Fact or Fiction?

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Radiation, Regulations and Terrorism

The possible use by terrorists of a conventional bomb wrapped with radioactive material, a so-called "dirty bomb," has been much in the news. Our media are poised to spread panic and fear throughout America if this should occur.

Yet, the fact is that such a device could leave only minor amounts of radiation in its wake. Dilution of the radioactivity in the wrapping by its spread over a large area by the explosion would necessarily reduce the radiation to such low levels that no fatalities might occur except from the effects of the blast itself. For a superb, easily understood refutation of the exaggerated risks we hear about, see a paper in *Science* co-authored by 19 distinguished experts on radiation and nuclear energy.[1]

However, as Arthur Robinson points out, "It is not the bomb that we must fear, but the EPA and Nuclear Regulatory Commission (NRC) standards that would allow the press to claim that radiation levels were thousands of times higher than those standards," in spite of the fact that people living in higher radiation background level environments than are now permitted by EPA and NRC standards actually have less cancer and better health than those in lower radiation environments.[2] This is the phenomenon of "hormesis" discussed in a May 2000 column.[3]

How high are the present standards? Anywhere between 300 and 2,000 fold more stringent than earlier standards, even though no case of harm to human health has ever been documented within those previous standards.[2]

Mark Hart reports that the first radiation standard, developed in the late 1920s, established a limit of 36 rem per year. After World War II a conservative approach was taken in reducing dose limits to 15 rem per year. This was done despite the fact that no death or injury had been documented under the 36 rem protection limit. Then in the late 1950s, once again, despite any evidence of harm under the 15 rem per year limit, the radiation standard was reduced to a value of 5 rem per year. This standard applies today to people working with radioactive materials.[4]

Regarding radioactive sites, EPA and NRC (Nuclear Regulatory Commission) have even more stringent standards, 0.015 rem and 0.100 rem per year, respectively, before a site can be released to the public.[2] And speaking of the public, have you been to Grand Central Station in New York or St. Peter's Square in Rome? The rules that would be applied in the decommissioning of U.S. nuclear power plants would require the stone structures of Grand Central Station and St. Peter's Square to be dismantled and buried because of their radioactivity.[5]

Hart provides two examples to help drive the fear and over-regulation aspect home:

One - In a downtown park of state capitol in the U.S. there's a 2300 pound radioactive rock. It's contributing a radiation field in excess of the 0.015 rem per year limit established by the EPA for cleanup of radioactive contaminated sites prior to release for public use.

Two - Radium 15 times more radioactive than plutonium is present in a more-than 25-square mile area including a popular seaside resort that is a favorite recreational area for high school and college-age students. Radium at this seaside resort is pervasive in the environment and radiation fields have been found in locally grown produce and meats served to tourists in resort restaurants. How high are the levels? They're 790 times higher than the safe levels established for public use by the NRC.

If these locations weren't contaminated, but became contaminated because of terrorist events, panic would ensue. Here's more from Hart on how the press and politicians might respond to the downtown rock scenario. "Recent reports are saying that scientists have been able to determine that this truckload of radioactive material will remain radioactive for millions of years. The governor's office has stated that they are doing everything possible to protect the public and that people who have been evacuated from surrounding residences can take shelter at the local National Guard Armory."

Regarding the seaside resort, here's a hypothetical reaction. "While no current plans are in place, it can be expected that the entire population of more than 2000 people will have to be evacuated and relocated to other areas. Some experts are discussing the demolition and removal of all structures followed by capping of more than 25 square miles with asphalt and concrete to contain the radioactivity and protect it from water and wind erosion."

Both of these places actually exist and the measured radiation fields relative to regulatory standards are accurate. But overly cautious standards have placed us in an untenable position. Does this mean that locations that are above standards are acceptable, but only if they are natural? However, if terrorists strike and create radiation fields of the same level, will response be per the above hypothetical examples. My guess is that it would, and even in a more exaggerated fashion.

Where are the two locations? The 2,300-pound rack can be found in downtown Santa Fe, New Mexico in a small park setting at the intersections of Don Gaspar and Water Streets. People congregate around this radioactive material every day.

The seaside resort is the oasis city of Ramsar, Iran. Ramsar is situated along the Caspian Sea, north of the Elburz mountain range. Despite high natural background radiation fields (~79 rem per year) and the fact that gram-for-gram, radium-226 and plutonium-239 have comparable radiotoxicity, the frequency of cancer and the life span of people living in the Ramsar area

is not noticeably different when compared to other general populations around the world. Ramsar, by the way, was host in 1990 to an International Conference on High Levels of Natural Radiation (HNLR). It kind of makes sense to hold such a conference in a city with one of the highest natural radiation levels in the world. This conference was a continuation of a series of conferences held previously on this topic. One conclusion from this meeting was that epidemiological studies on HNLRs in a number of countries did not show any evidence of increased health detriment, compared with normal areas.[6]

Past events

The accident at Chernobyl in 1986 caused widespread fear about radiation and predictions of thousands of deaths. However, according to a 2005 report entitled, "Chernobyl's Legacy: Health, Environmental and Socio-Economic Impacts," produced by an international team of 100 scientists working under the auspices of the United Nations, fewer then 50 deaths have been attributed to radiation from the accident. Almost all of these deaths were rescue workers who were highly exposed to radiation and died within months of the accident. There have been about 4,000 cases of thyroid cancer, mainly in children.[7] However, fear of radiation and poor planning based on that fear following Chernobyl caused "increased suicide, alcoholism, depressions and unemployment, plus 100,000 unnecessary abortions."[1]

Perhaps you've heard about the "nuclear disaster" at Three Mile Island (TMI) which occurred in March 1978. The press covered this nonstop, and it is still used by antinuclear groups as the biggest reason to trash all nuclear power plants. A report by the Nuclear Regulatory Commission (NRC) revealed that the average dose of radiation received by two million people in the surrounding area was 0.0014 rem. The highest estimated individual exposure was 0.075 rem. By comparison, a typical person in the United States receives about 0.36 rem of radiation annually from naturally occurring radiation, medical uses of radiation and consumer products.[8] We get five times more radiation a year just by being alive! The most serious damage from TMI was the psychological trauma and overexaggeration from the mishandling of this incident by politicians and the media.[9]

Summary

Would we react differently today to a radiation event? I doubt it. With the overly stringent standards we have in place, the media, activist groups and politicians would react similarly, if not more aggressively, than suggested in the scenarios discussed above. As Mark Hart suggests, our radiation standards should be changed and the American public should be re-educated about the real dangers and benefits of low level radiation, so that they will not be susceptible to the threat of a media-amplified terrorist attack. ***P&SF***

References

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