

From the desk of

GEORGE ROUSH, JR., M. D.

7/27/83

M. C. Throdahl

When we took the Nitro EPA data to the Governor's office, that office contacted the West Virginia University for advice. This letter is an attempt to help the University respond to the Governor's request.

CONFIDENTIAL
SUBJECT TO PROTECTIVE ORDER.

C04169

Monsanto

Monsanto Company
800 N. Lindbergh Boulevard
St. Louis, Missouri 63167
Phone: (314) 694-1000

July 27, 1983

Dr. E. Gordon Gee
President
West Virginia University
Morgantown, West Virginia 26506

Dear Dr. Gee:

I am writing to tell you of the dioxin health issue as faced at the Monsanto Nitro plant and by the community. Satisfactory handling of this issue is important to Monsanto, to Nitro and to West Virginia, and the issue demands the best that medical science and chemistry can bring to this many-faceted subject.

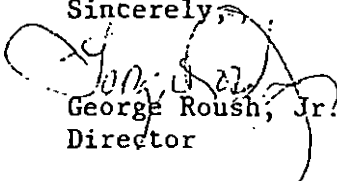
As a means of enlisting the input of the many disciplines at the West Virginia University, I would propose to describe the issue to a committee selected from the University. I would bring with me a chemist and a production engineer from the plant to present the background and to answer any questions. The committee could then decide what inputs the University would want to contribute to the issue as they believe appropriate.

If a chairman of the University committee were appointed, I would help him to select disciplines to be represented on such a committee and would help him to arrange an early time for his meeting. If I am told who is selected as chairman, I will then begin to help him bring together the committee.

If this possible approach to bringing the University into this issue seems reasonable, I will be happy to assist the chairman. If there are other possible approaches, I would also be anxious and willing to discuss them if that seems appropriate. I can be contacted at (314) 694-8800.

Thank you for your obvious interest and willingness to help.

Sincerely,



George Roush, Jr., M.D.
Director

GR:hc

bcc D. S. Frazer - Nitro
W. J. McCarville

Monsanto

DEPARTMENT OF MEDICINE &
ENVIRONMENTAL HEALTH

Monsanto Company
800 N. Lindbergh Boulevard
St. Louis, Missouri 63187
Phone: (314) 894-1000

June 22, 1983

Hon. James A. Finch, Jr.
Chairman, Governor's Dioxin Task Force
404 Capitol View Terrace
Jefferson City, Missouri 65101

Dear Judge:

As we have had presentations on the disposal of dioxin wastes, I have brought back the handouts for review by appropriate experts within Monsanto. Included in this group was James A. Peters from our Dayton Laboratory, who has been a consultant to the EPA on incineration.

Mr. Peters has just written to me with his comments on some of these proposals, and I am sending a copy of his letter to you for whatever use you may have for these comments. If you think it appropriate, you may give a copy to the Department of Natural Resources.

Part of my reason for giving this information to you is that if there are questions from either your sub-committee on disposal or by the DNR, they should feel free to contact Mr. Peters at the telephone number as shown on his letterhead.

On another subject, I saw a letter to the editor by Bob Powell, who was writing on the subject of dioxin panic, and he addressed his comments to the Wall Street Journal. His letter to the editor is enclosed. I have also enclosed a copy of the "Dioxin Hysteria" editorial.

Sincerely,



George Roush, Jr., M.D.
Director

/hc
Encls.

CC J. A. Peters
J. D. Wilson

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C04171

Monsanto

MONSANTO RESEARCH CORPORATION

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17 June 1983

Monsanto Company
George Roush, M.D.
Director DMEH
800 N. Lindbergh Blvd.
St. Louis, Missouri 63167

Dear Dr. Roush:

I have reviewed the Dioxin Waste Disposal Proposals prepared for the Governor's Dioxin Task Force, Missouri Department of Natural Resources. The best method of evaluating these diverse proposals is to respond synoptically to each, and follow with my recommendation.

Acurex Waste Technologies, Inc.

Acurex only wants to (and is capable of) treating the solvent wash concentrate from the soil extraction process. Another contractor (CH2M Hill) will excavate and solvent extract the affected soil. Washing tests on only 100g soil have shown 99% TCDD extraction but 3-4 ppb TCDD still remain with the soil -- this may still be excessive. Soil washing technology is rife with problems begging for technical solutions, e.g.:

- Because efficiency of soil extraction depends on the surface area (soil) / mass (solvent) ratio, pulverization and drying (to remove 25% moisture) are necessary. Each of these pretreatment steps have air emissions problems. Moreover, the best solvents for dioxin are toluene, aromatic naphtha, and methylene chloride; toluene and methylene chloride are likely to be classified as hazardous air pollutants by EPA in future rule-making.
- Separation and concentration of the washed soil involves filter pressing and drying; these operations are equipment intensive and must include emission control.
- Concentration of the wash solvent after extraction involves take-over distillation (energy intensive) for solvent recycle. Again, another process step which must have emission control.

Lastly, the resultant solvent concentrate could just as easily be incinerated for ultimate disposal as destroyed by the Acurex chemical process.

Critical Fluid Systems, Inc.

This firm is promoting the supercritical fluid extraction process, which is currently only a pilot scale process. This means unproven technology and impossible-to-estimate costs. Consequently, they propose only a small-scale test program, which, even if successful, does not guarantee their management and equipment ability to handle the super large scale disposal job at hand.

University of Missouri-Columbia

They want to study and study and study the technical approaches and migration/fate. They will probably become involved in the research mode of the disposal process anyway.

Midland-Ross

They have the requisite soil decontamination experience through years of U.S. Army research and application, e.g., their facility at Tooele, Utah. They also had success with Kepone-contaminated soil incineration for EPA, but did not get the acclaim they felt was deserving. Understandably, they maintain their proprietary and client confidentiality positions with respect to the Missouri problem. For this reason, they are wary of a fishbowl project environment.

Law Engineering Testing Company

I cannot evaluate what they are able to offer based on their letter.

Rollins Environmental Services - Deer Park, TX

They provided the most thorough technology assessment of the disposal alternatives, and have extensive operating experience in most of today's proven disposal techniques. They correctly identify the cost-intensive and time practicality constraints associated with direct feeding of soil to conventional incinerators. Similarly, they identified the unsolved technical problems of solvent extraction followed by chemical or thermal destruction, as well as most land-based disposal options. Rollins advocates building an aboveground secure landfill with gravitational-force leachate collection and treatment system. They offer compelling points to consider:

- They correctly point out the decreased cost and time advantages for "ultimate" disposal by aboveground closure.

To: George Roush, M.D.
17 June 1983

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- This remedial alternative has been successfully used before, e.g., the 800 acre vault constructed by Canonie-D'Appolonia for Hooker Chemical in Montague, Michigan for hexachloro-cyclopentadiene wastes.
- The resultant landfill would be a pyramid-shaped "monument" to man's past stupidity associated with contaminating these areas--this can be viewed in a beneficial or derisive light (my comments).
- Aboveground closure provides access and opportunity for in situ testing of biological degradation of dioxin in landfills.
- Aboveground closure can be designed to incorporate a bacterial seeding and nutrient circulating system to speed degradation. Separate cells can be constructed to test a multitude of bacteriological systems. What a great opportunity to test and publicize "superbugs" and genetic engineering to achieve hazardous waste destruction vis a vis the public impression that dioxins are stored in "the monument" in saecula saeculorum.

My Recommendation

Allow me to preface that what follows is only my opinion. The best technical solution proposed from what is contained in the file is the aboveground closure technique. Obviously, the social and political whirlwinds associated with siting such a "monument" are immense, but any alternative will have furjous siting problems. Rollins has prepared the most comprehensive proposal of the lot, have proven technology on their side, and offer the best cost and time estimates.

Thank you for the opportunity to comment on these proposals.

Sincerely,



James A. Peters
Air/RCRA Specialist/ESC

JAP:ged

Letters to the Editor

Dioxin Panic Poisons Our Judgment

Your penetrating editorial "Dioxin Hysteria" (May 31) provided a sense of balance and perspective that has been sadly lacking in news coverage of Times Beach and other areas.

While I agree with your conclusion that what is known suggests that "most of the scare stories are exaggerated," I feel it would have been still more useful to point out that the costs of this exaggeration and the resulting hysteria have been staggering and are likely to haunt us for years.

The high cost of hysteria to date is reflected, for example, in the Federal Government's \$33 million buyout of Times Beach, and in extravagant jury awards such as the \$58 million judgment in a tank-car spill in Madison County, Illinois, where the plaintiffs were not even shown to have suffered any ailments directly attributable to the spill.

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

The best way—indeed, the only sensible way—of coping with the increasingly complex and costly decisions we face in this area is through objective evaluation of the risks and benefits involved. Who ultimately

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

JOHN W. HANLEY
Chairman
Monsanto Co.

St. Louis

"Dioxin Hysteria" justifies as well as sets an example of its title. There was selective use of facts and scientific studies. A close reading of the Nitro, West Virginia, study will show the persistence of chloracne four years after the exposure. Evidence linking liver enlargement to exposure can be found in this study and in the report of the Council on Scientific Affairs of the American Medical Association, also referenced in the editorial.

Dioxin in the environment does not just go away—most of the Missouri sites were contaminated a dozen years ago—and to effectively deal with it, reasoned measures must be taken.

PROF. R.L. POWELL
Member, Governor's Task
Force on Dioxin
Washington University

St. Louis



REVIEW & OUTLOOK

Hardly a day goes by without some frightening headline about dioxin—or more precisely, 2,3,7,8-tetrachlorodibenzo-p-dioxin, one of 75 dioxins. This is reported as the most toxic chemical made by man. Its presence in drainage ditches was one of the principal reasons families near Love Canal abandoned their homes. The federal government bought out the town of Times Beach, Mo., after the Center for Disease Control recommended evacuation at exposures above one part per billion in soil samples. Traces of the toxin have been found in fish. And more than 16,000 Vietnam veterans have filed disability claims attributing skin disease, baldness, impotence, cancer and their children's birth defects to the dioxin in the defoliant Agent Orange. The conventional wisdom was aptly summed up in the title of a recent New York news show—"Dioxin: In Search of a Killer."

Clearly, there are reasons to be worried about the stuff. High concentrations in the soil—30,000 times greater than the CDC evacuation standard—killed horses at Times Beach. In the laboratory, low doses in the daily diet have led to increases in liver cancer among rats, to birth defects such as cleft palates among mice and to abnormally high numbers of miscarriages, as well as anemia and hair loss among monkeys. The lab results vary enormously by species: Dioxin appears to be about 5,000 times more toxic for guinea pigs than hamsters. Since it would be unthinkable to conduct laboratory experiments on people, researchers really don't know at what dose it becomes dangerous for humans.

What is known, however, suggests that most of the scare stories are exaggerated. Human exposure to dioxin has so far been scientifically linked to only one health problem—a skin disease called chloracne, which tends to go away fairly rapidly. This is true even at fairly high exposure levels.

We have some real experience with dioxin, resulting from major accidents, in particular the infamous explosion of a trichlorophenol plant in Seveso, Italy, in 1976. More than 700 people were evacuated from Seveso, and 181 contracted chloracne. So far, however, no serious medium-term health problems have been discovered, according to a report last year by the Council on Scientific Affairs of the American Medical Association. "The mild chloracne, which occurred mainly in a small group of children, healed quickly. . . . Except for the skin, no organs or body functions were

impaired. No derangement of gestation, no fetal lethality and loss, no gross malformations, no gross retardation at term and no cytogenetic abnormalities have yet occurred."

It's too early to tell whether the residents of Seveso face a higher risk of cancer as a result of their exposure, but studies of another dioxin accident more than 30 years ago suggest that this threat may be overblown. In 1949, there was an explosion at another trichlorophenol plant, this one owned by Monsanto in Nitro, W.Va. Soon afterward, 121 workers contracted chloracne. In 1980, the Journal of Occupational Medicine published a study by a Monsanto scientist and by the director of the University of Cincinnati Institute of Environmental Health, tracking the medical histories of those 121 workers through 1973. The authors discovered no abnormal incidence of cancer, and in fact the workers were on average living longer than would be expected from their age, race and sex distribution.

The Air Force has been conducting an epidemiological study of the 1,200 "Ranch Hands" who were directly involved in spraying Agent Orange in Vietnam; of all Vietnam veterans they were presumably the most exposed to dioxin. Of the 67 deaths among the Ranch Hands so far, only three are attributable to cancer, a lower proportion of cancer-caused deaths than in the control population.

The Environmental Protection Agency now bans the spraying of the dioxin-contaminated herbicide, 2,4,5-T, on forests, pastures and rights of way. It based its suspension decision on a study attributing to 2,4,5-T an abnormally high number of miscarriages in the area around Alsea, Ore., in 1976. The EPA Alsea study has since been discredited by 18 separate investigations. In particular, a study by the Environmental Health Sciences Center of Oregon State University concluded in 1979 that the "rate of spontaneous abortions in the study area does not appear to be related to the use of 2,4,5-T."

None of this means that dioxin is harmless. Certainly toxic chemicals should be carefully controlled, and accidental releases should be carefully monitored. But there are a lot of other threats to worry more about, such as tobacco, marijuana, drunk driving or street crime, where the evidence of threats to health is clear. The notion that dioxin is a doomsday menace is based less on medical evidence than on some kind of psychological phenomenon.

DATE: June 21, 1983

cc

SUBJECT: PROTOCOLS FOR EPIDEMIOLOGIC STUDIES
OF THE HEALTH OF VIETNAM VETERANS

REFERENCE:

TO: M. C. Throdahl
D1D

A great deal of effort has been expended in these protocols to ensure that an effect, if due to dioxin, will be detected. They will look for effects which have been identified by animal studies as well as by a variety of human studies and they acknowledge that there is still the real possibility they will have false positives, false negatives, and also equivocal findings despite this effort. I like the stated recognition that these protocols will be developmental and may change with time, but they do not state how they will be able to handle the biases if they later change protocols. If they change protocols, biases will be difficult to control.

In any of their three cohort studies, including "likely exposed" may identify a cohort with more combat duty, and with this selection there may be increased deaths, increased casualties, or even increased drug usage. This possibility is not considered in the protocol - maybe they can identify this possibility by comparison to the "likely not exposed", or even to cohort 3. World War I had its "gassed syndrome", World War II had its battle fatigue and tropical diseases, and Vietnam had its drugs and other known confounding factors.

I believe that the definition of cohorts in St. Louis should prevent biases, but the examinations of the veterans can be biased by the questioners, by the physical examiners, or even by those who decide they want to take the exams. From what I know of Ranch Hand, I believe that these possible biases have been well handled.

I now would like to list some of my specific comments for the various pages of this protocol:

Page 8, first paragraph. It states that it is possible that a significant exposure was from non-Ranch Hand applications. They do not give the basis for this statement and it would seem that this could not be a major source of exposure.

Page 9, second paragraph. It states that for the occupational exposure, the total number of exposed persons was usually not reported, but, in fact, this exposure list is recorded in a number of books and summaries. I believe this paragraph should also address the fact that 2,4,5-T was used widely and indiscriminately over a number of years in the United States and without reported effect over these many years.

Page 10, first paragraph. This paragraph talks about liver effects, but it does not acknowledge or recognize that these liver effects were temporary in practically all reported cases.

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Page 11, the last paragraph. The statement is made that literature suggests that Vietnam veterans differ from other veterans in a number of ways. This protocol does not state how they will deal with these many confounding factors.

Page 12, second paragraph. It states that the servicemen enjoyed better long-term health than their counterparts who did not serve in the military. I suspect that they are dealing with the so-called healthy worker effect. Nevertheless, a comparison between the military and non-military would be an interesting definition of long-term health status.

Page 12, last paragraph. The first sentence states that there are no studies comparing the health of combat veterans with those who did not participate in combat. I would think that the reason there are not reports is that those in combat did not suffer effects other than those who were not in combat. This would account for why there are not reports.

Page 17, ninth line from the bottom. It states that if differences existed and they applied to all veterans, then a valid study of Vietnam experience would not be possible. I don't see how they reach such a conclusion; if there is no difference seen, then there is not a Vietnam effect.

Page 18, second paragraph, fifth line. They are discussing the Swedish finding of soft tissue sarcomas but they fail to address the negative studies done similarly to the Swedish studies which found no effect. These studies include the Finnish and the New Zealand studies. See attached analysis.

Page 18, fourth from the last line on second paragraph. They state that other cancers could be added easily if an association was suggested. Based on a form of this lymphoma study, I don't see how the other cancers could be identified.

Page 35, first paragraph. This paragraph implies that the Swedish study has established an effect between the exposure and sarcomas. I have no problem with them attempting to prove Hardell's conclusions, but I do not believe that Hardell's conclusions are fact. I see no reason for not including cases which arose prior to 1984 as a part of the soft tissue sarcoma study. Again, see same attached analysis.

Page 44, first paragraph. This paragraph states that more emphasis will be given to dermatologic and immunologic studies for the Agent Orange cohort and for psychologic outcomes for the Vietnam cohort. Such an approach would encourage bias. The interviewer should not know which group an individual is in. A standard protocol should be used which would be constant, regardless of the response of the individual.

Page 44, second paragraph. It states that all the factors may be associated with service in Vietnam. They are indeed correct and these same confounders will be found not only in the non-service cohort but also in the Agent Orange cohort as well.

Page 44, third paragraph, fourth line from bottom. Though the subject's perceptions about exposure to herbicides are indeed appropriate, the same question should be addressed to the "exposure unlikely cohort" as well as the third cohort. After receiving replies to these questions, the remainder of the questionnaire should be followed just as though there had been no discussion of exposure to herbicides. Only in this way will biases be prevented.

Page 46, paragraphs one and two. There is no question but that servicemen with complaints will be more likely to participate in the study than a man without complaints. This will create a bias. This section does deal with the importance of well-standardized, non-biased approaches and it certainly is well stated.

Page 71, first paragraph. Though it states that this high risk is generally suspected to be exposure to Agent Orange, one of the reasons CDC has been asked to do the study is that many experts do not think that exposure to Agent Orange produces risk. Nevertheless, it is the possibility of high risk that is the basis for this study by the CDC. As stated earlier in the protocol, there are many other factors which are, not may have been, factors which can confer an increased risk. The last sentence in this paragraph acknowledges that being in Vietnam poses health risks which should be identified.


George Roush, Jr., M.D.

/hc
Attach.