

Special to the St. Louis Post-Dispatch

DIOXIN HAZARD TO HUMANS HAS BEEN OVERBLOWN

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Monsanto Company

Dioxin -- or more precisely, 2,3,7,8 tetrachlorodibenzo-p-dioxin -- is indeed a useless, worthless unwanted toxic contaminant. Our purpose here is not to justify its existence or to defend it but, rather, to put its relative risk to humans in perspective.

Hardly a day goes by without some frightening headline or scare story alluding to a doomsday forecast about this substance. Adjectives like "deadly dioxin" and "the most toxic substance known to man" are commonly used to describe dioxin in the typical news report. The St. Louis Post-Dispatch has run over XXX articles on dioxin, alone, in the past nine months, culminating in this special dioxin supplement.

Television news, both at the local and the network level have fed the public a steady diet of emotionally-packed "news" stories of alleged human suffering. Documentaries with inflammatory titles like "Agent Orange, Vietnam's Deadly Fog" and "Dioxin: In Search of a Killer" have also been served up for public consumption. There also has been a proliferation of new books with catchy titles like "Waiting for an Army to Die," "The Chemical Scythe," and "Hazardous Waste in America."

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In view of this relentless bombardment of scare stories, many quoting "so-called" scientific experts overstating the human risks and predicting a range of human catastrophic effects from cancer to deformed offspring, it's not surprising that the public is confused and scared, in some cases even hysterically. But is there any scientific basis for their fear? Has the public been unnecessarily alarmed? Has the dioxin risk been exaggerated?

To be sure, many people, including some Vietnam Veterans, some former residents of Times Beach and some chemical plant workers are really sick -- no doubt suffering a wide range of very real health problems. But so are millions of other people who have never been exposed to this toxic chemical. There is no scientific evidence that would link exposure to dioxin with serious long-term health effects and there is no evidence that the health status of those people who may have been exposed to dioxin is any different from those with no exposure.

Some, who were exposed or think they may have been exposed to dioxin, are no doubt suffering mental anguish and in some cases they may well be experiencing a phenomenon called psychosomatic illness. Recently in Florida, 12 people who thought they had been exposed to a toxic chemical were rushed to a hospital with symptoms clearly associated with exposure to the toxin. It turned out to be a false alarm -- in actual fact the 12 people were not exposed. Once this was confirmed, the symptoms, mostly nausea and dizziness, quickly cleared up and they resumed their normal activities. Medical experts diagnosed their problem as psychosomatic.

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And, finally, some people are sick because they have seen their property values plunge and their life savings disappear. That's enough to make anyone sick.

But what are the facts? What does the real world, documented scientific evidence tell us about the human health effects from dioxin exposure? "Some scientists" and most news media accounts have a habit of stating that "the long-term effects of dioxin on humans are unknown." That statement is simply not accurate. The scientific community knows quite a lot about what happens to humans following documented exposure to dioxin.

Dioxin-containing pesticides have been effectively and safely used throughout the world for over 40 years. More than 800 industrial workers have been exposed to dioxin in nine separate industrial accidents that occurred in various locations between 1949 and 1976. Thousands of men, women and children in Seveso, Italy, were exposed in a 1976 accident when a chemical cloud containing dioxin spread over several hundred acres in and around that city.

All of these incidents have been carefully studied by competent medical authorities. The causes of death of those people known to have been exposed and who have since died from any cause have been identified and compared to expected death rate statistics from baseline populations. The health status of those still alive has been and is being carefully monitored. The same type of careful analysis is being conducted on a large group of former U.S. Air Force personnel who handled and sprayed Agent Orange in Vietnam.

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Here are the facts gleaned from the substantial amount of documented medical information obtained from studying these human populations known to have been exposed to dioxin:

- Fact -- no human death has ever been associated with exposure to dioxin.
- Fact -- All observed short-term health effects were found to be non-permanent and gradually disappeared, once exposure ceased.
- Fact -- Long-term human exposure has been scientifically linked to only one, relatively minor health problem -- a skin condition called chloracne -- which in a few cases has persisted for up to 30 years.

Chloracne is widely regarded by medical experts as the hallmark or first visible symptom of toxic exposure to dioxin. It manifests itself shortly after exposure (usually within two to three months) and in most cases clears up fairly rapidly. The overwhelming weight of medical evidence published in the scientific literature to date says if a human does not get chloracne, he or she has not been exposed to a toxic or harmful level of dioxin and, further, that chloracne is the only documented long-term health effect ever observed in humans. The literature further states that there is no documented evidence of any other long-term health effect.

This opinion is shared by several prestigious scientific groups including the American Medical Association and the British Advisory Committee on Pesticides. Others who have studied the evidence also concur with these findings including the Veteran's Administration, the U.S. Air Force, a host of independent expert medical investigators and Monsanto's own medical department.

So why all the fuss? There are many factors contributing to the current state of public hysteria.

First, dioxin is very toxic stuff when fed to some species of laboratory animals. The guinea pig is the most sensitive. A single oral dose of dioxin, in the billionths of an ounce range, will almost instantly kill half the guinea pigs. However, other test animals are far less sensitive and can tolerate doses ranging from 100 to 7,000 times more than that which the guinea pig can handle. It is on the basis of the extreme toxicity to guinea pigs that dioxin has been called "the most toxic substance known to man." It should be pointed out that the guinea pig is also extremely sensitive to many highly beneficial chemicals, as well, including the penicillins. Fortunately, for society's sake the penicillins were not first tested on guinea pigs or it's doubtful they would have ever been approved for human use.

When scientists do not have human data to rely on, they are forced to use animal tests to make human risk assessments. This is called extrapolation. But the scientific community readily admits that it does not know how to extrapolate animal

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data to humans. This problem was at the root of the saccharin controversy a few years ago and it's still unresolved. However, it's clear from the accumulated human data that we are not nearly as sensitive to dioxin as the guinea pig or probably any other laboratory animal.

Based on projections of lethal toxicity from animal studies, the aforementioned accidental release of dioxin in Seveso, Italy would have killed every human being within miles of the plant where the incident occurred. Indeed, much was written immediately following the Seveso accident forecasting doom and horror of that magnitude. Fortunately, the doomsday predictions did not materialize. In fact, the only documented health effect observed to date from this exposure has been some cases of chloracne.

In 1978 increased attention and public concern was focused on dioxin when the Agent Orange controversy exploded on the national scene -- thanks initially to sympathetic television reports which informed the American public that Vietnam Veterans were suffering from diseases and were fathering deformed children -- both at "unusually large" rates. The fact that there was no scientific human evidence to support these allegations did nothing to restrain the reportage. In actual fact only three thousands of one percent of the Veterans thus far have been found to be suffering from any kind of health problem regardless of its origin. This is hardly a compelling statistic on which to make claims about

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"unusually large numbers" suffering ill effects. The American public -- already guilt-ridden over the country's involvement in the Vietnam War -- reacted with predictable shock and outrage. Agent Orange became a rallying point for some Vietnam Veterans and its built-in emotional appeal was tailor-made for dramatic treatment by the news media. Despite nearly five years of constant publicity, of the 2.4 million American military personnel who served in Vietnam, less than 10,000 have joined in the class action lawsuit.

Then came Times Beach, the Minkler-Stout sites and other Missouri locations -- the beginning of the relentless news and editorial coverage by the St. Louis Post-Dispatch -- and considerable coverage by other local and national media. Enter State Representative Bob Fiegenbaum, add the Federal EPA Superfund "scandal," a litany of congressional hearings and the famous Christmas Eve, 1982 pronouncement by an official from the Centers for Disease Control (CDC) urging the residents of Times Beach to evacuate immediately due to the "imminent threat" posed by the dioxin-tainted soil there. Together, these events pressured the EPA into making a political decision to buy out the residents at a cost to taxpayers of about \$33 million. It's important to note that not one single resident of Times Beach or any other Missouri dioxin site has ever had chloracne.

The CDC made its evacuation recommendation on the basis of a dioxin risk assessment which concluded that the presence of dioxin in the soil at levels above 1 part per billion (ppb) "constituted an unacceptable risk" or as the Post-Dispatch frequently states "may pose a health hazard."

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The CDC's so-called "safe level" guideline of 1 ppb was arrived at by extrapolating animal data to humans, e.g., it assumed that humans are as sensitive to dioxin as laboratory animals and that dioxin is a human cancer-causing agent. CDC then added a safety factor of 1,000 and then made the virtually impossible assumptions that a small child would eat one gram of dioxin-contaminated soil every day for several years while being further exposed to another gram every day through direct contact with the skin. Using this "worst case" scenario, CDC then projected that a child, so exposed for 6½ years, would accumulate a large enough dose of dioxin to raise his/her risk of cancer by one additional chance in a million.

On this basis, the citizens of Times Beach were urged to evacuate immediately on Christmas Eve and the EPA committed \$33 million to buy out the town. (Might add here other common risks that also increase chances of cancer by one in a million.)

Politicians who know a good thing when they see it leaped into the fray. Representative Tom Dashle, (D-S.D.), held a press conference in which he claimed to have uncovered "smoking-gun" evidence of dioxin's link with human health effects. He based his charged on a study done by a British researcher who quickly refuted Dashle's conclusion.

Not to be outdone, Representative James Scheuer, (D-N.J.), held a hearing of his House Science and Technology Subcommittee, in which a then six-month-old story concerning a possible link between dioxin and a rare form of cancer was

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rehashed as a "new government study containing dramatic evidence." When the principal hearing witness, a top government scientist, failed to corroborate Representative Scheuer's pre-hearing claims, he was severely criticized as being "totally relaxed and smug toward dioxin" and accused of foot-dragging on dioxin research.

Well known anti-business activist/critics like Dr. Samuel Epstein and EPA's Hugh Kaufman also got into the act. These "media stars" and others with similar biases, received considerable press coverage and national TV network exposure, exploiting the public's fear and confusion to sell their biased points of views and in some cases their newly published books about the evils of American industry.

In a recent decision by a Nova Scotia Supreme Court justice, several well known American scientists with similar anti-business leanings were severely chastised for their "lack of objectivity" in their attempt to prove dioxin is dangerous during a trial in that Canadian province last spring. The judge ruled against the plaintiffs on whose behalf these scientists testified as "expert" witnesses.

In a predictable and ludicrous but related development, dioxin has become a source of big profit for a few members of the plaintiff's bar and some of the alleged victims of alleged dioxin exposure. Damage awards in a recently concluded trial in Madison County, Ill., while still on appeal, could make instant millionaires out of some railroad workers and their lawyers stemming from a highly controversial case where no evidence of the existence of dioxin or exposure to

it was presented. The mere mention of the possibility of exposure was enough to convince a jury to find for the plaintiffs. The plaintiff's bar recently formed a dioxin task force to share information about cases and coordinate future litigation in what is a clear attempt to further exploit the fear of dioxin on behalf of themselves and would-be clients.

So -- has the public been unnecessarily alarmed? You bet they have. Has news coverage of dioxin been presented in perspective and with the appropriate balance? Hardly.

While these scare stories have been greatly exaggerated, the cost of this exaggeration and the resulting hysteria have been staggering and will likely haunt society for years to come.

The high cost of hysteria to date is reflected, for example, in the Federal government's \$33 million buy out of Times Beach, the ludicrous \$58 million jury award in the Madison County case and the mental anguish many confused citizens are enduring as a result of the scare stories.

These examples will be only a dismal prelude unless reason and knowledge are brought to bear on societal questions of this kind. Hysteria, fear, media hype and political and legal exploitation are poor substitutes for rational decision-making on public issues affecting the health, safety and livelihood of millions of Americans.

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It is clear that dioxin is unwelcome in the environment. However, once it becomes bound to soil, it does not pose much potential for exposure. Success in curtailing the amount formed from industrial and non-industrial sources should and is being pursued with vigilance. Great care should be taken in ensuring that dioxin-containing waste is disposed of properly and safely. Additional research should go forward to help scientists better understand this puzzling compound and its ultimate fate in the environment. Health studies should continue until even the most cynical critic is finally convinced that dioxin is not a major health threat to mankind.

The best way -- indeed, the only sensible way -- of coping with the increasingly complex and costly decisions we face with dioxin is through objective, reasoned evaluation of the true risk to mankind and that risk should be based on good science -- not political expediency.

Who pays the bills? We all do, of course. So it behooves those who make the judgments concerning risks and costs to make them carefully, unswayed by the hysteria of the moment or the hyperbole on which it thrives.

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