Risk and the Environment

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No free lunch

We've done an excellent job of making the public afraid of radiation; we need to balance this now as best we can.

We need to assess the risks from ground water contamination as realistically as we can. Ground water doses will be protracted doses and produce less risk, for example.

Why worry about this? Because there's no free lunch; the costs may be obvious or they may be subtle.

My morning coffee

I have no quarrel with advocacy groups' goal of protecting the environment. When I make my coffee in the morning, certainly I want pure water. I also want hot water, air conditioning, heat, and a variety of other things that depend on power. All methods of power production have an environmental impact. The question I wish to for us to consider here is: how can we best protect our environment while keeping our standard of living?

Driving risks

The rate of automobile fatalities in the US is about 1 per 100 million miles driven, or 1E-8 fatalities/mile. The current estimate of risk from radiation exposure is 1 fatality per 10,000,000 millirem of acute exposure, or 1E-7 fatalities/millirem. If you will indulge me, I believe that this overestimates the risk by at least a factor of ten for prolonged exposures. If you grant me this, the arithmetic becomes easy:

1 millirem of exposure = 1 mile driven by the average driver on average roads in the US.

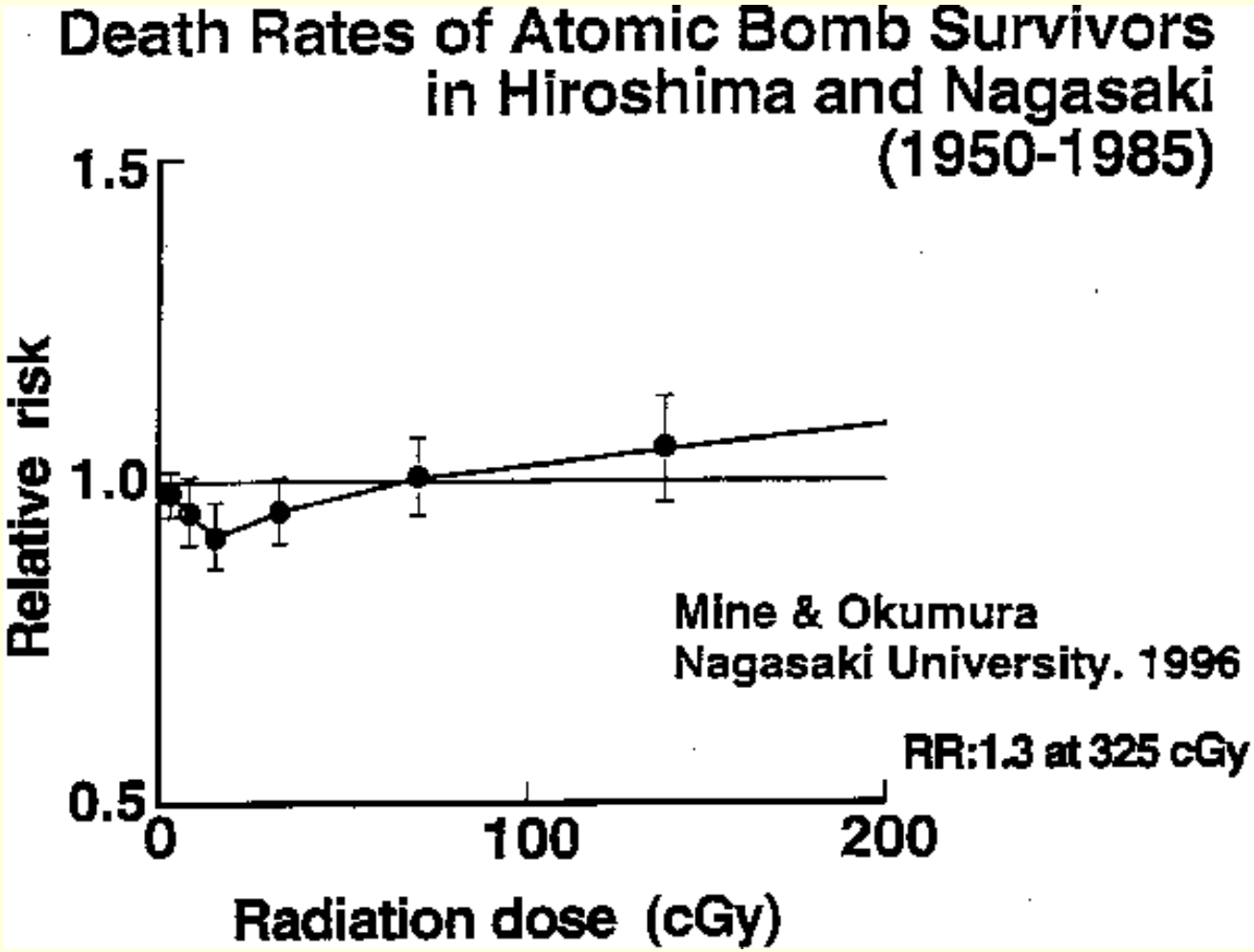
If you don't agree we can argue later or you can add another zero to my arguments that follow.

Dose protraction and health effects

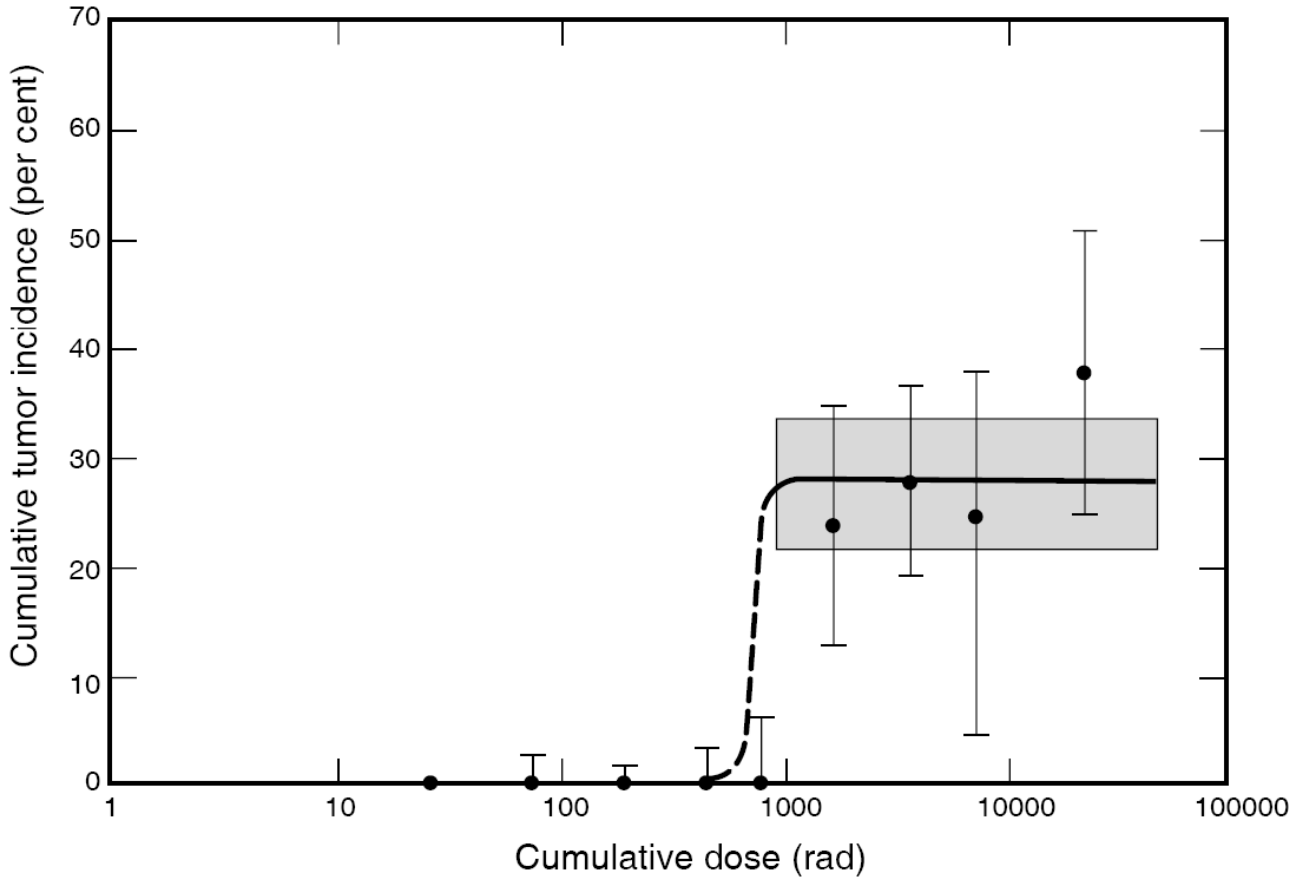
Fractionation or protraction of radiation dose over time greatly reduces any adverse health effects. This effect is used in medical treatment of cancer using external radiation, in explaining Chernobyl liquidator survival rates, and in understanding lack of detrimental effects to Naval shipyard and Hanford radiation workers.

The underpinning theory for NRC Part 20 regulations is based on acute doses; for example, the studies of the Japanese A-bomb survivors.

Death rate of JBS vs dose



Tumor incidence vs dose to bone for radium dial painters



Tourists… what can you say?

In parts of Guarapari, Brazil, the background dose rate is 17,500 millirem/yr. The average background dose in the US is about 400 millirem/yr.

Near hot springs in Ramsar, Iran…

The measured dose rate pictured here is 125,000 millirem/yr.

Match the response to the risk

There should be a different response to a speeder going 25.001 mph in a 25 mph zone compared to one going 50 mph and clipping telephone poles.

I urge the commission to consider carefully the risks involved with ground water contamination and make adjustments based on this risk.

Moderate doses of radiation produce trivial risk and the consequences of burdensome regulation may be counterproductive to overall safety and environmental quality.

Coal plants produced 45% of the US electricity in 2009

We need coal plants, but each new 1000 MW coal plant emits more radioactivity to the environment than all US nuclear power plants combined.

The NCRP estimates dose to the general population is 490 person-rem/y for a 1000 MW coal plant and 4.7 person-rem/y for a NPP (Reports 92 and 95).

The relatively low environmental impact of nuclear power plants has not been recognized by the general public unfortunately.

Summary

Radiation is relatively benign compared to other environmental insults and the effects of radiation exposure have been studied more than other risks. Certainly radiation is easier to measure and monitor.

During discussions today when radiation doses are mentioned, convert millirem to extra miles driven per year and judge for yourself if these are extraordinary risks. Also consider that locations with remarkably high background doses do not produce excess deaths at a level that we are able to measure.