time when the monsoons will be starting soon in June and then moving northwards. The prevailing monsoon winds are from the southwest. So, generally the radioactivity would be carried eastward and northward, at least as far as the regional patterns would be concerned. Because there is heavy rainfall in large parts of the region in June, July and August, if the war occurred at this time, there would be places severely affected and quite a lot of water would become contaminated.”

# More Information:

**China's Nuclear Program**

Arjun Makhijani: "We know quite a lot about the nuclear program of China. It is a much more modest than the nuclear program of the United States. China has a few hundred nuclear weapons. It has 20 long range ballistic missiles that could reach the United States. They are all liquid-fueled missiles which would take a day or more to fill up and fire. So, they seem quite vulnerable to a potential first strike from the United States. They are quite concerned about ballistic missile defenses because of that.

They are modernizing their arsenal and developing solid fuel rockets more similar to what the U. S. has. They might build dozens of these. It is unknown. Their nuclear arsenal is planned to be "small" relative to the U. S. No nuclear arsenal is small because each weapon is so terrible, but China does not to public indications seem to want to engage in a nuclear arms race with the U. S. They want to reserve their money to becoming an economic superpower."

**A Dramatic Case of U. S. Radioactive Fallout in 1954**

The U. S. government knows that people who lived in Nevada, Utah, Arizona, Idaho, Montana, Louisiana, North Carolina and even Albany, New York were subjected to radioactive fallout as a consequence of atom bomb testing in the Marshall Islands and the Nevada Test Site. One dramatic example of what can happen was described in a 1991 book:

> "The hot spot occurred during the Upshot-Knothole series due to a severe thunderstorm, which happened just as the fallout cloud passed overhead at an altitude of about 40,000 feet. According to the official evaluation of this test: 'An interesting example of a small area of very intense fallout occurred near Albany, New York on April 26, 1954 following the seventh (atomic) burst. On this date, the highest gummed film activity ever observed by the monitoring network – 16,000,000 d/m/ft2/day (disintegrations per minute per square foot) – occurred on the film exposed at Albany airport. Although there are six monitoring stations within 150 miles of Albany, the fallout would have been under-estimated by about three orders of magnitude in this area had there been no station in Albany.'
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> "The official report on Upshot-Knothole estimated that a hot spot similar to the one in Albany over a location such as western Kansas might have had intensities of one billion to 100 billion disintegrations per minute per square foot at the time of deposition only five or six hours after the test. This amounts to 4.5 to 450 millicuries per square meter, or 4,500 to 450,000 curies per square kilometer. Even short periods of human exposure to this level of radiation would mean that the dose received by such hot spot populations would be above the global average."

- From Book: Radioactive Heaven and Earth: The Health and Environmental Effects of Nuclear Weapons Testing In, On, and Above the Earth © 1991 by the International Physicians for the Prevention of Nuclear War (IPPNW) and the Institute for Energy and Environmental Research (IEER). Co-authors, Anthony Robbins, M.D., IPPNW; Arjun Makhijani, Ph.D., IEER; Katherine Yih, Ph.D., IPPNW.

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