Soldier of Orange: The Administrative, Diplomatic, Legislative and Litigatory Impact of Herbicide Agent Orange in South Vietnam

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SOLDIER OF ORANGE: THE ADMINISTRATIVE, DIPLOMATIC, LEGISLATIVE AND LITIGATORY IMPACT OF HERBICIDE AGENT ORANGE IN SOUTH VIETNAM

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I. INTRODUCTION

Little could British naturalist Charles Darwin have anticipated that his dedicated research in plant-growth regulation in 1880 would lead to subsequent development and manufacture of man-made growth regulators, later called phenoxy herbicides. Nor could he have anticipated that his research would lead to the highly controversial, first wartime use of such herbicides some eighty years later. A host of administrative, diplomatic, legislative and litigatory responses were spawned by this first military usage and in the nineteen years following to the present.

This article will briefly review the United States' development and use of herbicides in South Vietnam, and will discuss subsequent ramifications flowing from their use, resulting in a number of responsive actions by virtually every branch of our government. These actions have already affected many of the millions of

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The author would like to acknowledge Ralph S. Brown, Jr., Simeon E. Baldwin Professor of Law at Yale, whose seminar on "Toxic Substances" was the encouragement for this article.

1 Davis, Donald E., Herbicides in Peace and War, BioScience, Feb., 1979, 84, 84.
former service persons who served in Vietnam during the period 1962-1971. Although the civilian use of many of these same herbicides is concomitantly hosting a similar series of regulatory and litigatory issues, their detailed analysis is beyond the scope of this article which will address primarily the military use and issues flowing therefrom.

II. HISTORY OF DEVELOPMENT AND USE

Subsequent to Darwin's discovery of phototrophic (light seeking) response in plant cells and the chemical isolation of auxin (beta indole acetic acid), synthesis of similar growth-regulating compounds was conducted, resulting in the development of two phenoxy herbicides in use today: 2,4-D (2,4-dichlorophenoxy acetic acid) and 2,4,5-T (2,4,5-trichlorophenoxy acetic acid). In August of 1941, a botanist at the University of Chicago suggested research of the possible use of growth-regulators as "plant killers." This grew out of a warning by the National Academy of Sciences (NAS) to the Secretary of War of the potential dangers (to the United States) of biological warfare.

The outstanding effectiveness of these two herbicides in controlling the growth of broad-leaved plants and weeds, coupled with their apparently low mammalian toxicity and low application rates, resulted in their rapid acceptance in world agriculture. Peterson reported that the annual production of 2,4-D alone exceeded 14,000 pounds in 1950 and by 1960 manufacturers (principally American) were producing 36 million pounds.

Herbicides were not used in World War II, but a small program for screening potential herbicides for possible military use continued after the war. In 1959 the first large-scale military defoliation by aerial application using the butyl esters of 2,4-D and 2,4,5-T was conducted at Ft. Drum, New York. The success of these tests spurred the Office of Secretary of Defense Robert McNamara in May of 1961 to request feasibility tests for defoliation of jungle.

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* Peterson, G.E., *The Discovery and Development of 2,4-D*, 41 AGR. HIST., 243 (1967) [hereinafter Peterson].
* Id.
* Davis, supra note 1, at 91.
* Peterson, supra note 2.
vegetation in Vietnam. The results of these tests (first conducted in Thailand, later in South Vietnam (SVN)) were that significant defoliation and anticrop effects could be obtained with two different mixtures of herbicides. The first was a mixture of the n-butyl esters of 2,4-D and 2,4,5-T and the iso-butyl ester of 2,4,5-T. This mixture was code-named “Purple”. The second “military” herbicide was code-named “Blue” and was composed of the acid and sodium salt of cacodylic acid. The code names referred to the color of bands (Orange, White, Blue, Purple, Pink and Green) which had been painted around the center of the 55-gallon drum containers that were used to ship the herbicide to South Vietnam. They were painted in this manner in order to aid in identification by the personnel using them. The initial choice of herbicides used in Vietnam was based: “upon the chemicals that had had considerable research, proven performance, and the practical background. Also other factors had to be considered, such as availability in large quantity, costs and known or proven safety in regard to their toxicity to humans and animals . . . .”

Purple and Blue were the first herbicides to arrive in Vietnam in January 1962. They were followed shortly thereafter by Pink (mixtures of n- and iso-butyls of 2,4,5-T), and Green (composed of the n-butyl ester of 2,4,5-T), followed in 1965 by Orange and White (picloram). Herbicide Orange replaced all uses of Purple, Pink and Green and eventually became the most widely used military herbicide in SVN. Agent Orange was sprayed from aircraft (mostly C-123’s) that could carry 1,000 gallons of herbicide and deposit 3 gallons per acre in swaths 240 feet wide for defoliation and crop destruction missions. Herbicide Orange was a 50:50 mixture of 2,4-D and 2,4,5-T. The component 2,4,5-T was later found to contain a contaminant, TCDD (2,3,7,8-tetrachloro-
dibenzo para-dioxin) [dioxin] which is one of the most toxic chemicals known.\textsuperscript{11} [See Table I, appended].

Military herbicide operations were carried out from 1962 to 1971. They were used primarily for (1) defoliation of trees and plants to improve observation and prevent ambush of friendly forces and (2) for destroying food crops of hostile forces.\textsuperscript{12} After a relatively slow buildup from 1962 to 1965, herbicide operations increased rapidly to a peak in 1967; then declined slightly in 1968 and 1969 and dropped sharply in 1970 to eventually stop in 1971.\textsuperscript{13} Defense estimates that approximately 17.7 million gallons of herbicides were sprayed during the nine-year period: 10.65 million gallons of Orange, 5.63 million gallons of White, 1.14 million gallons of Blue, 145,000 gallons of Purple and 130,000 gallons of Pink and Green. The National Academy of Sciences estimated that of the 3.6 million acres sprayed, 66 percent was sprayed once, 22 percent was sprayed twice, 8 percent was sprayed three or more times, and 4 percent was sprayed four or more times.\textsuperscript{14} Herbicide Orange was sprayed undiluted in Vietnam at the rate of about 3 gallons (containing 12 pounds of 2,4-D and 13.8 pounds of 2,4,5-T) per acre.\textsuperscript{15} Civilian applications of this herbicide's components are usually diluted in oil and water. According to industry officials, the civilian application rate of 2,4,5-T varies from 1 to 4 pounds per acre.\textsuperscript{16} A defense official stated that the heavier applications were necessary to assure success of the herbicide op-


\textsuperscript{13} GAO REQUEST 1979, supra note 11, at 29.

\textsuperscript{14} Id. at 2.

\textsuperscript{15} Since Herbicide Orange is a 50:50 mixture of 2,4-D and 2,4,5-T, an average TCDD contaminant level of two parts per million (ppm) would indicate that the 2,4,5-T component, as manufactured, contained TCDD levels averaging about 4 ppm. GAO Request 1979, supra note 11 at 2, 3 n.1.

\textsuperscript{16} GAO REQUEST 1979 supra note 11 and Young supra note 6, at I-2 through I-15.
erations. They further advised that because of the dense jungle canopy, the amount of herbicide penetrating to the forest floor (six percent of that applied)\textsuperscript{17} would have been similar to those normally applied to brush-infested ranch land in the United States.\textsuperscript{18}

When one converts the millions of gallons sprayed, \textit{supra}, to pounds of herbicide, the 44 million pounds of 2,4,5-T contained an estimated 368 pounds of the toxic contaminant TCDD or dioxin. (NAS estimated that between 220-368 pounds of TCDD were released over South Vietnam during the period August 1965 to February 1971).\textsuperscript{19} Ninety-six percent of all 2,4,5-T was in Herbicide Orange; the remaining four percent was in Green, Pink and Purple (which contained approximately 40 percent [143 pounds] of the estimated TCDD disseminated throughout South Vietnam). Green, Pink and Purple were sprayed as defoliants on less than 90,000 acres from 1962 through 1964, when only a small force of U.S. military personnel were in South Vietnam. Ninety percent of all of the Herbicide Orange (containing 38.3 million pounds of 2,4,5-T and 203 pounds of TCDD) was used in defoliation operations on 2.9 million acres of inland forests and mangrove forest.\textsuperscript{20} [This incongruity of amounts sprayed varying inversely to the numbers of personnel serving in South Vietnam, complicates the analysis of what the actual exposure to U.S. forces might have been, i.e. when the more toxic Agents Green, Pink and Purple were being used (1962-1964), there were only relatively small numbers of service personnel in South Vietnam and, as the later (and relatively less toxic) Agent Orange was being sprayed from 1965 through 1971, its more extensive use was concomitant to the massive buildup of American forces to 2.6 million service personnel].\textsuperscript{21} A high Veterans Administration (VA)
official has indicated that during the period 1962 through 1971 it was "theoretically possible that about 4.2 million American soldiers could have made transient or significant contact with the herbicides because of this operation (Ranch Hand - the code name assigned by the Air Force to the herbicide spraying missions)".22

III. TERMINATION OF HERBICIDE USE IN VIETNAM

The decision leading to the termination on April 15, 1970 of all military herbicide use was caused by a fascinating interplay of diverse elements of our political fabric—scientific, regulatory, diplomatic and legislative. These included the National Academy of Sciences (NAS), the National Cancer Institute (NCI), the National Institute of Health (NIH), the American Association for the Advancement of Science (AAAS), a spate of independent scientists, a host of executive departments and agencies, the departments of Defense, Agriculture, Interior and HEW, the Air Force, the Surgeon General, the State Department, the Office of the President, and the Congress itself.

One of the first distinguished scholars to voice concern for the continued use of herbicides containing the toxic substance dioxin was Yale botanist Arthur W. Galston, at the time President-elect of the Botanical Society of America. In his 1967 article in the New Republic, Professor Galston voiced a warning of the potential hazards of continued unbridled use of herbicides that was all too prophetic: "we are too ignorant of the interplay of forces in ecological problems to know how far-reaching and how lasting will be the changes in ecology brought about by the widespread spraying of herbicides in Vietnam. These changes may include immediate harm to people in sprayed areas. . . ."23

The Department of Defense (DOD) was not unmindful of the growing criticism within the scientific community on the department’s use of herbicides in Vietnam. Each year the justification for continuation of Operation Ranch Hand was reviewed. In 1967, DOD contracted with Midwest Research Institute (MRI) of Kan-

22 Hearings, supra note 17, at 27 (Testimony of Dr. Paul Haber, Asst. Chief Medical Director for Professional Services, Veterans Administration, Washington, D.C.).
sas City, Missouri, for an in-depth assessment of the ecological effects of extensive or repeated use of herbicides. MRI concluded that the greatest short-term or long-term ecological consequence (in South Vietnam) was the “destruction of the vegetation . . . ”, the long-term effects on wildlife were unpredictable (some good, some bad), “the herbicides used (in South Vietnam) . . . will not persist in the soil for a long period of time . . . ” and, finally, “ . . . the possibility of lethal toxicity to humans . . . is highly unlikely and should not be a matter of deep concern . . . ”24 Both NAS and AAAS reviewed the report following its publication in December of 1967 and felt that although it was a creditable review of the available scientific literature relating to herbicides and their ecological effects, it was only a first step in such an investigation.25

In September 1968, the U.S. Department of State released an assessment of the ecological consequences of the defoliation program in South Vietnam. Tschirley, a plant ecologist, visited South Vietnam for one month and later published the results of his observations in Science (the Journal of the AAAS). Major conclusions reached by Tschirley included: “The defoliation has caused ecologic change, not irreversible, but recovery will take a long time . . . The effect on animals is not known, but it does not appear to have been extreme . . . There is no evidence to suggest that the herbicide used in Vietnam will cause toxicity for man or animals. . . .”26 In order to supplement Tschirley’s report, the Society for Social Responsibility in Science sponsored a visit by two zoologists in March 1969. Orians and Pfeiffer published their report in 1970. In contrast to the prior reports, they reported the ecological consequences of defoliation were severe, especially in areas receiving repetitive applications of defoliants. Little evidence of toxic effects of herbicides to animals was found, although they did receive a report (by interview) of many sick and dying birds and mammals. This report was not investigated. No evidence was found that the herbicides had direct adverse effects


on human health, although they did receive reports on the tremendous impact on remote mountain people.27

At this point, the Department of Agriculture (USDA) entered the scene, albeit involuntarily. In a February 1969 meeting of the National Academy of Science/National Research Council Committee, a copy of a “confidential” report prepared by the Bionetics Research Council Committee (BRC) (who had been employed by USDA to study the mutagenic, carcinogenic and teratogenic potential of a very large number [140] of commonly used pesticides) was shown to this influential committee. This study used highly susceptible test animals that were treated with massive doses of pesticides. Since the USDA had paid for the study, the report was made to them. In these studies, 2,4,5-T showed a “significant potential to increase birth defects.”28

About four months after the NAS Committee had seen the BRC report (June or July 1969), the first reports of human birth defects allegedly attributed to Herbicide Orange appeared in Vietnamese newspapers between June 26 and July 5, 1969.29 They blamed the increases on the chemicals used in defoliation. There is still no unanimity regarding interpretation of these findings. The number of recorded birth defects did significantly increase, however. Saigon is not in the area where most of the defoliation missions were flown, and similar increases in birth defects were not recorded in areas where defoliation was much more extensive.30 [E.g., one could take note of the concomitant influx of American doctors and other medical personnel into the Saigon area, which might have had a positive impact on better record keeping, thus explaining to some degree the apparent increase.]

A sense of greater urgency was attached to the mounting national concern about 2,4,5-T when, in October 1969, Dr. Lee F. Dubridge, Science Advisor to the President, announced that there

28 Davis, supra note 1, at 92, and telephone interview of Nov. 1, 1979 by Bruce F. Meyers with Prof. Donald Davis (Auburn Univ., member of 1968-69 National Academy of Science/National Research Council Committee on Persistent Pesticides).
29 Advisory Committee on 2,4,5-T. Report of the Advisory Committee on 2,4,5-T to the Advisor of the Environmental Protection Agency of May 7, 1971 (unpublished), quoted in EPA RPAR on 2,4,5-T at 43 Fed. Reg. 17124, 17144 n.48 (1978) [hereinafter Advisory Committee Report on 2,4,5-T], and USAF HERBICIDE ORANGE REPORT supra note 6, at V-14.
30 Davis, supra note 1, at 92.
would be a partial curtailment of the use of this herbicide. Following this announcement by the Office of the President, the Department of Defense restricted the use of Herbicide Orange to areas remote from population in South Vietnam. These actions were prompted by the National Institute of Health (NIH) report that 2,4,5-T could cause malformations and stillbirths in mice. In all probability, the "leaking" to the press of the USDA report (allegedly by a member of "Nader's Raiders", who "suggested" that USDA was trying to "hide" the adverse report) prompted the Surgeon General of the United States on April 15, 1970 to issue an opinion that the use of 2,4,5-T might be hazardous to "our health". He was immediately strongly criticized by some for not acting sooner.

On April 15, 1970 the Secretaries of Agriculture, HEW, and the Interior, jointly announced the suspension of certain uses of 2,4,5-T. These suspensions resulted from published studies indicating that 2,4,5-T was a teratogen. On the same day, the Department of Defense suspended all use of Herbicide Orange, containing the 2,4,5-T. The Dow Chemical Company, the primary manufacturer of 2,4,5-T and 2,4-D, predictably denied this teratogenicity, stating that according to their tests (with 2,4,5-T that had been produced in accordance with their production specifications) there was no indication of any fetal abnormalities. However, the Dow tests did confirm the Bionetics Research Council (BRC) findings that, when dioxin was present in quantities exceeding (then-current) production specifications, birth defects did occur.

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31 McCullough, supra note 11, at 11.
32 GAO Request 1979, supra note 11, at 3.
33 Davis, supra note 1, at 93.
35 The Secretaries' actions were taken because of evidence indicating "that 2,4,5-T, as well as its contaminant, dioxins, may produce abnormal development in unborn animals. Nearly pure 2,4,5-T was reported to cause birth defects when injected at high doses into experimental pregnant mice but not in rats. No data on humans are available." April 15, 1970 announcement of U.S. Department of Agriculture, U.S. Dept. of Interior, U.S. Dept. of Health, Education and Welfare, quoted in Dow Chemical v. Ruckelshaus, 477 F.2d 1317, 1319 (8th Cir. 1973), [hereinafter Dow v. Ruckelshaus]; see also Whiteside, supra note 34, at 2, and USAF HERBICIDE ORANGE REPORT, supra note 6, at II-1.
36 Id. and USAF HERBICIDE ORANGE REPORT, supra at II-1 and, McCullough, supra note 11 at 20.
38 McCullough, supra note 11, at 13.
IV. CONGRESSIONAL ACTIONS REGARDING 2,4,5-T AND/OR DIOXIN

Congress was keenly aware of the growing storm against the military use of herbicides. Within the Senate, attempts to block further use of herbicides in Vietnam were initiated by a proposed amendment (No. 784) to the authorization of appropriations for military procurement which prohibited U.S. military use of anti-plant weapons and prohibited the transfer of such weapons for use by second countries (presumably to prevent transfer to Vietnamese forces to permit them to do what the Congress was forbidding U.S. forces to do). The amendment also provided for the elimination of the present stockpile of antiplant chemical weapons (Agent Orange). When this amendment was defeated by a voice vote of 62-22, another amendment (No. 863) was offered which proposed the prohibition of crop destruction in warfare. This amendment was also defeated by a vote of 48-33. The Senate was obviously attempting to balance the growing criticism of the use of herbicides against the "undisputable" saving of American lives.

Both houses of Congress wanted more information on the possible toxicity of the herbicides in use. The House of Representatives was able to implement this desire by its appropriation action with respect to the military procurement bill for 1971. They directed the Secretary of Defense to arrange with the National Academy of Sciences (NAS) to conduct a study on the effects of herbicides in South Vietnam, including health effects.

A prior portion of the same section of the Act precluded expenditure of any funds for procurement of any "lethal chemical or any biological warfare agents . . ." and in the event of any disposal of such elements that "such agents [be] detoxified or made harmless

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40 U.S. Congress. Congressional Record at S14240-58 (August 26, 1970).
41 Congressional Record at S14419 (August 27, 1970).
42 E.g. "For whatever the possible side effects of our herbicide program, its primary contribution is indisputable: it has saved the lives of Americans in Vietnam." Id.
43 Public Law No. 91-441, sec. 506(c), 84 Stat. 905, 91st Cong., 2d Sess. Oct. 7, 1970: "(c) (1) The Secretary of Defense shall undertake to enter into appropriate arrangements with the National Academy of Sciences to conduct a comprehensive study and investigation to determine (A) the ecological and physiological dangers inherent in the use of herbicides, and (B) the ecological and physiological effects by the defoliation program carried out by the Department of Defense in South Vietnam."
44 Id. at 506(a).
V. DISPOSAL OF HERBICIDES FROM SOUTH VIETNAM

In September 1971, the Department of Defense directed that the Herbicide Orange remaining in South Vietnam be returned to the United States and directed that the entire 2.22 million gallons (unexpended) be disposed of in an "environmentally safe and efficient manner." At the time of the DOD suspension of its use, there were 1.37 million gallons of Herbicide Orange in South Vietnam and 0.85 million gallons at the Naval Construction Battalion Center (NCBC) at Gulfport, Mississippi. The 1.37 million gallons were removed from South Vietnam in April 1972 to remote Johnston Island in the Pacific Ocean for storage pending disposal. Various techniques of destruction and/or recovery of the herbicides used in South Vietnam were investigated between 1971 and 1974. Destructive techniques that were considered included soil biodegradation, high temperature incineration, deep-well injection, burial in underground nuclear test cavities, sludge burial and microbial reduction. Recovery techniques that were being examined (in order to possibly recover a useful product) included use, return to the manufacturers, fractionation and chlorinolyses. Of the techniques considered, only high temperature incineration was sufficiently developed to warrant further investigation. The others were rejected for a number of reasons, including inadequate assurance of success, long lead-times for development of efficient methods, and a complete lack of industrial interest.

Initially, the Air Force proposed to incinerate the remaining stocks at a commercial incineration site in Deer Park, Texas. The Texas Air Control Board was less than ecstatic about the prospect of spreading toxic contaminant byproducts over the Texas countryside. In a like manner, the Mississippi Air and Pollution Control

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46 Id. at 506(d).
47 The average concentration of TCDD in the Agent Orange awaiting disposal was 2 ppm and the total amount of TCDD in the entire stock was approximately 44.1 pounds. USAF HERBICIDE ORANGE REPORT, supra note 6, at II-1.
48 Id. As to the last mentioned possibility, when the USAF asked the manufacturers to take the Agent Orange back (according to a subsequent statement made to the EPA by an Air Force official) this proposal "created what might be known as a wide wave of disinterest on the part of manufacturers," WHITESIDE, supra note 34, at 20.
49 "The area around the proposed site of incineration . . . is a highly industrialized area (that already) has relatively high concentrations of air pollutants. The addition of combustion products from the incineration of over two million gallons of Orange herbi-
Commission in February 1972 formally requested that the Agent Orange (which was stored at NCBC at Gulfport) "be removed from its location immediately." 49

Finally, in response to the persistent urging and the realization that many of the steel drums containing the Agent Orange were beginning to leak, the Air Force, in December 1974, filed a final Environmental Impact Statement (EIS) with the President's Council on Environmental Quality. They had made the decision to incinerate the remaining stocks aboard a specially designed Dutch incineration vessel, the "Vulcanis." This was to be done at sea, in a remote area west of Johnston Island. 50 EPA held public hearings in February 1975 in accordance with the Marine Protection, Research and Sanctuaries Act of 1972, as amended. 51 The EPA deferred approval at this time and instead requested the Air Force to further explore reprocessing as a means of disposition prior to making a final decision to incinerate. 52 The reprocessing was actively pursued and in February 1977 the Air Force concluded that the reprocessing option was not feasible, timely or cost-effective because a technique for the ultimate disposal of the activated carbon by-product was not available or anticipated in the foreseeable future. 53 In March 1977 the Air Force requested reconvening of the EPA public hearings. Following these hearings, the EPA ultimately issued a research permit to the Air Force and Ocean Combustion Services. 54

In the destruction of Agent Orange stocks, the agent was drained from the drums at each of the sites (Johnston Island in the Pacific and Gulfport, Mississippi) and was transferred to the

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49 Id.

50 USAF HERBICIDE ORANGE REPORT, supra note 6, at II-2.

51 33 U.S.C. 1401 et seq. "(a) Unregulated dumping of material into ocean waters endangers human health . . . and the marine environment, ecological systems . . . " and (b) The Congress declares that it is the policy of the United States to regulate dumping . . . into ocean waters and to prevent or strictly limit dumping . . . any material which would adversely affect human health . . . or the marine environment . . . "


53 USAF HERBICIDE ORANGE REPORT, supra note 6.

Vulcanis. The empty drums were rinsed with diesel fuel and crushed. The rinse was then combined with the Agent Orange for incineration at sea. The operation was finally completed in September 1977, 16 years after its first military use.55

To ensure environmental safety, various monitoring and sampling programs were carried out in connection with the de-drumming and incineration. The results of these sampling programs revealed that the levels of 2,4-D and 2,4,5-T vapors were all below the Threshold Limit Value (TLV) for each of these materials.56

The congressionally directed studies to be done by NAS were conducted in South Vietnam during the period 1972-1973. The NAS committee spent about 1,500 man-days in South Vietnam during the course of the study. In a February 1974 report, NAS expressed concern over TCDD because of (1) its very high toxicity to animals, (2) its presence in Agent Orange, (3) preliminary reports of the presence of TCDD in fish in Vietnam, and (4) the lack of any data permitting assessment of TCDD effects on humans.57 As a result, the Academy recommended that long-term studies be made to obtain a firmer basis for assessing the potential harmful effects on man.58 The NAS committee could not gather any definitive indication of direct damage by herbicides to human health. The committee, however, was unable to visit the

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55 A total of 15,480 drums of Agent Orange were processed at the Mississippi site by approximately 110 USAF officers and technicians. A total of 24,795 drums were processed at Johnston Island by some 100 civilians hired by the contractor to perform the dedrumming process. At both sites, workers were provided with daily changes of work clothes and protective masks, hoods and clothes. The incineration was completed at sea during the period July to September 1977. CONGRESSIONAL RESEARCH, supra note 10, at CRS-7.

56 The noted levels were at least two and in most cases three orders of magnitude below the TLV's. TCDD was not detected in any air samples. Biomonitoring using rapidly growing tomato plants was used to confirm dispersal and diffusion downwind of the dedrumming and incineration sites. No adverse environmental impact resulted from these operations. USAF HERBICIDE ORANGE REPORT, supra note 6, at II-8, II-10, II-15, II-18.


58 "Further intensive studies are especially required with reference to the ecological distribution, the pharmacology mechanism of toxicity, possible mutagenicity, and carcinogenicity in man," Id.
Montagnards in their own locales to verify common and consistent reports of serious illness and death, especially among children, after exposure to herbicide sprays.  

With the increasing politicization of the herbicide issue worldwide, even within South Vietnam itself, the NAS committee attempted an assessment of the effects of the propagandistic activities on the attitudes of South Vietnamese towards the use of herbicides. They concluded that it had become a symbol among the urban intellectuals and was a lesser issue with the peasants.

VI. DIPLOMATIC IMPRINT OF THE MILITARY USE OF HERBICIDES

In concert with the mounting concern and criticism within both the scientific community and the Congress as to the continued military use of herbicides (particularly Agent Orange), foreign criticism also mounted. Allegations against the United States with regard to “chemical warfare” in Vietnam were discussed as possible violations of the Geneva Protocol of 1925. [This Protocol was proposed at Geneva in 1925 by the United States as a ban on the use in war of “asphyxiating, poisonous or other gases.” It was first submitted to the Senate for ratification in 1926, but was never ratified].

The United States’ position has consistently been that the use of herbicides in war is not prohibited by the Geneva Protocol.

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60 Id. at Encl. III at p. 7.
61 “Our findings indicate that there is a major dichotomy between the views of the rural population and those of the urban middle-sector regarding the use of herbicides in SVN. Contrary to what might be expected, the herbicide missions are much less an emotional issue among the peasants, who bore the brunt of the effects, than it is among the urban intellectuals for whom it has become a symbol.” 1974 NAS Study, supra, portion quoted in USAF HERBICIDE ORANGE REPORT, supra note 6, at V-30.
62 “Internationally, the United States has provoked mistrust and criticism. Countries of the world have spoken out against the United States’ use of chemical warfare in Vietnam, declaring that it is immoral, inhuman, in violation of the provisions of the Geneva Protocol of 1925, and [is] contrary to customary international practice which has developed as a result of the Protocol.” Goodell, Targets for Further Disarmament, CENTER FOR INTERNATIONAL STUDIES POLICY PAPER SERIES No.2, CIS No. 4 at 6 (1969). Quoted in McCullough, supra note 11, at 29.
This was the position taken by Secretary of State Rogers and by President Nixon in their letter of [re]transmittal of the Protocol to the Senate in August 1970 for its advice and consent to ratification.44

Illustrative of the contrary view taken by many others in the international community, was the adoption of a Swedish resolution in the United Nations General Assembly in December 1969 (by a vote of 80 to 3) which: “stipulated that it was contrary to the ‘generally recognized rules of international law’, as embodied in the Geneva Protocol, to use in international conflicts ‘any chemical agents of warfare’ phrasing which was intended to cover tear gas and other non-lethal chemicals as well as herbicides.”85

There are many arguments and analyses on whether herbicides (antiplant compounds) were to be included within the scope of the Geneva Protocol. Most analyses of this issue center around the fact that herbicides had not been discovered in 1925 when the Protocol was written.86

Following the resubmission of the Geneva Protocol of 1925 to the Senate in August of 1970 by President Nixon, extensive congressional hearings were conducted in 1971, during which differing views developed. At this same time the executive branch (and in particular the Departments of State and Defense as well as Justice) undertook a thorough and comprehensive review of the military, legal and political issues relating to the Protocol. Following the passage of the presidential office to Gerald R. Ford, President Ford announced on January 22, 1975 a new policy to govern any future use in war of riot control agents and chemical herbicides.87 On that date President Ford signed the instruments of

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44 President Nixon's Letters of Transmittal on the Protocol for Prohibition of the Use in War of Asphyxiating, Poisonous, or Other Gases, and of Other Bacteriological Methods of Warfare, (to the Senate of the United States), August 19, 1970.

45 It is the United States' understanding of the Protocol that it does not prohibit the use in war of riot-control agents and chemical herbicides. Smoke, flame and napalm are also not covered by the Protocol.” Department of State, Letter of Submittal [of the Geneva Protocol of 1925] to the President, (August 11, 1970).

46 House Committee on Foreign Affairs, supra note 63, at 24 [The United States, Australia and Portugal were the only nations voting against this resolution, although there were 36 abstentions].


87 Supra note 62, at p. 74.
ratification of the Geneva Protocol of 1925 and the Biological Weapons Convention, to which the Senate had given its advice and consent on December 16, 1974. The new policy was a renunciation of: "the first-use of herbicides in war except use, under regulations, applicable to their domestic use, for control of vegetation within U.S. bases and installations or around their immediate defensive perimeters."

This was set forth in an Executive Order, which in addition, reaffirmed United States policy (established in 1971), that "any use in war of chemical herbicides and riot control agents must be approved by me [the President] in advance."

From this review of the United States foreign policy with respect to the use of herbicides for military operations, one can see what some might characterize as a "responsive adjustment" as the body of scientific evidence grew on the possible toxic effects of our military herbicides (specifically 2,4,5-T and dioxin). During this same time similar reassessments were going on with respect to its domestic and civilian uses.

VII. CIVILIAN USAGE AND EVENTUAL CURTAILMENT

As discussed supra, the civilian usage and eventual curtailment of 2,4,5-T is beyond the full scope of this article. An overview, however, to show the similarities in resistance to curtailment is necessary in order to place the Agent Orange problems in appropriate perspective.

The herbicide 2,4,5-T has been produced as a "registered pesticide" in the United States since 1948. EPA records show approximately 122 companies hold Federal registrations and formulate 424 registered products; eleven additional companies have former state registration and formulate 21 products. To provide some insight as to the magnitude of the civilian usage within the United States, the Department of Agriculture's official Pesticide...
Review reported that 11.6 million pounds of 2,4,5-T acids, esters and salts were produced in the United States in 1969 and 12.3 million pounds in 1970. During the period 1971-1974 some 0.7 million pounds were imported.\textsuperscript{79} Principal domestic use in 1974, as an example of the panoply of types of utilization, was as follows: (1) weed control on rights-of-way: 4 million pounds; (2) range land and pastures: 1.5 to 2.3 million pounds; (3) rice crops: 220,000 pounds; and (4) forestry: 50,000 pounds.\textsuperscript{74}

Since 1950 most of the chemical industry has known that large quantities of TCDD may be formed as a byproduct of the 2,4,5-T manufacturing process if the manufacturing procedures were not carefully controlled. At one time, 2,4,5-T was produced which contained between 30-40 ppm of TCDD. Between 1968 and 1969, one manufacturer had a 90 percent decrease in TCDD present in the 2,4,5-T that it produced. After concern arose in 1969 about the extremely toxic effects of TCDD, manufacturing methods were changed and carefully controlled. By 1971 industry had reduced TCDD content in commercial samples to less than 1 ppm. Current U.S. manufacturing specifications require 2,4,5-T presently being sold to contain less than 0.1 ppm. Several foreign countries now produce commercial 2,4,5-T containing less than 0.05 ppm of TCDD.\textsuperscript{76}

Herbicide 2,4,5-T has been the subject of a number of Federal regulatory actions following its first registration in March 1948. Initially, regulation of 2,4,5-T came under the aegis of the United States Department of Agriculture (USDA). Subsequently this function was transferred to EPA. On April 13, 1966 USDA and the Food and Drug Administration (FDA) jointly announced in the Federal Register the abolishment of the “no residue and zero tolerance” concepts [of drug and chemical registration] as scientifically unattainable. Future registrations were to be granted on the basis of either “Negligible Residue” or “Permissible Residue.” Industry was given until December 31, 1967 to comply by obtaining tolerances for residues of 2,4,5-T in all treated food, feed


\textsuperscript{74} Id. at 17119.

\textsuperscript{76} Id. The average TCDD levels in Agent Orange used in South Vietnam was 2 ppm (96% of all herbicide used was Agent Orange) and approximately 32.8 ppm of Agent Purple and 65.6 ppm in Agents Pink and Green (comprising the remaining 4% of herbicides used), Congressional Research, supra note 10, at CRS-2.
products and byproducts. Following this announcement, a series of Pesticide Registration (PR) notices were issued over the next several years, extending certain "no residue" and "zero tolerance" registrations for uses of 2,4,5-T on pasture grasses and rangeland, apples, blueberries, cereal grains, rice, sugarcane, and in lakes and ponds. Subsequent PR Notices identified 2,4,5-T compounds as requiring further teratogenic studies. PR's 70-11 and 70-13, issued in April and May of 1970, however, suspended 2,4,5-T products from certain uses (e.g. on lakes, ponds or ditch banks and around the home and recreation sites), but PR 70-13 issued on May 1, 1970 cancelled (among other uses) all 2,4,5-T uses on food crops intended for human consumption.

With these last PR cancellations of registrations for 2,4,5-T food crop use, two of the registrants (who were two of the largest manufacturers of 2,4,5-T in the United States) Dow Chemical and Hercules Incorporated, exercised their rights under section 4(e) of the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA) by petitioning for referral of the cancellation to an Advisory Committee of scientists to review all relevant facts. The Advisory Committee met and submitted their report to the Administrator of EPA in May 1971, recommending:

permitted use of 2,4,5-T in forestry, range land and rights-of-way providing that the limit of 0.1 ppm contamination with TCDD be set for all future production of 2,4,5-T; that all 2,4,5-T be applied no more than once a year at any one site; and that 2,4,5-T be applied with proper caution so that it will not contaminate other areas where it may come into contact with humans.

Shortly thereafter, USDA published PR Notice 70-22 on September 28, 1970 advising of the presence of chlorodioxin contaminants (such as TCDD) in economic poisons (including herbicides

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76 U.S. Environmental Protection Agency, supra note 29, at 17124.
77 Id.
78 An agent or chemical is considered teratogenic when it causes development disturbances in the embryo resulting in congenital malformations. GAO Request 1979, supra note 11, at 20., USDA. 1970. PR Notice 70-8. Looseleaf pub. 1, p.
81 7 USC § 135 et seq. [hereinafter FIFRA].
82 Sec. 4(c) of FIFRA (1964 amendment) provides for a nine-member committee of scientists to consider all relevant facts, submit a report and recommendations regarding registration (or continuation). (Explained in EPA supra note 29, at 17124).
83 Id. at 17124, 17144 n.48.
and pesticides). It stated further, that such contaminants in 2,4,5-T constituted a possible hazard to man since they had been found to be extremely toxic to laboratory animals. This PR advised that appropriate regulatory action would be taken under FIFRA since products containing chlorodioxins were considered to be “in violation of FIFRA.”

Dow moved to protect one of its major markets—rice. They filed for injunctive relief in the District Court in Arkansas (an area heavily involved in rice crop production). They obtained injunctive relief against EPA in the United States District Court in Arkansas in July 1972, enjoining further administrative action against 2,4,5-T. The United States Court of Appeals for the Eighth Circuit overturned this injunction in April 1973, and EPA proceeded with formal cancellation hearings to remove the herbicide from the market. [Dow was not the complete loser in this action: they were successful in gaining nearly two years of delay in the suspension by their appeal].

Extensive public hearings were held during 1974 on all uses of 2,4,5-T including insecticides as well as herbicides containing 2,4,5-T. In June 1974, EPA decided that it would “continue its TCDD residue monitoring” since it didn’t have sufficient hard evidence that was needed to rebut the herbicide manufacturers and users (farm groups), and [to the shock of environmental groups] withdrew the proceedings. Although the 2,4,5-T Notice of Hearing was withdrawn, EPA advised that it would continue its TCDD residue monitoring and that it will take such further action as it deems appropriate once the results of the monitoring projects were available. EPA continued its review of 2,4,5-T in a

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88 USDA. 1970. PR Notice 70-22. Looseleaf pub. 1 p., and see EPA RPAR on 2,4,5-T, supra note 29, at 17124. 
89 (Dow Chemical Co. v. Ruckelshaus, 477 F.2d 1317, 1320 (8th Cir. 1973).
86 EPA, supra note 29, at 17124. (EPA Administrator for Toxic Substances, Steven Jellinek explained: “While laboratory studies have demonstrated that even such minute quantities of dioxin [as those present in the environment] could produce oncogenic, teratogenic and other reproductive effects in animals . . . the exposure link between the use of 2,4,5-T and these effects in human beings could not be demonstrated. The inability to generate reliable data relating to 2,4,5-T use to a measurable presence of dioxin made it difficult to determine whether the risks associated with the compounds’ use were unreasonable, and EPA therefore withdrew the proceedings.” June 1979 Congressional Hearings before House Commerce Committee, Subcommittee on Oversight and Investigations, quoted in Human Disease Linked to Dioxin: Congress Calls for 2,4,5-T Ban After Dramatic Herbicide Hearings, BIOSCIENCE VOL. 28, No. 8, August 1979, at 454 [hereinafter Dioxin Linked].
87 39 C.F.R. 24050. (June 28, 1974).
series of studies and conferences. They established a Dioxin Implementation Plan (DIP) which was intended to identify the preferable, analytical methodology for the monitoring of human and environmental samples for TCDD.88

During this time (1974-1979) the results of several TCDD “incidents” began to develop and corroborate, in an ominous manner, the dangerous toxicity to humans and animals of TCDD. In August 1972, in a horse arena in Eastern Missouri, 57 horses died shortly after exposure to arena turf that had been oil-treated. The cause of death was an illness characterized by skin lesions, severe weight loss and heptotoxicity. Birds, dogs, cats, insects and rodents were also found dead in and around the arena. One six-year old girl exposed developed epistaxis, gastrointestinal complaints, and severe hemorrhagic systitis (characterized by blood in the urine). Subsequent studies and investigations determined that the arena had been treated with surplus oil sludge that had been contaminated with TCDD (31–33.8 ppm).89

An explosion in a chemical plant in Seveso, Italy (near Milan) in July of 1976 exposed some 2,000 persons to TCDD as a toxic cloud drifted across approximately 5 km. x 700 m. of Italian countryside. Animals began to die two to three days after the incident with 1,100 animals killed by direct exposure to TCDD. A total of 37 cases of chloracne (skin lesions) were reported (primarily in children). Additional health data have been collected but have not been analyzed to the point that any conclusions can be drawn about the chronic effects of human exposure to TCDD. The data being developed as a result of the Seveso incident are quite controversial. Some scientists claim that there is a lack of reliable background data for the exposed area which will make evaluations difficult.90

The most recent incident occurred in the late 1970's in the mountainous area surrounding Alsea, Oregon. The women of Alsea, located near a National Forest which was heavily sprayed with 2,4,5-T, were experiencing miscarriages, complications of pregnancy, and delivery of malformed babies at a rate more than three times the rate that would be expected in a comparable pop-

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88 EPA supra note 29, at 17124.
89 USAF Herbicide Orange Report, supra note 6, at V-17, V-18; EPA, supra note 29, at 17123.
90 See for example Congressional Research, supra note 10, at CRS-4; Whiteside, supra note 34, at 65-130; USAF Herbicide Orange Report, supra note 6, at V-21.
ulation. The epidemiological study that followed confirmed: "a statistically higher incidence of spontaneous abortions (miscarriages) than women living in comparable [urban or rural] control areas where there is no known use of 2,4,5-T . . . . a significant correlation between the amounts of 2,4,5-T used in the study area during the spraying season and the subsequent increase in the spontaneous abortion index in the study area . . . ."92

The Alsea study has been cited as showing the first correlation between 2,4,5-T (and presumably its TCDD contaminant) and teratogenic effects in humans.93

With the evidence mounting, EPA on April 21, 1978 issued its Rebuttable Presumption Against Registration (RPAR) of pesticide products containing 2,4,5-T for certain uses. The Administrator, after weighing the risks and benefits as per 40 CFR § 162.11 for FIFRA determined that a: "rebuttable presumption exists against registration and continued registration of all pesticide products containing 2,4,5-T."94

The administrator found that all registrations for 2,4,5-T pesticide products containing 2,4,5-T and/or TCDD met or exceeded the level of risk of acute and chronic toxicity that EPA established for pesticides (under 40 CFR § 162.11(a) (3)) for teratogenic and/or fetotoxic effects, raising a rebuttable presumption against new or continued registration of such products [for forestry, rights-of-way and pasture uses]. He further found insufficient data and analyses available with respect to mutagenic effects in test animals and toxic effects on humans, to issue the rebuttable presumption with respect to those effects (but did indicate further and continued research for those areas).95 Request was made for any scientific material with respect to all aspects of 2,4,5-T. Within ten months EPA had assembled sufficient data to

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82 Environmental Protection Agency, supra note 91, at 15876.

83 CONGRESSIONAL RESEARCH, supra note 10, at CRS-4.

84 EPA, supra note 29, at 17116.

85 Id. at 17116-17117. Note that the burden of proof was shifted from the government (to prove why registration should not be continued or granted) to the manufacturer (to prove the safety of his product). This was done by the 1964 amendment to FIFRA. See Environmental Defense Fund v. Ruckelshaus, 439 F.2d 584, 593 (D.C. Cir. 1971) [hereinafter EDF v. Ruckelshaus].
make its decision: emergency suspension for "forestry, rights-of-way, and pasture uses." The most persuasive additional data flowed from the epidemiological studies of the Alsea, Oregon incidents. EPA concluded:

"the use of 2,4,5-T over a six-year period in the Alsea area was related to a statistically significant increase in the frequency of miscarriages by women residents of the area, and that these miscarriages occurred shortly after the use of 2,4,5-T in the area where the women lived."98

These emergency suspensions were carried out under FIFRA Section 6(c). The "emergency" was considered to exist because the EPA Administrator decided that "there was not enough time to complete a suspension hearing before the next spraying season."97

From this overview, one can see the similar paths between the military and civilian use of 2,4,5-T (and its associated dioxin): initial unbridled use, followed by some restriction as the evidence mounted, ending with complete suspension for all military uses and for many of the major civilian uses.

VIII. VETERANS' COMPLAINTS OF RESPONSES TO AGENT ORANGE EXPOSURE

The first reports of veterans' concerns over possible health effects of exposure to 2,4,5-T/dioxin began to trickle in in late 1977. The Veterans Administration (VA) began receiving herbicide-related compensation claims at this time,98 and increasing numbers

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98 Environmental Protection Agency, supra note 91, at 15874.
97 Id. The Administrator's definition and interpretation of "emergency" and "imminent hazard to the public" had previously been given judicial sanction by Chief Judge Bazelon who held such definitions to be "consistent with the statutory [FIFRA] language," EDF v. Ruckelshaus, 439 F.2d 584, 597 (D.C. Cir. 1971). When a pesticide registration is suspended, the sale of the compound in interstate commerce is halted immediately. When the intent to cancel registration is announced, the sale and use of the compound can continue pending review of the announcement as published in the Federal Register and appeals may further extend the cancellation date. The EPA may suspend a registration when, in the opinion of the experts, an immediate and/or imminent hazard in the registered use is involved. See McCullough, supra note 11, at 17 and McCarey, Pesticide Regulation. Risk Assessment and Burden of Proof, 45 GEO. WASH. L. REV. 1066, 1081 (1977).
98 Comptroller General, U.S. Ground Troops in South Vietnam Were in Areas Sprayed With Herbicide Orange, GAO REPORT FPCD-80-23, November 16, 1979, [hereinafter GAO Reports Troops Sprayed] at p. 2. (As of September 30, 1979, 750 persons had submitted claims but about 4,800 persons had requested treatment for
came forward in 1978 and 1979. Of the 450 claimants, some 255 of the veteran's complaints were generated in the Chicago area by the airing in March 1978 by Chicago CBS-affiliate WBBM of a one-hour television special: "Agent Orange: Vietnam's Deadly Fog." The VA is primarily concerned with the question of whether the herbicides used in South Vietnam could be affecting the veterans' health at the present time. The VA feels that news media reports as to the latent effects have precipitated a great deal of the concern by the veterans (as in Chicago). The news stories have mentioned health problems including: hand tremors, weight loss, diminished sexual drive, cancer, birth defects in offspring, a skin condition called chloracne, liver damage and psychological problems. As the veterans have actually come into the VA facilities they have added other complaints: respiratory problems, numbness in extremities, gastrointestinal tract disturbances and vision and/or hearing impairments. Following initial complaints of inept and inappropriate treatment at VA hospitals and complaints to Congressmen, the VA began immediate investigations on its own and the Subcommittee on Medical Facilities and Benefits of the Committee on Veterans' Affairs began its hearings. The VA's research confirmed the animal studies showing the impact of the highly toxic TCDD on laboratory animals: tissue edema; liver necrosis; gastric mucosal hypertrophy; gastrointestinal erosion; thymic and lymphatic atrophy. In addition the VA confirmed fetal toxicity, teratogenesis and tumor production reports from animal tests.

VA testimony by Dr. Paul Haber, Assistant Chief Medical Director, highlighted the internal steps taken by the VA to evaluate the possible causes and effects of Agent Orange exposure. The VA's position at the time of testimony on October 11, 1978 (after herbicide-related claims. Id. at 3.

99 CONGRESSIONAL RESEARCH, supra note 10, at CRS-8. Of the 450 claims as of September 1978, 255 of these claims were filed in the Chicago area following the WBBM CBS TV special Veterans Administration: Agent Orange and Vietnam Veterans (20 typical questions asked of the VA with answers about Agent Orange received by the Veterans Administration). VA INFORMATION SERVICE No. 063 dated 2-21-79. 6 p. V.A., Washington, D.C. 20420 [hereinafter VA Questions and Answers] at pp. 1-2.

100 Id.

101 CONGRESSIONAL RESEARCH, supra note 10, at CRS-8.

102 Agent Orange Furor Continues to Build, SCIENCE, VOL. 205, 24 August 1979, 770, 771 [hereinafter Orange Furor].

103 Veterans Hearings, supra note 17 and GAO REQUEST 1979, supra note 11, at 1.

104 Id. Veterans Hearings, supra note 17 at 23.
review of the human studies of industrial, agricultural and railroad workers who used herbicides, and epidemiological studies following industrial accidents in both Europe and the United States, as well as reports from Vietnamese citizens exposed to 2,4,5-T and dioxin) was:

The only human disorder which can definitely be linked to herbicide exposure is chloracne. The lesion may heal completely or result in scar tissue. Temporary symptoms can be produced after heavy exposure, including nausea, diarrhea, fatigue, anorexia, headaches, backaches, cutaneous sensory deficiency, impaired olfactory or gustatory sensation, tremors, and temporary focal muscle paralysis. These symptoms disappeared after a short period of time.105

The VA then began a series of administrative actions directed specifically toward the Agent Orange problems. First, the VA issued guidelines for its health care facilities and regional offices on how to handle veteran complaints on Agent Orange exposure. It then initiated internal studies, and it established three committees to work on the herbicide problems. An internal Steering Committee has been meeting since June 1978 to provide in-house internal guidance for both medical and administrative VA personnel. Assisting this committee is an interagency group known as the Interagency Committee on Herbicides. It functions as a factfinding advisory group and was developed to explore potential adverse health effects of defoliants, including symptomatology, methods for diagnosis and treatment, and approaches through which the VA might discover the adverse effects of defoliants used in South Vietnam on its patient population.106 Formation of a VA Advisory Committee on Health Related Effects of Herbicides was announced in June of 1979. This Committee is composed of 15 members from the scientific community, the academic community and from government. It will assist the VA in monitoring the VA’s continuing inquiry into the possible health effects of Agent Orange and resulting VA claims activities.107

105 Id.
106 GAO REQUEST 1979, supra note 11, at 10.
A.) VA Dioxin in Body Fat Study

One of the main medical concerns was to determine the persistence in body tissue of TCDD for protracted periods of time. The VA decided to conduct a brief, controlled investigation of 20 age and service-matched veterans, ten being individuals who had unquestionable exposure to Agent Orange during the Vietnam war and ten being veterans who have not knowingly had any exposure to this agent during their military service.\textsuperscript{108} Preliminary results of this small-scale epidemiological study were announced on December 12, 1979 by VA Dr. Lyndon E. Lee. Dr. Lee said that fat tissues had been taken from 33 men, including a control group who had not served in Vietnam. Results of these body-fat tissue studies showed that 22 of the 33 samples had been analyzed and dioxin was found in 10 of them. The amounts ranged from three to 57 parts per trillion, amounts so minute that ordinary test methods would not have detected them.\textsuperscript{109}

In January 1978, a joint National Institute of Environmental Health Sciences (NIEHS)/International Agency for Research on Cancer (IARC) ad hoc working group was convened to consider the feasibility of coordinating epidemiological studies on the long-term health hazards associated with dioxin compounds and certain other structurally related compounds (e.g. polychlorinated dibenzofurans).\textsuperscript{110}

B.) Defense Department Actions

In contrast to the increased and seemingly responsive reactions...
within most of the executive and legislative agencies described above (e.g. EPA, USDA, VA, NIEHS, IARC, HEW, GAO etc.), the Department of Defense was continuing to maintain its position that it did not know what the long-term effects of large acute doses of TCDD or small intermittent or chronic exposures were. It asserted that:

The handling, transport and storage procedures employed for the herbicide generally precluded physical contact with the herbicides by most military personnel assigned to Operation Ranch Hand. The methods employed in spraying herbicides and the geographical areas designated for dissemination of the herbicides generally precluded direct physical contact with the herbicide by military personnel assigned to other programs.

The GAO, as the investigatory arm of the Congress, did not accept the above conclusions. But Defense doubted that a retrospective epidemiological study would produce reliable results because of the 17-year lapse from the beginning of the herbicide operations and the general lack of data on exposure concentrations and times, and concluded that identification of an appropriate control group would be "virtually impossible." Despite these doubts, GAO urged Defense to conduct such a study. Presently such a study of the Air Force personnel involved in Operation Ranch Hand is now in the protocol planning stage (by the NAS

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111 Id. See also USAF HERBICIDE ORANGE REPORT, supra note 6, at pp. VI-29, V-30.

In summary, the USAF Report concluded:

(1). If there is not a history of chloracne, it is highly unlikely that systemic changes will be due to TCDD.

(2). The presence of active chloracne months to years after exposure does not necessarily mean continuing exposure.

(3). Skin lesions of porphria cutanea tarda are independent of those associated with chloracne.

(4). The development of porphria cutanea tarda following exposure to TCDD suggests an adverse liver response to the TCDD.

(7). Claims of carcinogenesis, teratogenesis, and mutagenesis in man have not been confirmed at this time for the phenoxy herbicides or TCDD. However the topic remains open.

(9). The long-term effects of large acute doses of TCDD or small intermittent or chronic exposures are not known. Id.

112 USAF HERBICIDE ORANGE REPORT, supra note 6, at I-31 (emphasis added).

113 The Department of Defense, with the assistance and guidance of an appropriate interagency group, should conduct a survey of any long-term medical effects on military personnel who were likely to have been exposed to herbicides in South Vietnam. GAO REQUEST 1979, supra note 11, at 27.

114 Id. at 27.
and the Air Force Scientific Advisory Board and the Armed Forces Epidemiological Board). By use of computer tapes (known as the "HERBS TAPES" - computer tapes containing data on the date, number of planes, amount of herbicide dropped, and the location for approximately 86 percent of all herbicide missions in South Vietnam), the GAO was able to compare this data base with daily troop locations and strengths and estimate the number and proximity of troops to herbicide missions (however, actual exposure could not be documented from available records). Unfortunately, "Army records from the Vietnam conflict are neither complete nor well organized. This results from the Army's rapid pullout from Vietnam." In contrast, "Monthly Marine Corps battalion reports contained detailed information on location, strength, and personnel turnover necessary to develop a data base to compare with the herbicide orange spraying missions [GAO] compared ground troop locations with herbicide orange missions [and] estimate that about 5,900 Marines were assigned within 0.5 km. of areas sprayed with herbicide orange on the same day . . . the number of Marines within 0.5 km. of the sprayed areas before the four-week reentry period which DOD established was about 16,100 . . . ." [N.B. These GAO conclusions are — justifiably — extremely critical of the gross underestimates of the Department of Defense and the USAF (in its 1978 Report) as to the number of military personnel potentially exposed to Herbicide Orange (i.e. some "few" of 1,200 Operation Ranch Hand Personnel (DOD) vs. virtually all of 16,100! (GAO)). One cannot help but view the 1978 Air Force Study in a far more critical light in view of these GAO findings].

IX. RELIEF FOR AFFECTED AGENT ORANGE VETERANS

A.) Possible Legislative Action

Possible legislative assistance to potential Agent Orange victims was recently announced in October 1979 by a bipartisan congressional group from the 96th Congress. This group urged broader assistance in health care benefits (among other aids) to Vietnam

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118 This protocol planning stage was expected to be completed in January 1980. GAO Reports Troops Sprayed, supra note 98, at 3.
116 Id. at p. 5.
117 Id.
118 Id. at p. 8.
veterans. The bill urges compensation to Vietnam veterans and their families who suffered health problems after exposure to Agent Orange. In addition, several bills have been introduced in the 96th Congress (1st Session) which were to extend and revise a program of grants to State homes for veterans and to extend and expand a program of exchanges of medical information. Somewhat companion bills (S.1039 and H.R. 3892) have begun the hearing process with their respective Committees on Veterans' Affairs.

B.) Litigatory Response to Agent Orange

Two lawsuits have been filed on behalf of the alleged Agent Orange victims, both in United States District Courts, but each seeking differing types of relief: a private class action suit for damages against the manufacturers of 2,4,5-T in products liability; the other, a public interest class action suit for injunctive relief to force the VA to go through a formal public rule-making procedure regarding its policies governing claimants for Agent Orange disability.

1.) Private Damage Suit, District Court, Eastern District of New York

The first suit filed in the Eastern District of New York was filed by Victor J. Yannacone, Jr., a longtime environmental lawyer. As co-founder of the Environmental Defense Fund (EDF) Yannacone earlier led the fight against DDT in the late 1960's and defined many of the basic concepts of environmental law. The suit, initially with plaintiff Paul Reutersham (since deceased from cancer), was filed against the major manufacturers of 2,4,5-T in the United States: Dow Chemical; Hercules Incorporated; Diamond Shamrock Corporation; Monsanto Company and Thompson-Hayward Chemical Company. The action was brought as a


120 S. 1039 and H.R. 3892 (Calendar No. 219) of 96th Congress, 1st Session, Clerk of the House and Clerk of the Senate, United States Congress, Washington, D.C..

121 Orange Furor, supra note 102, at 770.


123 Reutersham v. Dow Chemical (D.C. E.D. N.Y., 1979) (Docket No. 79C 1195) subsequently recaptioned: IN RE "AGENT ORANGE," Multidistrict Litigation (MDL) No. 38
class action on behalf of the veterans, their wives, children and parents and has now become consolidated with a number of other similar class action cases filed across the country to become a multi-district litigation case titled: “Agent Orange Product Liability Litigation.” The suit attempted to invoke statutory causes of action under the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA), the Federal Environmental Pesticide Control Act (FEPCA), the Toxic Substances Control Act (TOSCA) and the Consumer Product Safety Act (CPSA). Product liability (inherently dangerous product) causes include: strict liability; negligence and breach of warranty; intentional tort; and in addition requests equitable relief, with a cause in nuisance and for declaratory judgment. In sum the suit asks for:

1. An immediate ban on all advertising, promotion, distribution, marketing and sale of the contaminated herbicides;
2. A declaration that the corporate defendants are trustees of the public health and safety and welfare with a fiduciary responsibility to the public;
3. A disclosure of everything [that] the companies knew about the dangers of the contaminated herbicides; and
4. Establishment by the [defendant] companies of a tax-exempt reserve fund sufficient to cover damages from the use of the herbicides (to reimburse the VA and the Social Security Administration for benefits, compensate victims and their families and protect consumers from any attempt to pass along the cost of damages from resulting use of utility and railroad rights of way).

This Agent Orange litigation may be expected to be innovative in several respects: (1) the establishment of a federal common law for negligence and product liability (2) denial of any “private” cause of action from the toxic chemical statutes (3) establishment of a trust fund for the class recovery (4) extension of the tort recovery under “enterprise liability” and, (5) the unique argu-

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(1979) [hereinafter In Re “Agent Orange”] (See Rules of Procedure of the Judicial Panel on Multidistrict Litigation).

124 Id.


128 In re “Agent Orange”, supra in Plaintiff’s Third Amended Verified Complaint, at 18-22.
ment for the establishment of a class “at risk.” (This class would consist of living veterans without [current] symptoms, but at risk of genetic and somatic damage).\textsuperscript{127}

a). Establishment of “Federal Common Law” for Negligence/ Product Liability

Of major significance to the practice of negligence and product liability law in the federal courts is the establishment of a “federal common law.”\textsuperscript{128} The plaintiffs argued successfully that the corporate defendants (Dow et al) have allegedly violated the “common law . . . of the United States . . . .” Judge George C. Pratt, the Agent Orange trial judge in the Eastern District of New York held that the litigation affects substantial federal interest and that federal common law must be applied. The Court, using Miree \textit{v. DeKalb County}, 433 U.S. 25 (1977) and Wallis \textit{v. Pan American Petroleum Corporation}, 384 U.S. 63 (1966), synthesized the three factors crucial to the applicability of federal common law under any test: “(1) the existence of a substantial federal interest in the outcome of the litigation; (2) the effect on this federal interest should state law be applied; and (3) the effect on state interests should state law be displaced by federal common law.”\textsuperscript{129}

i) Substantial Federal Interest.

The Court found a substantial federal interest in soldiers serving in the armed forces, finding them to be “government charges”, entitled to government protection. Further, torts committed by war contractors against soldiers in action constituted “harms inflicted” on the soldiers and “interference” with the relationship between soldiers and the government, citing United States \textit{v. Standard Oil}.\textsuperscript{130} The Court struck down the defendant’s

\textsuperscript{127} Id. at 5. This “class” would include those veterans who served in South Vietnam and who were exposed to Agent Orange, yet do not presently evidence symptoms of dioxin-related medical problems.

\textsuperscript{128} Decision of Judge George C. Pratt, (E.D.N.Y., MDL No. 381, November 20, 1979) [hereinafter District Court Finding of Federal Common Law], at p. 12.

\textsuperscript{129} Id. at p. 17.

\textsuperscript{130} 332 U.S. 301, 305-306 (1947).

Perhaps no relation between the Government and a citizen is more distinctively federal in character than that between it and members of its armed forces. To whatever extent state law may apply . . . the scope, nature, legal incidence and consequence of the relation between persons in service and the government are \textit{fundamentally derived}
argument that VA benefits\textsuperscript{181} provided adequate federal protection to veterans injured in active service, discounting the limited monthly benefits which may not fully compensate and the fact that 38 USC § 310 \textit{et seq.} provided no compensation to veterans' spouses or their children who have allegedly suffered genetic damage due to the defendant's activities. Judge Pratt further held that the "federal interest" was not limited to the rights of the soldiers, but extended to the liability of war contractors which would undoubtedly affect future dealings between the contractor and the government.

The Court was careful to limit its holding saying that by permitting it in \textit{this} case, it does not mean that there is a substantial federal interest \textit{in every product liability suit brought by a veteran against a government war contractor}:

A lone veteran suing the supplier of a single piece of defective military machinery would implicate only a minimal federal interest . . . But this litigation, in contrast, involves suits by many veterans against five war contractors who supplied a product used for some nine years in military operations across a large portion of Vietnam. The estimated number of involved veterans ranges from thousands to millions, and the estimated potential liability of the five war contractors ranges from millions to billions of dollars. As the number of veterans and the size of the claims against the war contractors increase, so the federal interest in this litigation expands.\textsuperscript{188}

\textbf{ii) Effect on Federal Interests Should State Law Be Applied}

Were Agent Orange litigation governed by state law, the Court found that different state laws would be applied to essentially similar claims by Vietnam veterans and their families against the five different war contractors. It further held that application of varying state laws would burden federal interests by creating uncertainty as to the rights of both the veterans and the war contractors.\textsuperscript{188} Judge Pratt concluded that portion of his decision by saying that the application of state law in the litigation would

\textsuperscript{181} 38 U.S.C. § 310 \textit{et seq.}

\textsuperscript{188} \textit{Supra} note 128 at pp. 19-20 (citations omitted).

\textsuperscript{188} \textit{Id.} at 21. The Court cited the extreme example where the application of different state statutes of limitation to claims by veterans who were injured together in Vietnam, but who lived in different states before or after service.
burden substantial federal interests.184

iii) Effect on State Interests Should State Law Be Displaced By Federal Common Law

The United States Supreme Court’s caution on state law displacement by federal common law enunciated in DeKalb, supra, was noted: “... the issue of whether to displace state law on an issue such as this is primarily a decision for Congress.”185

The Agent Orange defendant war contractors argued that it would be improper to hold that “state law be displaced by an unprecedented federal common law of products liability.”188 In rejecting this argument, Judge Pratt held that the negligence and strict product liability claims of the Agent Orange litigation did not fall under the developed body of state tort law, holding that “state tort law has not yet evolved rules to govern the duties of federal war contractors to soldiers”, distinguishing Whitaker v. Harvel-Kilgore Corporation, Boeing Airplane Company v. Brown and Adams v. General Dynamics Corporation.137 As to the displacement issue, the Court concluded:

State law has not considered the complex question of a war contractor’s liability to soldiers injured by toxic chemicals subject to federal regulation while engaged in combat and serving abroad. Because state law is no more or less developed as to such claims than federal common law, application of federal common law thereto would not significantly displace state law.188

This precedent-setting aspect of the Agent Orange litigation evoked a rapid appeal by Dow and the other corporate defendants. The Second Circuit has indicated that it will give an early hearing to this important issue.189 Judge Pratt’s federal common law decision has now been adopted by the Third Circuit in Jaffe v. United States.140 With a two-judge panel citing it with ap-
proval, it would appear that the Second Circuit may be hard pressed to overturn their own District Court’s ruling on this issue.141

b.) Denial of Implied Private Cause of Action for Toxic Chemical Injuries

The plaintiff’s argued that a “private” cause of action existed “that could be implied” from the four toxic substance related statutes (FEPCA, FIFRA, TOSCA and CPSA) under the aegis of 28 USC § 1331.142 In rejecting this argument, the Court pointed out that FIFRA, as amended by FEPCA, treats defoliants as “pesticides” which has led the parties to refer to 2,4,5-T as a pesticide, although common usage would undoubtedly categorize 2,4,5-T and other defoliants as herbicides and not pesticides. Because of FIFRA, the other two statutes by which the plaintiffs sought to imply a private right of action, TOSCA and CPSA, were held specifically inapplicable to the litigation, both having specific exclusions as to “any pesticides” (within the statutory definition as set forth in FIFRA and FEPCA) from coverage by the respective acts.143 With FIFRA, as amended by FEPCA, the only remaining statutory base for an “implied private cause of action”, the Court after analyzing the four tests used by the Supreme Court in Cort v. Ash,144 concluded: “a private cause of action should not be read into FIFRA, or any other toxic chemical statute, and that the plaintiffs’ claims asserted thereunder must be dismissed.”145

141 Decision by Circuit Judge John J. Gibbons, concurred in result by Circuit Judge A. Leon Higginbotham, Jr.
142 Plaintiff's Third Amended Verified Complaint, MDL No. 381, filed 79-10-15 [herein­after TAVC] at p. 2.
144 422 U.S. 66, 78 (1975).
In determining whether a private remedy is implicit in a statute not expressly providing one, several factors are relevant. First, is the plaintiff “one of the class for whose especial benefit the statute was enacted [citation omitted] that is, does the statute create a federal right in favor of the plaintiff? Second . . . legislative intent, explicit or implicit, either to create such a remedy or to deny one? [citation omitted]. Third, is it consistent with the underlying purposes of the legislative scheme to imply such a remedy for the plaintiff? [citations omitted] And finally, is the cause of action one traditionally relegated to state law, in an area basically the concern of the States so that it would be inappropriate to infer a cause of action based solely in federal law?
c.) Establishment of a Trust Fund for the Class Recovery

The plaintiff's lead attorney bases his trust fund theory on what he describes as the basic fiduciary obligation of a corporation that is marketing a dangerous product to set aside moneys to compensate potential victims of its products. With no legal precedent, per se, the plaintiffs turned to the insurance industry and the methodology of retrospective risk assessment. Any insurance company on a new type of risk will do what is called retrospective risk assessment. This involves more than a mere judgment call of a claims underwriter. In the early years of a risk that is insured an amount is set aside which, in the best judgment of the insuror, will cover the expected costs to cover the claims for that year. At the end of the first year of operation of the risk industry, the insuror reviews the incurred losses and adds a loading constant, which is a factor for overhead, and then divides by the number of premium payors and comes up with a "premium." Most carriers look back over a prior three-year period of assessment and then compute the risk. In essence, it becomes a "moving average." Plaintiffs' attorney Yannacone explained that in the Agent Orange litigation, it is assumed that there will be a certain number of cases of say, cancer, which will become evident following some seven to twenty years of latency after exposure in South Vietnam. A trustee administered claims organization, working under the supervision of the court (or a specially appointed Master), would wait for the claims to be adjudicated in a certain year. The defendants would then pay into the trust fund (assuming arguendo that liability is found) an amount sufficient to cover the claims so adjudicated. The following year a like computation would be made. At this point, the retrospective risk assessment system would be implemented and used in the future to cover the unknown number of claimants (both service-persons as well as the children in the class) who are argued to be "at risk"—members of the class whose symptoms have not as yet surfaced. The plaintiffs proposed that compensatory damages would be paid out on an annuity basis to cover the costs of treatment as received. Pain and suffering or punitive damages (if awarded) would be paid out separately by means of lump sum payments. The plaintiffs estimate that the bulk of damages (if successful) would be in the

146 Author's interview, supra note 139.
147 Supra note 127.
form of compensatory damages.

If such a trust fund system is approved by the Court, it would answer many of the criticisms of increased product liability awards as being crippling to American industry. Attempts have been made in the past by major corporate manufacturers to establish private reserve funds to cover potential product liability. These, however, have been held taxable by the IRS. This has had the effect of reducing the amount of money available for corporate dividends. Stockholders would not be enthusiastic over the prospect of reduced corporate dividends, particularly when advised of the “dangerous product” basis for setting such a reserve aside. As an alternative, several large corporate manufacturers attempted to set up off-shore insurance companies (in the Bahamas etc.), and the IRS recently held that such wholly-owned insurance companies whose main client was the parent corporation were in effect “subsidiaries” of the parent corporation and thus subject to pre-tax assessment as another form of a reserve fund.148 If the trust fund concept of damage payment is approved by the Court, it would be a court-supervised trust fund and thus tax-exempt.

The trust fund would be administered so that liability claims against the fund would be limited (as a maximum) to the claims that could be paid from the fund for any one year. Were additional claims adjudicated in excess of the amount held in trust for that year, they would be held over and assume a priority for payment from the next year (in a similar manner to admiralty and other in rem claims payments).

The plaintiffs concede that it would be difficult for corporate defendants (even of the size of Dow, Hercules et al) to set aside a reserve under normal techniques of damage payment, adequate to cover the potential of future “at risk” claims. However, by use of annuity payments and the trust fund concept, the corporate defendants could cut the reserve value from a figure possibly in the area of 20 billion dollars, to a commuted value of two or three billion, thus making such a recovery manageable and within the realm of feasibility.

Each of the corporate defendants have affirmatively pleaded “set-off” to all payments received by the plaintiffs from collateral sources (VA, Social Security/HEW and DOD benefits).149 The

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149 Defendant Dow Chemical’s Answer to Plaintiffs’ Third Amended Verified Com-
plaintiffs, acting as private attorneys general, have asked for reimbursement by the trust fund for such payment, thus being a form of subrogation on behalf of the United States against the trust fund.

d.) Extension of Enterprise Liability

Anticipating causation and proof problems as to which particular herbicide, manufactured by which particular manufacturer caused a particular plaintiff class member's injuries, the plaintiffs have argued for extension of the enterprise liability theory to cover the causation and proof problems. Similar causation/proof problems have been litigated in other industries. One of the primary cases was the blasting cap case Hall & Chance v. Du-pont decided by Judge Weinstein in the Eastern District of New York. Those cases permitted recovery against the entire blasting cap industry, premised on enterprise liability (the nature of explosion of a blasting cap is such that no evidence remained from which a determination could be made as to which particular manufacturer produced the defective cap). More recently in In re Beverly Hills Fire Litigation, the Federal District Court for the Eastern District of Kentucky ruled the entire aluminum wiring industry liable for damages resulting from the disastrous Kentucky nightclub fire.

The Second Circuit in Ezaqui v. Dow Chemical Corporation in distinguishing Ezaqui from the principles of Summers v. Tice intimated that it accepts enterprise liability as the law of the Second Circuit. If that is so, it would appear that many of the


Plaintiffs' Rejoinder Memorandum Supporting Class Certification, December 21, 1979, MDL No. 381 (E.D.N.Y. 1979) at p. 12.


598 F.2d 727 (2d Cir. 1979).

Summers v. Tice, 33 Cal. 2d 80, 199 P.2d 1 (1948), case involving two hunters who simultaneously shot injuring third hunter (plaintiff), holding that where plaintiff has shown fault on the part of two or more defendants, and there is equal probability that either defendant caused the injury, the court will shift to the defendants the burden of showing exoneration from liability.
usual proximate cause issues as to which particular manufacturer made the particular damage-causing herbicide would be moot.

e.) Establishment of An “At Risk” Class

One of the unique arguments arising in this litigation is the establishment of an “at risk” series of sub-classes within the Class Action (under FRCP 23). These sub-classes would include veterans without current symptoms, but at risk of genetic and somatic damage, and veterans’ children at risk of genetic damage. Thus the “at risk” class may potentially contain as yet unborn children. At this time, scientists do not know if such injuries will be by autosomal dominant genes or autosomal recessive genes. If experience and further scientific research prove the genetic damage alleged to be caused by autosomal dominant genes, then its effects would be expected to die out within one generation (thus reducing the future size of the “at risk” class). If however, it is found to be autosomal recessive genetic damage, this means that it could be carried into succeeding generations, thus expanding the “at risk” class.

f.) United States Joined as Third-Party Defendant

In January 1980, Dow Chemical Company filed a third-party complaint under the Federal Tort Claims Act, 28 U.S.C. 1346(b) and 2671 et seq., seeking to join the United States, DOD, each of the Armed Services, USDA, HEW, Interior and the VA as third-party defendants. In sum, Dow alleges that it manufactured the herbicides to the USA’s direct specifications; Dow alleges inability to control the methods and amount of Agent Orange used; that it was misused (by excessive sprayings) over the objections of the manufacturer(s), and, as a result of the United States’ negligence in use and misuse and failure to warn the potentially exposed service persons, that if the defendants are found liable, then the United States government must indemnify or contribute all amounts that the defendant manufacturers are required to pay (as a result of the class action). This appears to be a classic

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186 TAVC at pp. 6-7.
186 E.g., see generally McKusick, Victor A., Mendelian Inheritance in Man, (5th ed. 1978).
third-party joinder, typical of such products liability litigation. It may be anticipated that the Government will move for dismissal as a third-party. In all probability this motion for dismissal will be based upon several of the immunities or exclusions of the Federal government as contained in the Federal Tort Claims Act, supra, the Tucker Act,\textsuperscript{158} the Defense Production Act,\textsuperscript{159} or under the Feres' doctrine.\textsuperscript{160}

2.) Public Interest Suit, United States District Court for the District of Columbia

The second major Agent Orange litigation has been filed by Mr. Lewis Milford, Deputy Director of the National Veterans Law Center at American University, a public interest law clinic. This suit was filed in May 1979 in the District Court for the District of Columbia. It is also filed as a class action (similar to the product liability suit, supra), but includes three non-profit veterans organizations in addition to the eight named plaintiffs (injured veterans). These three plaintiff veteran organizations include The National Association of Concerned Veterans (NACV), Agent Orange Victims International (AOVI), and Concerned American Veterans Against Toxins (CAVEAT).

Named as defendants are Max Cleland, Administrator of Veterans Affairs of the VA and the Veterans Administration \textit{per se}. The complaint does not ask for damages, but is a complaint for declaratory and injunctive relief framed in the constitutional requirements for due process, challenging the VA's failure to publish in the \textit{Federal Register} and conduct "... a rulemaking proceeding allowing public notice and comment regarding ... [VA] rules that established procedures and substantive criteria for determining whether a veteran who applies for [VA] disability benefits should receive such benefits based on exposure to herbicide Agent Orange while performing military service in Vietnam."\textsuperscript{161}

Plaintiffs rely upon the requirements for notice and due process as set forth in the Administrative Procedures Act (APA), 5 U.S.C.

\textsuperscript{158} The Tucker Act, 24 Stat. 505.
\textsuperscript{159} The Defense Production Act, Title 50, Appendix § 2061 et. seq.
\textsuperscript{161} White v. Cleland, D.C. Civil Action No. 79-1426, at I-29 (Filed May 31, 1979), [hereinafter \textit{White v. Max Cleland and VA}].
§ 553 et seq., the VA’s regulations (38 CFR § 1.12 et seq.) and the Freedom of Information Act (FOIA), (5 U.S.C. § 552(a)(1)).

X. CONCLUSION

Agent Orange and its associated military and civilian herbicides containing 2,4,5-T with the contaminant dioxin have had far-reaching impacts. These herbicides were obviously utilized before the full ramifications of their use and effects were sufficiently known. The complex panoply of the scientific community, the academic community and various political factions (many of which were opposed to the United States involvement in Indochina) combined initially to lead to the herbicides’ military usage being curtailed and then completely terminated, followed shortly thereafter, as the scientific body of evidence grew, to curtailment in many domestic and civilian usages. This use of herbicides caused major diplomatic changes for the United States and eventually led to renunciation of first-use of military herbicides as a national policy and the signing of the Geneva Protocol of 1925.

Of the two major class-action suits flowing from Agent Orange, the multidistrict litigation suit may very possibly end up involving nearly a hundred federal district courts across the country (e.g. for final determination of individual damages for each of the individual plaintiffs, once liability was proven in the Multi-District-Litigation [MDL] Court). It may well be precedent-setting in the negligence and product liability areas of the law in the present decision of the trial court establishing federal common law in those areas (currently expected to be heard by the Second Circuit). The Eastern District of New York (and almost certainly the Second Circuit) will have to pass upon the unique “at risk” concept for a class of plaintiffs. These class members, it is argued, were presumably exposed to the toxic substance dioxin, yet have

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168 APA - 5 U.S.C. § 553 requires: (1) written notice [of proposed rule making] in the Federal Register; (2) opportunity to participate; (3) notice of not less than 30 days; and (4) right to petition for issuance of amendment or appeal of the rule.

VA Regulations [regarding Public Participation in Regulatory Development], 38 CFR § 1.12 has similar notice and due process requirements for VA Rule Making: General Notice [of proposed VA regulations] must be published in the Federal Register; receive written comments and opportunity to participate unless exception [to public participation] is authorized by the VA Administrator or Deputy when concurred in by General Counsel [of the VA].

not as yet developed visible symptoms of their exposure. One may anticipate the use of such an "at risk" concept (if it is accepted by the MDL Court and the Second Circuit) in a host of other product liability contexts, particularly in the drug or other "inherently dangerous" product fields. There is the possibility, however, that the District Court may defer to the legislature in solving the problems of the victims of Agent Orange exposure. A little-discussed, yet ever-present element of the litigation is its international impact. If the present Agent Orange MDL litigation remains viable and, assuming arguendo that liability were to be found against some or all of the defendants (possibly including the United States government), then this may open the door to a series of litigatory or diplomatic issues, either in the United States or before one or more of the world tribunals (i.e. the International Court of Justice, the United Nations, etc.), including possible war damage claims by Vietnamese persons exposed.

As the body of scientific knowledge grows and definitive data on teratogenicity, mutagenicity, fetotoxicity, and carcinogenicity confirms or denies the sometimes hysterical claims (both ways) as to 2,4,5-T and dioxin, we may anticipate the possibility of greater constraints on the use of 2,4,5-T and increased refinement in both its manufacture and in tests and protocols to detect its presence.
### Table 1

COMPARATIVE TOXICITY OF SEVERAL HERBICIDES

<table>
<thead>
<tr>
<th>Herbicide</th>
<th>Toxicity a</th>
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<tbody>
<tr>
<td>2,4-D butyl ester (Agent Pink, Green)</td>
<td>LD 50 * (orally in mice) 375 mg/kg</td>
<td>LD 50 (rats)— 400-500 mg/kg</td>
</tr>
<tr>
<td>2,4,5-T**</td>
<td>LD 50 (orally in rats) 300 mg/kg</td>
<td>LD 50 (rats)— 300 mg/kg</td>
</tr>
<tr>
<td>Cacodylic acid (Agent Blue)</td>
<td>LD 50 (s.c.) (in dogs) 1.0 g/kg</td>
<td>LD 50 (rats)— 830 mg/kg</td>
</tr>
<tr>
<td>Picloram (Agent White)</td>
<td>LD 50 (orally in mice) 2.0-2.0 g/kg</td>
<td>LD 50 (rats)— 8.2 g/kg</td>
</tr>
</tbody>
</table>

* LD 50 — An acute dose which is fatal to 50 percent of test animals.

** N.B. Agent Orange is a 50:50 mixture of 2,4-D and 2,4,5-T.