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Agent Orange Investigative Report Series, No. 11

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ALLEGATIONS AND IMPLICATIONS THAT AGENT ORANGE INTENTIONALLY CONTAINED HIGH LEVELS OF DIOXIN

Compensation Service

Department of Veterans Affairs

810 Vermont Ave., NW

Washington, DC 20420

A. L. Young Consulting, Inc.

Alvin L. Young, PhD

Kristian L. Young, MA

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A. L. Young Consulting, Inc.
1810 Tranquility Road
Cheyenne, WY 82009-2903
307-638-6279
youngrisk@aol.com

September 30, 2013
Mr. Michael D. Pharr
Contract Officer's Representative
Compensation Service
Department of Veterans Affairs
810 Vermont Ave., NW
Washington, DC 20420

Dear Mr. Pharr,

Please find attached to this letter the Final Report: **Allegations and Implications that Agent Orange Intentionally Contained High Levels of Dioxin.** This report is the eleventh of many reports that will be prepared in fulfillment of Contract VA-101-12-C-0006, *Development of an Archival Directory of Agent Orange Documents.* The Investigative Reports are supported by the archival research. The goal of developing the Directory is to search and identify the thousands of documents, reports, and correspondence located within our National Archives and Records Administration and other document repositories that relate to the use of "Tactical Herbicides", including Agent Orange, *outside of Vietnam.* Using documents from the repositories, reports are prepared on topics requested by Compensation Service.

In the case of this unusual report, the Compensation Service has previously challenged a source of misinformation that is repeatedly cited by the news media and blogs until it has become accepted as historical fact. Thus, this report is part of an effort by the Department of Veterans Affairs to correct an oft repeated assumption that the dioxin levels in Agent Orange were not only extremely higher than commercial products of that period, but also that these levels were manipulated to be higher, even with the intent of deliberately impacting the health of those supposedly exposed to dioxin laden Agent Orange.

In a 1988 letter sent to a Member of Congress by a former Air Force scientist allegations were made: that the Department of Defense was aware as early as 1967 that chemical defoliation was of limited effectiveness in Vietnam; that scientists in the Department of Defense in the 1960s were capable of manipulating and thus increasing the dioxin concentrations in the 'military formulations'; that the Department of Air Force was already aware in the 1960s of the potential for damage (*presumably soft tissue sarcomas and non-Hodgkin's lymphoma)* due to dioxin contamination in the herbicide, and thus, knew that Agent Orange was far more hazardous to the health of humans than anyone would admit at the time; and, that the Department of Defense had intended Agent Orange to be only used on the "enemy", not on our own troops, but our troops had been frequently sprayed. A review of the historical records and scientific information surrounding the selection and use of Agent Orange in Vietnam disproved each of these allegations.

Sincerely,

Alvin L. Young

Alvin L. Young, PhD
Professor of Environmental Toxicology
Colonel, USAF (Retired)

DISCLAIMER FOR VA REPORTS

The conclusions reached in this report are based upon a comprehensive review of the historical records maintained in the publicly available files of the National Archives and Record Administration, and other archival repositories. However, the conclusions reached do not necessarily represent those of the Department of Veterans Affairs or any other Department or Agency of the United States Government.

This report is part of the Agent Orange Investigative Report Series, and should be considered as an amendable or living document. If additional authenticated documents or records are found that address the topic of this report, a re-evaluation of the conclusions may be necessary.

ALLEGATIONS AND IMPLICATIONS THAT AGENT ORANGE INTENTIONALLY CONTAINED HIGH LEVELS OF DIOXIN

EXECUTIVE SUMMARY

For more than 30 years, the controversy over the use of Agent Orange in Vietnam has generated thousands of articles in the media and the blogosphere. Many of these articles have provided factual information for the Vietnam veterans, Vietnam-Era veterans and the public. Unfortunately, the vast majority of these articles have become a source of misinformation that is repeatedly cited by the news media and blogs until they become accepted as historical facts. All too often, this misinformation is not challenged by the historian, the scientist, or the government agencies impacted by it. This report is part of an effort by the Department of Veterans Affairs to correct an oft repeated assumption that the dioxin levels in Agent Orange were not only extremely higher than commercial products of that period, but also that these levels were manipulated to be higher, even with the intent of deliberately impacting the health of those exposed to supposedly dioxin laden Agent Orange.

In a 1988 letter sent to a Member of Congress by a former Air Force scientist it was alleged: that the Department of Defense was aware as early as 1967 that chemical defoliation was of limited effectiveness in Vietnam; that scientists in the Department of Defense in the 1960s were capable of manipulating and thus increasing the dioxin concentrations in the 'military formulations'; that the Department of Air Force was already aware in the 1960s of the potential for damage (*presumably soft tissue sarcomas and non-Hodgkin's lymphoma*) due to dioxin contamination in the herbicide, and thus, knew that Agent Orange was far more hazardous to the health of humans than anyone would admit at the time; and that the Department of Defense had intended Agent Orange to be only used on the "enemy", not on our own troops; our troops were frequently sprayed.

The author/source of these allegations, Dr. James R. Clary, seems not only to have provided misinformation but possibly exaggerated and distorted his knowledge of the history of the use of herbicides in Vietnam. A review of the historical records and scientific information surrounding the selection and use of Agent Orange in Vietnam has disproved each of his allegations. The concentration of dioxin (TCDD) in the Orange formulation was first determined in 1973, and that the levels of TCDD in the 2,4,5-T used in the production of Agent Orange were the same as in the 2,4,5-T commercially used in American agriculture. The safety of this dioxin contaminated herbicide in Agent Orange was established during a

period of more than 30 years of use worldwide. This safety was reaffirmed by the results of the 20-year epidemiologic study of the men of Operation RANCH HAND. Lastly, the historical records provided evidence that the oversight and restrictions placed on defoliation missions in Vietnam minimized the exposure of Allied troops to Agent Orange.

INTRODUCTION

Various media and blogosphere articles repeatedly make allegations concerning the intentionally high dioxin content of Agent Orange and its health dangers [1]. The source of these allegations is attributed to an Air Force scientist in a letter sent to a member of Congress in 1988. The following is the source document and description of the author, and the quote that is in the Congressional Record:

Congressional Record, 101st Congress (1989-1990), Page S16541

Agent Orange: Ten Years of Struggle (Senate – November 21, 1989)

The Honorable Tom Daschle: "*I have a letter from Dr. James Clary, an Air Force scientist who served in Vietnam, saying that he and others involved in writing the history of Operation RANCH HAND, the operation that involved the actual spraying of Agent Orange, knew that Agent Orange was harmful at the time it was used."*

Statement in the Clary Letter:

"I was the scientist who prepared the final report on RANCH HAND: Herbicide Operations in Southeast Asia, July 1971, while assigned to the Department of Life Sciences, USAFA, after completing my work in Vietnam." *The Congressional Record notes that Dr. Clary commented on dioxins increasing the number of veterans who have (or will have) soft tissue sarcomas (STS) and Non-Hodgkin's lymphoma (NHL).* "As time progresses and additional evidence is forthcoming, it will be increasingly difficult for anyone to deny the relationship between dioxin exposure (in Vietnam) and NHL/STS."

"When we (military scientists) initiated the herbicide program in the 1960s, we were aware of the potential for damage due to dioxin contamination in the herbicide. We were even aware that the 'military' formulation had a higher dioxin concentration than the "civilian" version due to the lower cost and speed of manufacture. However, because the material was to be used on the 'enemy', none of us were overly concerned. We never considered a scenario in which our own personnel would become contaminated with the herbicide. And, if we had, we would have expected our own government to give assistance to veterans so contaminated."

These same statements attributed to Dr. Clary have been cited on the Internet under the headline that "documents uncovered in the late 1980s in the National Archives present a troubling picture: ***Air Force knew of Health Dangers***" and that "military officials aware as early as 1967 of the limited effectiveness of chemical defoliation" [1]. In a May 1990 report to the Secretary of Veterans Affairs on the association between adverse health effects and exposure to Agent Orange, Admiral Elmo R. Zumwalt also cited and placed the comments from the Clary letter as follows:

Although the military dispensed Agent Orange in concentrations 6 to 25 times the manufacturer' suggested rate, "*at that time the Department of Defense (DOD) did not consider herbicide orange toxic or dangerous to humans and took few precautions to prevent exposure to it.*"' Yet, evidence readily suggests that at the time of its use experts knew that Agent Orange was harmful to military personnel [2]

Interestingly, Zumwalt added the note that Dr. Clary was also instrumental in designing the specifications for the **A/A** 45Y-l spray tank (ADO 42) and was the scientist who prepared the final report on **Ranch Hand: Herbicide Operations in SEA, July 1979** (not the correct date) [2].

While the Clary statements were cited on the blog, by Admiral Zumwalt, or in the Congressional Record, no supporting documentation was provided by Dr. Clary in his letter to Senator Daschle.

INVESTIGATION INTO THE ALLEGATIONS

Statements and Implied Knowledge Attributed to Dr. James Clary

In the absence of any supporting documentation, it is important to have an understanding of the statements and implied knowledge that are the basis for the allegations. By dissecting the various allegations attributed to Dr. James R. Clary, the following list was composed:

- That Dr. Clary was attributed with being an "Air Force scientist" involved in developing spray systems for Operation RANCH HAND at Eglin AFB Florida;
- That the Department of Defense was aware as early as 1967 that chemical defoliation was of limited effectiveness in Vietnam;
- That Dr. Clary was an Air Force scientist in Vietnam who "helped write the history of Operation RANCH HAND in Vietnam";

- That scientists in the Department of Defense in the 1960s were capable of manipulating the dioxin concentrations in the 'military formulations';
- That the Department of Air Force was aware in the 1960s of the potential of Agent Orange to cause Non-Hodgkins lymphoma and soft tissue sarcomas due to dioxin contamination in the herbicide, and thus Agent Orange was far more hazardous to the health of humans than anyone would admit at the time;
- That the Department of Defense had intended Agent Orange to be used only on the "enemy", not on our own troops; our troops were frequently sprayed.

Examination of the Facts

In the absence of supporting documentation by Dr. Clary, it is appropriate to challenge the credibility of his statements made in the 1988 Congressional Record, or attributed to him by Admiral Zumwalt in 1990.

1. **Dr. Clary was attributed with designing the specifications for the A/A 45Y-l spray tank**.

   A careful examination of the historical records on the development of the A/A 45Y-1 Internal Defoliant Dispenser at the Air Proving Ground Center, Eglin AFB Florida did not list Captain James R. Clary as an individual involved in any phase of the project [3, 4, 5, 6, 7]. The 1963-65 reports of the project development of the Hayes A/A 45Y-1 Internal Dispenser indicated that Charles L. Flynn, Captain, USAF was the Project Engineer and that the Test Designer was John H. Wilson, 2nd Lt, USAF [3, 4]. The Engineer responsible for the modifications of the Defoliant Dispenser was Richard A. Horan, 2nd Lt, USAF [5]. In 1966, at the Logistics Support Conference on the evaluation of the A/A 45 Y-1 as deployed in Southeast Asia, Captain James R. Clary was not listed as a participant [6]. In 1970, in a report summarizing the development (1965 – 1970) of the A/A 45-Y-1 and the final calibrations tests in the UC-123K, the Project Engineer was Edward T. Harrigan, Captain, USAF, and again there was no listing of a Captain James R. Clary [7].

   CONCLUSION: Captain James R. Clary was not involved in designing specifications for the A/A 45Y-1.

2. **Dr. Clary was attributed with the statement that the Department of Defense was aware as early as 1967 that chemical defoliation was of limited effectiveness in Vietnam**.

   A careful examination of historical reports does not support the statement that "chemical defoliation was of limited effectiveness" [8, 9, 10]. Indeed, in a "Professional Study" for the Air University, Lt Col Joseph Dougherty provides a 1967 quote by General William C. Westmoreland (Commander MACV, Military Assistance Command, Vietnam): "*The significance of the defoliation program and the importance of its contributions to the success of our strategy are of the highest order and cannot be overlooked*" [8]. In August 1968, a report prepared for the American Ambassador to Vietnam by a special "outside" Committee charged with conducting a Herbicide Policy Review, the Committee noted: "*From a military point of view, the US/GVN (Government of Vietnam) herbicide program has been successful. Its military benefits, especially in defoliation operations, have been clearly demonstrated"* [9]. As noted by the 1971 CHECO Report prepared by Captain James R. Clary, it was not the defoliation program that was criticized in a report prepared by the Rand Corporation in 1967, but the crop denial program [10].

   CONCLUSION: The statement attributed to Dr. Clary that the " chemical defoliation was of limited effectiveness" is not supported by historical documents of the period or even Captain Clary's own report on "RANCH HAND – Herbicide Operations in SEA" [10].

3. **Dr. Clary was described as an Air Force scientist who "helped to write the history of Operation RANCH HAND in Vietnam**."

   In 1970, Captain James R. Clary was an "Associate Professor of Ecology" at the United States Air Force Academy. That year he was selected to participate in Project CHECO, an acronym for Contemporary Historical Examination of Current Operations (*in Vietnam*). Captain Clary was sent to Vietnam for 90 days with the expectation that he would capture in a report the operational data and experiences of personnel and projects in Operation RANCH HAND. On 17 July 1970, prior to his arrival, the Commander, US Military Assistance Command, Vietnam cancelled all fixed wing defoliation missions and initiated a rapid phase-out of RANCH HAND Operations [10]. As a consequence, Captain Clary's CHECO report released on 13 July 1971 was essentially a summary of previous reports

and documents, with an added section of his comments as an ecologist/biologist, thus his report was not a primary source document [10]. The history of RANCH HAND has been written by two prominent military historians [11, 12]. In 1982, William Buckingham published "***OPERATION RANCH HAND: THE AIR FORCE AND HERBICIDES IN SOUTHEAST ASIA 1961-1971*** [11]. In 1986, Paul Cecil published ***HERBICIDAL WARFARE: THE RANCH HAND PROJECT IN VIETNAM*** [12]. Neither author cited Dr. Clary in their books, although a single reference was made to the 1971 CHECO Report.

CONCLUSION: Dr. Clary's CHECO Report was incidental in the history of RANCH HAND.

4. **Dr. Clary implied that scientists in the Department of Defense in the 1960s were capable of manipulating the dioxin concentrations in the military formulations**.

This statement is not supported by historical documents [13, 14, 15]. From its earliest production, 2,4,5-T herbicide has always been contaminated with 2,3,7,8-TCDD (dioxin), however, the significance of the contaminant was not realized until the 1948 industrial accident at the Monsanto facility in Nitro West Virginia [13]. The hallmark of exposure to dioxin was a condition known as chloracne, a severe form of acne of the skin. Because there was no known analytical method to detect TCDD, a biologic method was used, namely the rabbit ear test. If hyperkeratosis occurred on the ear from a sample of the 2,4,5-T, the herbicide was re-processed until it met the standard. In the late 1950s and early 1960s modifications to the synthesis of TCDD and the addition of purification techniques became the norm for industrial production of the herbicide [13]. The military specifications for Agent Orange were established by the US Army Chemical Corps' Biological Sciences Laboratory, Fort Detrick, Maryland. The specifications for the purchase of Agent Orange did not identify TCDD or any other contaminant [14].

The first analytical method used for the analysis of dioxin in 2,4,5-T was developed in 1971, and the first results of dioxin contamination of Agent Orange were published in 1973 [15].The allegation that Agent Orange contained higher levels of TCDD than commercial products is incorrect. Historical records indicate that the United States Air Force had collected 525 samples from the Agent Orange inventories that had been stored on

Johnston Island or the Naval Construction Battalion Center (NCBC) [15]. The 95th percentile of the mean concentration of the TCDD in the pooled datasets was calculated to be 1.88 ppm [15]. In 1984, the Industrywide Study Branch of the National Institute for Occupational Safety and Health (NIOSH) in Cincinnati Ohio began construction of a "Dioxin Registry", a compilation of demographic information and work histories of all US production workers who had synthesized products known to be contaminated with TCDD [15]. The Registry covered workers in the six major manufacturers that produced 94% of all the Agent Orange, including Hercules, The Dow Chemical Company, and Monsanto Company [15]. To document that the workers were exposed to TCDD, data were obtained on the dioxin levels of 557 archived samples of 2,4,5-T. Using the same statistical procedures as were used in the samples from Johnston Island and NCBC, the best estimate for the average dioxin concentration in the NIOSH samples was 1.88 ppm [15].

CONCLUSION: The Department of Defense did not manipulate the dioxin concentration of Agent Orange. The concentration of dioxin (TCDD) in commercial formulations of 2,4,5-T were the same concentrations as the 2,4,5-T that was purchased for Agent Orange.

5. **The Department of the Air Force was aware in the 1960s of the potential for soldiers to develop soft tissue sarcomas (STS) and non-Hodgkins lymphoma (NHL) due to dioxin contamination in the herbicide, and thus Agent Orange was far more hazardous to the health of humans than anyone would admit at the time**.

   As with the previous statements, the historical records and scientific studies present a different view. From their uses as herbicides in 1945 through 1977, an extremely large amount of research data, demonstration, and experience of using 2,4-D and 2,4,5-T herbicide (the components of Agent Orange) had been accumulated including toxicity in animals and man and vegetation control recommendations under field conditions. Thousands of scientists and military personnel were involved in those early years of the development of the 2,4-D and 2,4,5-T herbicides for military use. Equally important was the recognition that hundreds of thousands of agricultural and forestry scientists, university faculty, graduate students, and commercially-available personnel participated in the testing, evaluation, and field applications of 2,4-D and 2,4,5-T from 1947 through 1977, a period of 30 years of commercialization. Thus, it was not

surprising that the consensus of the agricultural scientific community concluded: *Few agricultural chemicals have a longer safety record in the field than 2,4-D and 2,4,5-T* [16]. Therefore the selection of 2,4-D and 2,4,5-T as components of two of the tactical herbicides used in Vietnam (Agents Purple and Orange) was a logical choice based upon years of experience and safe use. The first association suggesting that the herbicides or TCDD might be linked to increases in STS or NHL was published in 1988 from studies conducted on Swedish Forestry workers [17]. However, even today, definitive causes of STS and NHL are poorly understood [17]. The Air Force Health Study, a 20-year epidemiological study of the men of Operation RANCH HAND, did not find NHL or STS differences between RANCH HAND veterans and their matched (1:5) controls (C-130 Vietnam veterans) [18]. Indeed the Air Force Health Study reconfirmed the safety of Agent Orange [18].

CONCLUSION: The outstanding 30-year safety record of 2,4-D and 2,4,5-T, the components of Agent Orange, and the results of the 20-year epidemiologic study of the men of Operation RANCH HAND negate the allegation that the Air Force was aware that Agent Orange was hazardous to humans.

6. **The Department of Defense had intended Agent Orange to be used only on the "enemy", not on our own troops; but our troops were frequently sprayed**.

Tactical herbicides were developed specifically by the US Army Chemical Corps' Biological Laboratories to be used in "combat operations" for defensive purposes to remove the vegetation that was used by the enemy to conduct ambushes and offensive actions against Allied Forces and installations. The herbicides were never designed to be used as anti-personnel chemicals [19]. Military Assistance Command, Vietnam (MACV) Directive 525-1 strictly controlled the use of tactical herbicides in Vietnam [20]. Historical information confirms that herbicide spray missions were carefully planned and that spraying occurred only when friendly forces were not located in the area designated for spraying. Stringent criteria had to be met before spray missions could be approved. The operational information shows that spray missions for defoliation and crop destruction were conducted in an extremely hostile environment. Heavy 'fighter suppression' with antipersonnel ordnance was used to minimize the impact of hostile ground fire. Procedures were in place that

prohibited movement of troops into sprayed areas after a mission due to the possible presence of unexploded ordnance [11, 12]. Anecdotal reports of direct spraying of troops in Vietnam likely reflected the RANCH HAND mission spraying insecticides for mosquito control at regular intervals from March 1967 through 1972 [21].

CONCLUSION: Tactical herbicides were designed to control the luxuriant vegetation of Vietnam that offered cover and concealment of enemy troops while restricting movement of friendly forces. The uses of tactical herbicide were strictly controlled by MACV Directives to ensure that friendly forces were not in areas where defoliation missions occurred.

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BRIEF BIOGRAPHY OF THE AUTHORS

For more than 40 years, Dr. Alvin L. Young has been involved in issues surrounding the use of Herbicide Orange and other tactical herbicides in Vietnam. He completed his PhD in Herbicide Physiology and Environmental Toxicology at Kansas State University in 1968. In his 21 years with the USAF (obtaining the rank of Colonel), he was involved with the testing and evaluation of the equipment used in Operation RANCH HAND, Vietnam, and with the environmental and human health studies with the USAF School of Aerospace Medicine and the Department of Veterans Affairs. He served as a Science Advisor on environmental issues including Agent Orange with the President's Office of Science and Technology Policy. He was the Director of the Department of Energy's Center for Risk Excellence. He was a Visiting Professor at the University of Oklahoma, 2001-2007, and has served as the Senior Consultant on Herbicide Orange for the Office of the Deputy Under Secretary of Defense (Installations and Environment). He has more than 300 publications in the scientific literature, including five books on issues related to Herbicide Orange and/or dioxins and furans. From 2000 to 2012, He was the Editor of the international journal *Environmental Science and Pollution Research*.

For the past ten years, Kristian L. Young has been the Principal Researcher for A.L. Young Consulting. He received his Bachelor of Arts in Political Science from DePaul University, Chicago (Magna Cum Laude, Phi Kappa Phi, and Pi Sigma Alpha). He received the Master of Arts in International Relations in 2010 through Webster University's Global Program having studied in Europe and China. He has provided support to the company in areas of public policy, technical issues, archival research, and the coordination of national and international projects.