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## CHAPTER 1

### "AGENT ORANGE AT THE CROSSROADS OF SCIENCE AND SOCIAL CONCERNS"

#### INTRODUCTION

A. L. Young and G. Reggiani

For almost two decades, the United States has been involved in controversy over its tactical use of herbicides in Southeast Asia during the Vietnam Conflict. The controversy centered first on the actual employment of herbicides in South Vietnam, then on the safe disposal of surplus herbicide following the Conflict, and lastly whether herbicides were responsible for health problems reported among Vietnam veterans.

The use of chemicals (herbicides) to control vegetation has been one of the most controversial subjects arising from the Vietnam Conflict. The United States Air Force applied most of these herbicides in jungle areas to clear vegetation from the perimeters of military bases and camps, along lines of communication, and in enemy staging areas. The objective was to provide defoliated zones that would reduce ambushes and disrupt enemy tactics. The most commonly used "defoliant" was "Agent Orange", a mixture of two commercial herbicides widely employed for a number of years in brush control programs throughout the United States and other countries.

During a five-year period from 1965 to 1970, the United States Air Force applied more than 42 million liters of Agent Orange in South Vietnam, and some 2.5 million military personnel from the

United States, Australia, New Zealand, and South Korea served one-year tours during the same period. Beginning in 1978, many veterans of that era have reported medical problems that they believed stemmed from exposure to Agent Orange during their military assignments. Their complaints have ranged from tingling in the extremities to rare forms of cancer. Some veterans had fathered children with birth defects. But overwhelming scientific data on the toxicology of chemical components in Agent Orange do not substantiate these claims.

Nevertheless, the news media has given intense sympathetic coverage to the veterans and their medical complaints. In the meantime, the governments of the United States and Australia have mobilized the massive resources of their federal agencies to conduct multi-million dollar, long-term studies of military personnel allegedly exposed to herbicides in South Vietnam from 1962 to 1970. The issue is whether actual or perceived health problems stem from herbicide exposure or whether other factors drive the controversy.

Two key questions must be considered in reviewing present concerns over Agent Orange. First, why did the Agent Orange issue surface 10 years after it was used in Vietnam? Second, what criteria can be used to insure an objective analysis of such a complex, controversial, and politically sensitive subject? One answer to the first question may be that presumed health effects from exposure to the herbicide did not appear, or at least, were not diagnosed among Vietnam veterans until late in the 1970's. Another possible answer is that the general public and Congress only lately recognized the concerns of Vietnam veterans, and Agent Orange is only a vehicle to focus those concerns. Certainly, the acrimony and bitterness over involvement in Vietnam drove most Americans to repress memories of that war. As a result, they have tended either to ignore veterans of the Vietnam era or to relegate to a lesser status than veterans of other wars. Certainly the longing for respectability of Vietnam

veterans have coincided with increasing American and world-wide interest in health and environmental issues. Thus, the controversy surrounding Agent Orange has surfaced primarily because it involves the veterans and herbicides, both of which have been the center of controversy since they were employed in Vietnam.

Much of the controversy concerning Agent Orange is attributable to concern over its toxic dioxin contaminant 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD). A large volume of toxicological data on 2,4,5-trichlorophenoxyacetic acid (2,4,5-T) and 2,4-dichlorophenoxyacetic acid (2,4-D), the two herbicides in Agent Orange, were available during the final years of United States involvement in Vietnam, but woefully inadequate toxicological and environmental data on TCDD precluded resolution of the issues. Although scientists recognized that TCDD was acutely toxic and teratogenic (birth deforming) in laboratory animals, no studies were available on the effects of chronic longterm, low-level exposure in lower mammalian species. Furthermore, numerous occupational exposures to TCDD were reported during the industrial production of trichlorophenol, but human epidemiologic studies were not available despite documented exposure as early as 1949.

To further complicate the Agent Orange controversy, during the 1970s a number of major chemical episodes occurred that fueled the issues. In July 1976, the Seveso Accident occurred wherein a small Italian community became contaminated with TCDD as a consequence of an accidental release of reactor products from the synthesis of trichlorophenol. The following years, the controversy surrounding the Love Canal made front page news throughout the United States and Europe. This was subsequently followed by the evacuation of Times Beach, Missouri, as a result of the dioxin contamination from the improper disposition of chemical wastes.

All of these episodes, combined with the regulatory response of the United States Federal Agencies resulted in further commitment of national and state resources to address the human and environmental impact of dioxin and the phenoxy herbicides.

The scientific resolution of the Agent Orange controversy presumably rests with the results of human epidemiologic studies assessing the long-term effects of exposure to TCDD and whether the veterans' complaints are consistent with the data. Of course, one major assumption would necessarily be that military personnel reporting health effects were, in fact, exposed to Agent Orange and, hence, to TCDD during their tours in Vietnam. Regardless of any reported health effects, a valid study must include examination of all facets of the controversy.

This requirement poses a dilemma in any attempt to answer the second question because objective analysis depends on such an examination, but there are simply no models available for analyzing environmental health issues.

In a subsequent chapter of this book, Young, proposes that the examination of environmental crises involving other chemicals can provide a useful parallel for analyzing the Agent Orange controversy. Accordingly, he suggests that there are a series of events that describe the nature of "quality of life" controversies and that these are predictable events. Hence, the chapters and topics of this book are intended to elucidate such characteristics as adequacy of the scientific data and assessment of the political, social and legal issues of the Agent Orange Controversy. It is appropriate that we address these components of the controversy at this time because much, if not most, of the information necessary to make informed judgments is now available. In addition, certain actions of the courts in the United States, Italy, and Australia, have taken action that have a significant impact on the final outcome of the controversy.

On May 9, 1985 the district court for the Eastern District of New York rendered the final judgement on the largest class action lawsuit in American legal history, i.e., the Agent Orange product liability litigation.

The central issue of the case was "the ability of the plaintiffs to demonstrate the necessary causal connection between the exposure of the veterans to Agent Orange and the subsequent development of a variety of ailments".

In the final judgement it was concluded that the incidence provided by the plaintiffs "lacks sufficient probative force, except in the case of chloracne, to permit a finding of general causality".

On July 31st, 1985 the Australian Royal Commission on the use and effects of chemical agents on Australian personnel in Vietnam, presented its final report of inquiry to the Governor General.

The report concluded that neither Agent Orange nor the chemical agents used to defoliate battle zones in Vietnam have any causal connection with the ailments of the Australian Vietnam veterans.

At about the same time (May 1985) the Court of Appeal of Milan, Italy, revised the first judgement on the defendants in the Seveso case largely accepting their claims and the International Steering Committee for the study of the effects on health of the Seveso accident concluded its work stating that "nearly 8 years after the accident in Seveso it has become obvious that besides chloracne in a very small group of children, no adverse health effects related to the chemical produced by the accident have been observed".

These events prompted us to ask the question whether the outcome of the judiciary assessments of the Agent Orange issues and the conclusions of the International Advisory Committee steering the health surveys of the Seveso population exposed to dioxin could be taken as a landmark also for the other aspects of the same issue, i.e., the medical and scientific, the social and political issues associated with it.

We thought may be the time had arrived for trying to come to a conclusion of a controversy which has been at the center of concern of million of people and of the governments of several nations of the western world, beside having affected and changed the course of our personal life for more than 10 years.

Hence we readily accepted and greatly appreciated the offer of the Toxicology Forum to present an assesement of the controversial issues related to Agent Orange and Dioxin in the light of our present knowledge at the Summer Meeting in Aspen, July 1985 and at the Winter Meeting in Washington in February 1986.

We are aware of the difficulties of the task which we have set for us. In our quest of truth we have approached the issue of the Agent Orange controversy and its association with Dioxin with humilty, conscious of the impact it has on human lives. However we tried to remain faithfull to the rules of the scientific tradition of research that requires unequivocal proof of cause and effect relationship in its experimental models. In the choice of the contributors we have looked not only for professional competence but also for qualities such as reason, logic and objectivity. We trust that all of us as well as the selected audience of the Toxicology Forum which discussed the presentations have been accurate and unbiased.

The future will tell whether in fact the conclusions of the New York district court and of the Royal Commission of Inquiry mark the end of the Agent Orange controversy. It is our fervent hope for all concerned that this will be the case.

However already now we would like to acknowledge the help, advice, and support we have received from so many scientists and scholars. Without their suggestions, their sympathy, their goodwill and competence we would not have been able to put togheter an adequate account of the Agent Orange controversy.