

WHY THE ASSURANCES THAT THE WATER IS "SAFE"  
HAVE NO SCIENTIFIC VALIDITY

Testimony submitted to:

Assembly Committee on Environmental Conservation  
Capitol Building, Room 520  
Albany, New York 12248

For a Joint Public Hearing on  
New York State Public Interest Research Group's (NYPIRG)  
Report on Toxics in the Niagara River  
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Testimony of:

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I testify as an individual and for no institute or organization. As a public health scientist and biostatistician-epidemiologist for more than 30 years, I have published more than 300 papers and my latest book, SCIENTIFIC STRATEGIES TO SAVE YOUR LIFE (Marcel Dekker, Inc., 1981), deals in detail with studies of the hazards of low-level ionizing radiation. For more than 20 years I have been Director of Biostatistics at Roswell Park Memorial Institute for Cancer Research in Buffalo, New York (for 7 years as Acting Chief of Epidemiology) and before that was at Cornell University Medical College and Johns Hopkins.

NYPIRG has done a good job of compiling the available factual information on the chemical pollution of the Niagara River. This compilation gives a clear picture of what chemicals are present and in what amounts they are released. Since the data comes from public records, the "reservations" or "qualifications" or "doubts" of the chemical industry concerning the NYPIRG report are in the nature of quibbles. They do not change the broad picture of what is going into the Niagara River, only relatively minor details. There is little real or substantive disagreement.

Hence, the crux of the argument is not "What is going into the river?", but "What will this do to human beings?" What are the health effects (what deaths and disabilities will be caused) in humans downstream from the releases?

NYPIRG does not make a quantitative assessment of the deaths and disabilities but instead relies on a <sup>qualitative</sup> ~~quantitative~~ argument: The toxics in the releases are known to be hazardous and any excess risk from them is unacceptable. However, this allows industry lobbyists to argue that zero-risk levels are unattainable and unrealistic. They then go on to claim (on television, for instance) that the risks are negligible and the water is "safe".

My purpose is to consider the question: Do these claims of safety have any scientific validity?

Two distinctions are essential to avoid confusion on this question:

(1) The scientific issue of human health and safety should not be confused with the legal issue of compliance with official levels set by EPA.

(2) This is a public health issue and we must not confuse acute (or short-term) health effects with chronic (or long-term) health effects. It is the latter, deaths from cancer for example, which are more serious hazards to human health and safety from the chemical releases.

On the question of compliance, the issue can be settled by physical measurements. However, on questions of safety, the issue involves study of health effects in human beings--an entirely different matter. For instance, in a recent federal study of nuclear workers at the Portsmouth Naval Shipyard, the installation was in compliance with officially permissible levels. Indeed, on the average the worker had received only one-tenth of the permissible level. Nevertheless, the data shows serious health hazards at the installation, including a doubled risk of lung cancer. Official levels are not necessarily safe. Compliance is not the same thing as safety (Attachment A makes this point in detail).

There seems to be a widely-believed myth (often asserted "in the name of science") that when a hazardous chemical is diluted with enough water the health hazards simply disappear. It is true that the acute (short-term) effects of some chemicals do disappear in this way. However, the chronic (long-term) effects that are the crux of the public health problems are not diluted out of existence and may be made worse by the wider dissemination involved in dilution. This is why standards

that depend on dilution factors for mutagenic materials may provide no guarantee whatever against serious health effects.

A simple example may clarify this point. Suppose we have a dose of a toxic substance that will produce an acute effect such as nausea. If a single individual gets this dose, he will get sick. However, if the same amount of the material is diluted by a factor of 1000 and given to 1000 persons, no one will get sick. This is because an acute physiological effect that involves the gastrointestinal system requires enough material to affect billions of cells. However, the long-term effects occur when a chemical produces genetic damage to the DNA of a single cell--a break-point in the structure of the DNA. One molecule of a mutagen can cause this damage. Fifteen years later the clone of this single cell could cause clinical cancer. Note that if a dose of the mutagenic chemical is given to a single individual it can only harm this one person. However, if it is diluted and given to 1000 persons, it can cause numerous cancers. Thus, long-term health effects can be increased by dilution.

This point can be made in technical terms by estimating health effects (e.g., death from lung cancer) per unit weight of hazardous material (e.g., grams). We can then ask: Are the effects per gram greater at low doses (high dilutions) or at high doses (low dilutions)? For acute effects, the effects may occur at high doses but not at low doses. For cancer and other chronic diseases, the reverse tends to be true. In a recent study (Attachment A), the effect of a mutagen turns out to be over 100 times greater at low doses than at high doses. So it

is a dangerous myth that the dilution of toxics in the Niagara River solves the health problems.

Compliance with standards based on concentration of chemicals in drinking water may be better than non-compliance but compliance does not guarantee that the health and safety of the public has been protected. Water meeting these standards may cause serious health problems. Even though we may not see these problems right away, they may occur 20 years later, or they may be moved downstream and into Canadian populations, or they may be postponed to future generations. However, the total deaths and disabilities may be increased if the toxics are diluted and more widely disseminated.

Perhaps it is now clearer why the public assurances of safety that are issued by the spokesmen or the friends of the chemical industry have been largely based on a confusion of compliance with safety and on the dangerous myth that the health hazards of toxics vanish when they are diluted. Does this mean that the safety assurances that the chemical industry has given on the NYPIRG report (and on many previous occasions when there have been reports of serious health hazards from dumpsites or occupational exposures or other chemical exposures) have no valid scientific basis and are worthless?

I'm afraid so. Since the chemical industry has been issuing bland assurances of safety for the past 50 years in Niagara Falls and elsewhere, and since there are a number of studies involving health effects in Niagara Falls and Niagara County, there is a direct way to assess the validity of these repeated assurances of safety that have

been given the public and the workers. According to the defenders of the chemical industry, the politicians, public relations staff, scientists, and other industry allies, Niagara Falls should be a healthy place to live despite the concentration of the chemical industry in the city. We can see just how healthy Niagara Falls actually is by taking the death rates, comparing them to other areas in upstate New York or in the nation, and estimating the excess deaths for causes of death that Public Health scientists have found to be related to chemical exposures. In this way, we can see how many residents of Niagara Falls have probably been killed by chemical exposures during the period that the spokesmen for the chemical industry have been issuing their many assurances of safety.

In a recent State Health Department study of Love Canal, for instance, the census tracts in Niagara Falls had significantly higher death rates for lung cancer (and other cancers) than the average for upstate New York census tracts. This was true whether the Love Canal tract was included in the figures or not. One trouble with these survey figures is that the numbers are fairly small and give an erroneous impression of the death toll that the chemical industry has caused by occupational hazards, dumpsites, and other releases of hazardous chemicals. To get a clearer picture of this toll, it is worthwhile to take a quick look at national figures.

The U.S. Department of Health, Education, and Welfare report (DHEW Publication No. (NIH)74-645 on "U.S. Cancer Mortality by County: 1950-1969) gives some idea of how many persons in Niagara County have

been killed by hazards that the chemical industry claims do not exist. For example, for lung cancer in men there are 922 deaths and a death rate of 45.5 per 100,000 in Niagara County. By contrast, the nationwide rate was 38.0 and only 10% of the U.S. counties had a rate over 43.3. This works out to 160 excess deaths from lung cancer. Bladder cancer is another cancer which Public Health scientists have found to be related to chemical exposures. There are 155 male deaths and a death rate of 8.2 in Niagara County. The national rate is 6.8 and the 90% decile is 8.3. There are about 26 excess deaths.

It would be possible to go on with this dismal listing adding excess deaths from other causes and in women as well as men, but perhaps enough has been said to make the point: During the years that the chemical industry has been strenuously denying that there are serious health hazards from exposures to toxic chemicals, hundreds of persons in Niagara County have been killed by these exposures. This record of the safety assurances of the chemical industry does not inspire much confidence in the latest pronouncements that, despite the heavy burden of toxics going into the Niagara River, the water is "safe".

Finally let me add one personal comment. I have been a Public Health scientist for more than 30 years, I've published more than 300 articles and three books, and I know most of the Public Health scientists of stature personally or by reputation. None of this stream of safety assurances has been issued or endorsed by any scientist of stature, and I don't believe that any competent scientist could or would make such an assurance. The evidence of hazards, such as the NYPIRG

report, is too strong and the evidence of safety is nonexistent. So I particularly resent it when these false assurances of safety are made "in the name of science" because this is bad for genuine Public Health and other sciences. Nor do I think it helps the chemical companies in the long run when they issue these incompetent and irresponsible claims of safety that actually endanger the health and safety of the citizens of Niagara Falls and other areas.