

**INVESTIGATIONS INTO  
ALLEGATIONS OF  
HERBICIDE ORANGE ON  
OKINAWA, JAPAN**

**January 2013**

**Submitted by  
A. L. Young Consulting, Inc.**

**for**

**William Nicholls,  
Office of the Deputy  
Under Secretary of Defense (I & E)  
4800 Mark Center Drive  
Alexandria, VA 22350-3605**

**US Army  
Public Health  
Command**



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31 January 2013



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William Nicholls  
Deputy Director  
Environmental Safety & Occupational Health (International Environmental Programs)  
Office of the Deputy Under Secretary of Defense (I&E)  
4800 Mark Center Drive  
Alexandria, VA 22350-3605

Dear Mr. Nicholls,

Please find enclosed the report: **Investigations into the Allegations of Herbicide Orange on Okinawa**. This project was initiated on 21 May 2012 through appointments with Oak Ridge Institute for Science and Education, Oak Ridge Associated Universities with the funding provided by United States Army Public Health Command.

Documentation for the preparation of this report required an extensive search for historical records in the various United States National Archives, the historical collection on Agent Orange at the National Agricultural Library, Military Service Archives, and the Armed Forces Pest Management Board's Literature Retrieval System. In addition, searches of records were conducted by The Naval History and Heritage Command, The United States Army Public Health Command, and the records maintained by the military units of the United States Forces Japan.

Seven allegations by former US military stationed in Okinawa implicated Herbicide Orange as being transported to Okinawa, and there tested and evaluated for use in Vietnam, used in perimeter vegetation control on military installations, stored prior to shipment to Johnston Island, or buried as a means of disposal. Each allegation was carefully investigated and an assessment of fact determined.

This investigation verified that the US veterans had remembered actual events that were recorded in the various historical records of that period. These events included a ship stranded on a reef, an observation that men were unloading large 55-gallon drums from a ship, and men seen spraying pesticides in jungle operations. Many of the veterans also recalled accurately the names of the ships that had visited the Port at Naha. However, after an extensive search of all known and available records, there were no documents found that validated the allegations that Herbicide Orange was involved in any of these events, nor were there records to validate that Herbicide Orange was shipped to or through, unloaded, used or buried on Okinawa.

Sincerely,

A handwritten signature in cursive script that reads "Alvin L. Young".

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

# **INVESTIGATION INTO THE ALLEGATIONS OF HERBICIDE ORANGE ON OKINAWA**

## **EXECUTIVE SUMMARY**

For the past few years, there have been an increasing number of US veterans alleging exposure to Herbicide Orange while serving in the US military at military installations in Okinawa during the Vietnam Era. The Department of Defense has repeatedly stated to the Government of Japan and the Department of Veterans Affairs that it has not found records validating allegations that Herbicide Orange was transported to, used, stored, or buried on Okinawa. However, these findings continue to be challenged by US veterans and by the news media in Japan.

The allegations that Herbicide Orange was involved in various events on Okinawa included the following: that as early as 1962, Herbicide Orange and other tactical herbicides were tested and evaluated in the jungle areas of Okinawa; that Herbicide Orange and other tactical herbicides were shipped to or through, unloaded on, or used in Okinawa by the US Department of Defense during the Vietnam War; that large quantities of Herbicide Orange were buried “in and around Chatan Town at Hamby Air Field” , and/or “buried at White Beach near the Machinato Supply Depot” and/or “buried near the Futenma Air Station near the City of Ginowan”; that an American Cargo Ship was stranded on a reef near Naha and drums of Herbicide Orange were recovered and subsequently buried; that numerous US Vietnam-era veterans stationed in Okinawa handled and sprayed Herbicide Orange, or were witnesses to it being sprayed by a C-123; and, that shipments of the remaining surplus inventory of “25,000 barrels” of Herbicide Orange from Vietnam were sent to Okinawa prior to shipment to Johnston Island in 1971 during Operation RED HAT.

In order to assess the allegations, an in-depth search of historical records and information was conducted. The extensive search included historical records in the various United States National Archives, Military Service Archives, Armed Forces Pest Management Board’s Literature Retrieval System, Naval History and Heritage Command, and US Army Public Health Command, as well as records maintained by the military units of the United States Forces Japan.

The tactical herbicide, Herbicide Orange, was produced solely for the Department of Defense and was managed under the tight controls of the US Army Chemical Corps and the United States Air Force Logistics Command. The Army Chemical Corps and Air Force Logistics Command kept extensive records on all movement and shipment of tactical herbicides, and those records were in the archives that were searched under this investigation.

This investigation verified that the US veterans had remembered actual events that were recorded in the various historical records of that period. These events included a ship stranded on a reef, an observation that men were unloading large 55-gallon drums from a ship, and men seen spraying pesticides in jungle operations. Many of the veterans also recalled accurately the names of the ships that had visited the Port at Naha. However, after an extensive search of all known and available records, there were no documents found that validated the allegations that Herbicide Orange was involved in any of these events, nor were there records to validate that Herbicide Orange was shipped to or through, unloaded, used or buried on Okinawa.

## **INTRODUCTION**

During the past few years, there have been an increasing number of US veterans alleging exposure to Herbicide Orange while serving at military installations in Okinawa during the Vietnam Era [1]. Questions about allegations have also been raised by the Japanese Government and the residents of the Prefecture of Okinawa [1, 2]. The Department of Defense has repeatedly stated to the Government of Japan and the Department of Veterans Affairs that it has not found records validating these allegations [3]. Nevertheless, the allegations have continued.

## **ALLEGATIONS OF HERBICIDE ORANGE IN OKINAWA**

In the past two years there have been a series of articles published in *The Japan Times* and other news outlets alleging the following:

- Herbicide Orange and tactical herbicides were tested and evaluated in the jungle areas of Okinawa in 1961 – 1962;
- Beginning in 1962 in Project AGILE, Herbicide Orange and other tactical herbicides were shipped to or through, unloaded on, or used in Okinawa by the US Department of Defense during the Vietnam War;

- The Port of Naha, the adjacent US Army’s Machinato Supply Depot (now Makiminato Service Area, part of the US Marine Corps Camp Kinser, bordering Urasoe City), and Kadena Air Base were used to receive and store large quantities of Herbicide Orange for subsequent shipment “on merchant ships such as the *USS Comet*, *SS Sea-Lift* and the *SS Transglobe*” or by air transport to Vietnam during the Vietnam War;
- Shipments of the remaining surplus inventory of “25,000 barrels” of Herbicide Orange from Vietnam were sent to Okinawa prior to shipment to Johnston Island in 1971 during Operation RED HAT;
- Large quantities of Herbicide Orange were buried “in and around Chatan Town at Hamby Air Field” , and/or “buried at White Beach near the Machinato Supply Depot (Service Area)”, and/or “buried near the Futenma Air Station near the city of Ginowan”;
- An American Cargo Ship was stranded on a reef near Naha and drums of Herbicide Orange were recovered and subsequently buried at one of the above sites;
- Numerous US Vietnam-era veterans stationed in Okinawa handled and sprayed Herbicide Orange, or were witnesses to it being sprayed by a C-123; and,
- Some veterans stationed at Kadena Air Base cleaned the C-123 aircraft contaminated from spraying Herbicide Orange.

## **OVERVIEW OF THE REPORT**

The report identifies the information sources used to conduct an in-depth search of historical records for information on the allegations that Herbicide Orange was shipped to or through, unloaded, used or buried at Okinawa. There is also a discussion on the differences and controls on the use of commercial herbicides and tactical herbicides, an assessment of the major allegations, and the results of the comprehensive search. Finally, a summary and conclusion are included.

## **RECORD SEARCH**

The search for documentation supporting this Okinawa Project involved searching the following potential information sources:

- The Department of Army’s research on tactical herbicides was conducted primarily by the Army Chemical Corps’ Plant Sciences Laboratory, Fort Detrick, Frederick, Maryland and its predecessors. A search was conducted

of more than a thousand documents from the Army Chemical Corps stored at the National Archives and Record Administration (NARA) in College Park, Maryland;

- The United States Army & Joint Records Research Center (JSRRC), previously the Armed Services Center for Unit Records Research (CURR), The Department of The Army, Springfield, Virginia was contacted with the assistance of the Deployment Health Support Directorate, Deputy Under Secretary of Defense (Installations and Environment), Department of Defense, Washington, DC. JSRRC provided numerous leads on important documents;
- The files at NARA included the Air Force Judge Advocate Agent Orange Records from 1961 – 1983, the Department of State’s Records of the Southeast Asia Bureau, the Department of State’s Foreign Affairs Records on Vietnam, and many of the Military Sea Transportation Service Ship Logs;
- Numerous trips were made to the Washington National Records Center (WNRC), Suitland, Maryland. This is the site of the largest historical collections of US Agencies documents, including many of the records from all United States military units worldwide. The Record Group Series for the Air Force, Navy, and Army Records applicable to the units that served in Okinawa and the respective time frames were the focus for events alleged by the veterans;
- The Agent Orange Collection at the National Agricultural Library, Bethesda, Maryland is a collection that contained a large number of reports prepared by the US Army Chemical Corps, the 7<sup>th</sup> Air Force, and the Air Force Logistics Command on the tests and evaluation of the tactical herbicides, their potential use outside of Vietnam, and the environmental fate, and disposition, including storage and disposal of Agent Orange;
- The Armed Forces Pest Management Board’s Literature Retrieval System (AFPMB-LRS), US Army Garrison - Forest Glen, Silver Spring, Maryland was carefully searched. This collection of over 130,000 documents in searchable PDF formats contained trip reports involving the pest control programs of all US military installations worldwide beginning in late 1950s through 2011. These reports documented pest problems, operations concerning the use of AFPMB-approved pesticides (including herbicides), and reports of storage, approved methods for application of herbicides, and for the disposal of excess or surplus pesticides;
- The Office of Air Force History, Bolling Air Force Base, Washington DC, and the Office of History, Air Force Logistics Command, Wright-Patterson

Air Force Base, Ohio were additional sources for information on tactical herbicides, Operation RANCH HAND, Operation PACER IVY, and Operation PACER HO. Leads from these locations permitted the targeting of key boxes in both NARA and WNRC. These included boxes that contained information on where tactical herbicides were used or shipped outside of Vietnam, or contained the records collected by the Air Force Office of History in preparation of the 1982 book **OPERATION RANCH HAND: The Air Force and Herbicides in Southeast Asia, 1961-1971** by William Buckingham. The hundreds of references and messages cited in the book were collected and placed in the NARA archives. These provided information on the first shipments of tactical herbicides on the *USNS SO BLAND* and the *SS Sooner State*, and on the fate of the RANCH HAND UC-123 aircraft after their use in Vietnam;

- The Southwest Regional National Archives at Fort Worth, Texas, provided deck logs on a number of the Merchant Marine and US Navy ships that were alleged to have carried Herbicide Orange and other tactical herbicides to Okinawa;
- Inquiries related to the transport, use, storage, and burial of Herbicide Orange on Okinawa were made with the Fort Detrick Records Manager and Records Holding Area Manager, the US Army Medical Research Institute of Infectious Diseases, the US Army Medical Research and Materiel Command, the Institute for Public Health with the US Army Public Health Command, the Naval History and Heritage Command, and the RANCH HAND Vietnam Association; and,
- Direct contact with the various divisions of the United States Armed Forces that are stationed in Japan (The **United States Forces Japan, USFJ**). Specifically contact was with the Director of the Environmental Branch, USFJ/J42E, and through the Director to each of the Environmental Point of Contacts (POCs) for each of the Service Components in Japan to include Army, Navy, Air Force and Marines; the Commander of the USAF School of Aerospace Medicine at Kadena Air Base; and the Director, Division of Laboratory Science, US Army Public Health Command, Camp Zama, Zama, Japan.

## **COMMERCIAL HERBICIDES AND TACTICAL HERBICIDES**

The Department of Defense strictly controlled the use of all commercial and tactical herbicides used. This included any research, field evaluation, personnel certification, procurement, and application.

## **Commercial Herbicides**

Commercial phenoxy herbicides such as 2,4-D (2,4-Dichlorophenoxyacetic acid) and 2,4,5-T (2,4,5-Trichlorophenoxyacetic acid) are the main active constituents of the herbicide family discussed in this report. These two herbicides have had a long and safe history of use worldwide. For many years, the commercial herbicide 2,4,5-T was the major herbicide for rice production in both the United States and Japan [4]. The formulation of these commercial herbicides was vastly diluted compared to tactical herbicides. The herbicide 2,4,5-T was used at the rate of 1 pound/acre for the effective control of broadleaf aquatic weeds [5]. In 1983, rice was the only human food crop in the US that could be legally sprayed with 2,4,5-T after the EPA's emergency suspension in 1979. All routine domestic uses of this compound were banned in September 1984 [5]. Also, the relatively low cost of the phenoxy herbicides (especially 2,4-D and 2,4,5-T mixtures) and their wide spectrum of broad leaf and shrub control contributed significantly to their popularity for their use in the management of rights-of-way. In Okinawa and throughout Japan, programs to control vegetation depended upon the availability of commercial herbicides. Indeed, Japan was a major producer of commercial herbicides (including the phenoxy herbicides) [4, 5, 6]. Commercial formulations of 2,4-D remain one of the most widely used herbicides in the world today [7].

DoD used commercial herbicides to control vegetation ( along roads, fence lines, power lines, etc.). Internal DoD guidance now and during the Vietnam Era allowed only the use of "commercially available - registered herbicides" on US military installations applied by "licensed applicators". Licensed applicators could only apply commercial herbicides – they were not authorized to apply tactical herbicides. Commercially available herbicides had to meet USDA's regulatory requirements (now the US Environmental Protection Agency, EPA), and had to be in compliance with the requirements of the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA) [8, 9].

Inside DoD, the Armed Forces Pest Control Board (AFPCB, now Armed Forces Pest Management Board, AFPMB) approved all commercial herbicides and other pesticides that were to be used on US military installations, including those in Japan [8, 9]. In 1963, USDA's regulatory program on pesticide labeling was further strengthened by requiring that the registration labels were also to be in the



language of the user [10]. The use of commercial herbicides on a US military installation outside the US also were required to meet the US Department of State's Agency for International Development guidelines, ensuring both quality of product, its approved uses, and its distribution [7, 11, 12]. In Japan any use of a commercial pesticide by United States Forces was also required to be registered by the Japanese Department of Agriculture and Forestry (in 1978, the name changed to the Ministry of Agriculture, Forestry and Fisheries) and approved by the Command Entomologist [7, 13].

The Armed Forces Pest Control Board has had a cadre of military and civilian personnel via supporting Agencies and Laboratories (e.g., the Epidemiology Division of the School of Aerospace, Brooks AFB, Texas; USAF Occupational and Environmental Health Laboratory, Kelly AFB, Texas; the Army's Environmental Hygiene Agency (now the US Army Public Health Command); and the US Public Health Service) that routinely conducted pest surveys, staff visits, training programs, and conferences to ensure that military installations were identifying and controlling pests detrimental to military personnel, property, projects, and programs. Reports of these visits, programs, and conferences were published by the Board and widely circulated to other military installations [13, 14, 15].

### **Tactical Herbicides**

Formulations of the phenoxy tactical herbicides, e.g., Orange, Purple, Pink and Green, contained only the active ingredients with no solvents, diluents, or surface active agents (surfactants) added. The Army Chemical Corps specified the formulations of tactical herbicides. The tactical herbicide, Herbicide Orange was produced solely for the Department of Defense and was managed under the tight control of the US Army Chemical Corps and the United States Logistics Command. The Army Chemical Corps and Air Force Logistics Command kept extensive records on all movement and shipment of tactical herbicides, and those records were in the archives that were searched under this investigation [3].

The United States Army Chemical Corps' Plant Science Laboratory at Fort Detrick, Maryland, was responsible for the screening, testing, and evaluation of tactical herbicide candidate formulations [16]. The initial development of tactical herbicides began near the end of World War II and was the responsibility of the US Army Chemical Corps, Fort Detrick, Frederick, Maryland [16]. This testing and

development continued through the Korean War and prior to the Vietnam War, and involved tests at many US Military Installations, including Bushnell Army Air Field, Florida; Eglin Air Force Base, Florida; Fort Detrick, Maryland; Fort Ritchie, Maryland; Dugway, Utah; Fort Drum, New York; and at several US agricultural universities [3, 16, 17].

In early 1961, the US military initiated Project AGILE, a project designed to provide technical information on the chemical means of controlling vegetation that could be applied to military operations in South Vietnam. The research was directed toward the development of chemicals that could rapidly control a broad range of botanical species. Once again, the Department of the Army's Plant Sciences Laboratories at Fort Detrick, Maryland was given the responsibility for determining the technical feasibility of defoliating jungle vegetation in South Vietnam [3, 16, 17].

The first tactical herbicides selected for evaluation in Vietnam were Purple, Pink, and Green [18, 19]. In March 1965, Herbicide Purple was replaced by Herbicide Orange [20, 21]. Recognizing the continuing mission in Vietnam for tactical herbicides, the Plant Sciences Laboratories maintained an active program of testing and evaluating chemicals for potential use in Vietnam [19]. "Defoliation Conferences" were held in 1963, 1964, and 1965 and were sponsored by US Army Chemical Corps at Fort Detrick [22, 23, 24]. Plant Sciences Laboratory personnel simultaneously conducted field tests in Puerto Rico, and at military reservations in Thailand and New Brunswick, Canada. Small isolated tests were also conducted at military or government installations in the States of Alabama, Arkansas, Florida, Georgia, Hawaii, Maryland, and Texas [3, 18, 25]. With the exception of Texas and Puerto Rico, the responsibility for the testing protocol and spray operations rested with the US Army Chemical Corps' Plant Science Laboratories and US Air Force personnel [3, 18]. Overall policy and procedures for herbicide operations in Vietnam were set forth in MACV (Military Assistance Command, Vietnam) Directive 525-1, which governed all tactical herbicides used by both US and Free World Military Assistance Forces Troops between 1965 and 1970. The Directive "*prescribed policies, responsibilities, and procedures governing the operational employment of tactical herbicides, including all fixed wing, helicopter, and surface-based methods of herbicide application.*"

In late 1971, the Army Chemical Corps determined that surplus Herbicides Blue and White (that were not shipped to Vietnam) could be used as commercial herbicides [26, 27]. Indeed, Herbicide Blue had a valid EPA registration as Phytar 560® (cacodylic acid/sodium cacodylate) and a valid Federal Stock Number and was approved for use in weed control. Herbicide White also had a valid EPA registration as Tordon 101® for brush control, and a valid Federal Stock Number [27]. Herbicide Blue was not chemically related to Herbicide Orange and continued to be used as a commercial herbicide as Phytar 560® through 2009 [18]. The AFPCB concurred that the two herbicides could now be used as commercial herbicides in military vegetation control programs as designated by the Facilities Civil Engineer [26, 27]. Subsequently, the San Antonio Air Materiel Area (SAAMA) approved shipment of 20 drums of Herbicide Blue as Phytar 560 to the “*Cmdr Fleet, Misawa Honshu Air Base Japan.*” Neither the date of shipment nor its receipt at the Air Base could be verified, although the year was likely 1972 [document from NARA files].

Recently, the 1971 Report by Deputy Director of the Fort Detrick Plant Science Laboratories, Dr. Robert Darrow, [26] has also been identified as a source of information indicating that DoD stored herbicides in Thailand and Okinawa. Under a section titled “*Activities or actions of the following type should be assessed carefully for the necessity of preparing an environmental statement*” CINPAC (Commander in Chief, Pacific) was tasked with identifying any “*Herbicide Stockpiles (outside of Vietnam) Elsewhere in PACOM-US Government Restricted Materials Thailand and Okinawa (Kadena)*”, page 49 [26]. The eventual preparation and publication of **The Department of Air Force Final Environmental Statement, November 1974** did not identify any stockpiles of Herbicide Orange in either Thailand or Okinawa [28], nor did subsequent reports by Craig in 1975 [20] or Young in 2006 and 2008 [3, 18].

## **SUMMARY OF CONTROLS ON COMMERCIAL HERBICIDES**

- **Guidance:** Department of Defense Directive 5154.12 established the Armed Forces Pest Control Board (AFPCB) to provide oversight of DoD’s pest management programs on its more than 600 worldwide installations.

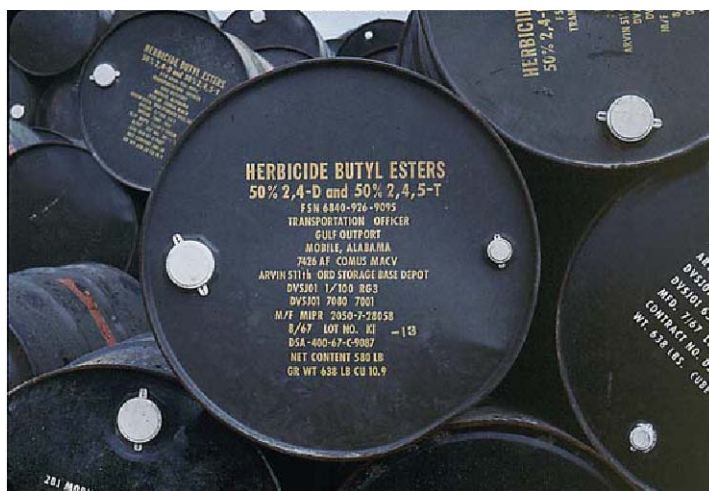
- **Availability:** The US Department of Agriculture (USDA) provided recommendations to AFPCB for the efficacy and safety of commercial herbicides.
- **Federal Specifications:** USDA provided Federal purchase descriptions for approved commercial herbicides that could be purchased directly by the Government Supply Agency (GSA) from chemical companies.
- **Regulatory Oversight:** The AFPCB required all DoD agencies to use pesticide formulations with labeling and use directions approved by the Pesticides Regulation Branch of USDA (now US EPA) and in full compliance with FIFRA.
- **Applications of Commercial Herbicides:** The AFPCB required Board Certified (trained) applicators that had been approved by USDA, and under the supervision of the Facilities Civil Engineer with oversight by the Command Entomologist.
- **Control of Pests on Military Installations:** To ensure that military installations were identifying and controlling pests, including noxious vegetation, detrimental to military personnel, property, and programs, the AFPCB had a cadre of military and civilian personnel that routinely conducted pest surveys, staff visits, training programs and conferences on identifying and controlling pests. Reports of these activities were published by the Board, via the AFPMB Literature Retrieval System, and widely circulated to other military installations.

## **SUMMARY OF CONTROLS ON TACTICAL HERBICIDES, i.e., ORANGE**

- **Availability:** Herbicide Orange was only produced for the US military, and specifically for the US Army Chemical Corps and the US Air Force Logistics Command for tactical military operations. It was not available commercially through GSA. Procurement of tactical herbicides was the responsibility of the Defense Supply Agency (DSA).
- **Military Specifications:** The US Army Chemical Corps was responsible for the determination of formulation, efficacy, and safety of tactical herbicides. This included the publication of the military specifications of the

formulations that were subsequently used directly by DSA through competitive bids for purchase of the tactical herbicides.

- **Labeling:** The only “label or descriptor information” was stenciled on the lid of the 55-gallon drum, and of course, the colored-coded band around the center of the drum (see **Figure 1**).



**Figure 1.** A shipment of “Herbicide Orange” in 208-liter (55-gal) drums. The lid (top) of each drum specified the content (Herbicide Butyl Esters of 2,4-D and 2,4,5-T), the Federal Specification Number (FSN) for the individual herbicides, US Port of Embarkation (Mobile, Alabama), destination (ARVN 511th Ordinance Storage Depot, Da Nang, Vietnam), procurement information (including date, 8/67), and net weight[18, 20, 21]. Each of the 11 different companies that manufactured military herbicides packed them in new 208-liter 18 gauge steel drums for shipment directly to Southeast Asia [20]. Each herbicide drum was also marked with a 7.6-centimeter (3-inch) color-coded band around the center to identify the specific military herbicide (Photograph courtesy of A. L. Young).

- **Use:** Only the US Army Chemical Corps and the USAF RANCH HAND Squadrons via the Air Force Logistics Command had the authority and the training to obtain and spray Herbicide Orange, and then only in a combat environment. Overall policy and procedures for herbicide operations in Vietnam were set forth in MACV (Military Assistance Command, Vietnam) Directive 525-1, which governed all tactical herbicides used by both US and Free World Military Assistance Forces Troops between 1965 and 1970.
- **Regulatory Oversight:** The selection and use of tactical herbicides were exempt from USDA regulatory oversight, and from FIFRA.

- **Transport:** The transport of Herbicide Orange required concurrence by the US Army Chemical Corps and/or the San Antonio Air Materiel Area, Air Force Logistics Command, with full approval by the Military Sea Transportation Service. Shipments were authorized by a DD Form 173 “Joint Message Form”. This was critical so that schedules were established and stevedores and barges or derricks were dispatched to the dock and ship to facilitate in the loading and unloading of the drums, and arrangements made to ensure the safety, transport, and storage of the defoliant. The first shipments of tactical herbicides (Purple and Pink) were shipped from the, Port of Oakland or the Naval Shipyard at San Francisco, California and the Port of Baltimore, Maryland. Herbicide Orange was initially shipped from the Ports at Seattle, Washington; Baltimore, Maryland; and, New Orleans, Louisiana (1965-1966). In mid-1966 through 1969, essentially all tactical herbicides were shipped from the Port of Mobile, Alabama, although some Herbicide White was shipped from Port of Houston [DD forms 173 maintained at NARA].
- **Evaluation of Tactical Herbicide Use:** Scientists of the US Army Chemical Corps, Fort Detrick, Maryland prepared formal reports on all tests and evaluations of tactical herbicides [3]. In addition, numerous evaluations of the effectiveness of tactical herbicides in South Vietnam were published by MACV, the 7<sup>th</sup> Air Force, and the Rand Corporation [18].

## ASSESSMENTS OF THE ALLEGATIONS

**Allegation Number 1:** *Herbicide Orange and other tactical herbicides were tested and evaluated in the jungle areas of Okinawa in 1961 – 1962.*

**Assessment:** There were no records or correspondence found that indicated that any testing and evaluation of Herbicide Orange occurred on Okinawa.

**Investigation:** In his book **Herbicidal Warfare: The RANCH HAND Project in Vietnam** [21], on page 23 Dr. Paul Cecil described the establishment and tasks of Project AGILE:

In May 1961, Vice-President Lyndon Johnson was sent to Saigon by President Kennedy to consult with Vietnamese President Diem about future American Assistance. One result of this consultation was the establishment of a joint United States/Vietnamese Combat Development

and Test Center (CDTC) in Vietnam, under direction of the Defense Department's Advanced Research Projects Agency. The CDTC was formed to develop new counterinsurgency methods and weapons, and the first tasks (identified as Task 2 and Task 20) were to evaluate the use of herbicides to destroy concealing vegetation and enemy food supplies in Vietnam (**Project AGILE**). Dr. James W. Brown from Fort Detrick was selected to direct the Project.

The records located for Project AGILE indicated that the first testing of potential tactical herbicides for defoliation were conducted in 1961 and 1962 in South Vietnam, not Okinawa. Dr. James Brown, a world renowned Plant Scientist at the US Army Chemical Corps Biological Laboratories (later the Plant Science Laboratories), Fort Detrick, Maryland and military personnel of the Army Chemical Corps tested a variety of defoliant and "vegetation killers" north of Kontum, South Vietnam from August 1961 through February 1962. The protocols, chemicals, equipment for applications, and the test procedures and evaluations were recorded in a two-volume series titled "**Vegetational Spray Tests in South Vietnam**" and published in April 1962 [17].

**Allegation Number 2:** *Beginning in 1962 in Project AGILE, Herbicide Orange and other tactical herbicides were shipped to or through, unloaded on, or used in Okinawa by the US Department of Defense during the Vietnam War. **The merchant marine ship SS Schuyler Otis Bland** (T-AK277) transported Agent Orange from the United States to Okinawa in the early 1960s.*

**Assessment:** There was nothing in the deck logs examined at NARA that supported the allegation that either the SS Schuyler Otis Bland or USNS S.O. Bland ever transported Herbicide Orange to or through Okinawa. [See text for Allegation 1, and as noted, Brown published the results of Project AGILE in April 1962.]

**Investigation:** The second part of the allegation is whether the deck logs for the *USNS Schuyler Otis Bland* (T-AK277) confirms that the *USNS Bland* actually delivered tactical herbicides to Okinawa. It is also important to remember that Herbicide Orange was not deployed to Vietnam until March 1965, thus any shipment of tactical herbicides would have been primarily Herbicides Purple or Pink.

To assess this second allegation, examination was first made of the materials published by William A. Buckingham, Jr. in his 1982 book (published by the

Office of Air Force History) **OPERATION RANCH HAND: The Air Force and Herbicides in Southeast Asia, 1961-1971** [29]. On page 29 of his book, Buckingham described the following:

The acquisition of defoliants occurred on an expedited basis. As rapidly as truckload lots accumulated, shipments left the factories for the docks at Oakland, California where port workers loaded 110,000 gallons of PURPLE and 49,000 gallons of PINK on the *SS Sooner State* which sailed for Saigon on December 15, 1961, and arrived on January 8, 1962. The remaining chemicals, 17,000 gallons of PURPLE and 31,000 gallons of PINK were loaded on the *USNS S.O. Bland* which had a sailing date later in December. The drums carried no military markings and were consigned only to "Country 77", a shipping designation for Vietnam.

[NOTE: In fact, a 30-cm color-coded band was painted around the center of each drum to distinguish the two tactical herbicides [28].]

The actual deck logs for the *USNS Schuyler Otis Bland (T-AK277)* were located and examined at the National Archives and Record Administration (NARA) in College Park, Maryland. The deck logs for the *SS Sooner State* were located and examined at the Southwest Regional National Archives at Fort Worth, Texas.

The Buckingham files at NARA noted that the *USNS S.O. Bland* was to move the "Pink" and "Purple" defoliants "on an expedited basis" from the Port of Embarkation (Hunters Point Naval Shipyard, San Francisco) directly to Saigon via Pointe du Lazaret at the mouth of the Saigon River. The log book for that time period confirmed that a large number of drums were loaded by barge prior to the departure from Hunters Point Naval Shipyard at 0800 hrs on 28 December 1961. The log book confirmed that the *S.O. Bland* arrived at Pointe du Lazaret at 0400 hrs on 16 January 1962. The ship was piloted up the Saigon River to a berth in the Saigon Harbor arriving at 1045 hrs on 16 January 1962. The log book noted that 5 gangs of stevedores and 4 barges were dispatched to the ship to unload "the cargo" (a previous note in the log book indicated that a barge could carry ~230 drums); the total amount of the Purple and Pink herbicides was 872 55-gallon drums). The *S.O. Bland* departed Saigon, Vietnam on the 22nd of January for Subic Bay in the Philippines, arriving on the 24th of January. It departed Manila on the 26th of January arriving Kao Hsiung, Taiwan on the 27th of January 1962. From Taiwan (departing on the 30th) it went on to Naha, Okinawa arriving on the 31 January 1962. The log book confirmed that petroleum fuel and Conex containers were offloaded and additional cargo taken on board. The ship departed 3 February 1962 and made stops in Inchon, Korea; Yokosuko Naval Base, Japan; Subic Bay,



Manila, the Philippines; Guam; Eniwetok Atoll; and Pearl Harbor; and, returned to San Francisco arriving on the 15<sup>th</sup> of March 1962. **Summary:** The *S.O. Bland* off loaded tactical herbicides in South Vietnam on 16-18 January 1962. Subsequently, the *S.O. Bland* off loaded other cargo in Okinawa on 31 January 1962, but that cargo did not include tactical herbicides.

There was nothing in the deck logs examined at NARA that supported the allegation that **“the ship’s logbook shows it was carrying classified cargo that was offloaded under armed guard at White Beach on 25 April 1962.”** There was no indication that the *USNS Schuyler Otis Bland* made an additional trip “loaded with defoliants” to Okinawa from its Port in San Francisco after its return to San Francisco on the 15<sup>th</sup> of March 1962. In addition, a DD Form 173 “Joint Message Form” was prepared on each shipment from the authorizing agency to “Military Traffic Management and Terminal Services.” Copies of the Joint Messages were available at NARA. The deck log of the *USNS Schuyler Otis Bland* indicated that a message had been received prior to its loading and departure.

An examination of the deck logs for *SS Sooner State* also confirmed that its use for transporting defoliant to Vietnam occurred on a number of occasions, e.g., on 8 January 1962, and that trips transporting materials to Okinawa were equally common, just not the delivery of tactical herbicide. The key to determining whether a US Merchant Marine vessel had carried defoliant could be determined by whether it originated at a Port of Embarkation that was authorized to store the tactical herbicide until shipment to Vietnam.

**Allegation Number 3:** *That the Port of Naha, the adjacent US Army’s Machinato Supply Depot (now Makiminato Service Area, part of the US Marine Corps Camp Kinser, bordering Urasoe City), and Kadena Air Base were used to receive and store large quantities of Herbicide Orange for subsequent shipment “on merchant ships such as the USS Comet, SS Sea-Lift and the SS Transglobe” or by air transport to Vietnam during the Vietnam war.*

**Assessment:** There were no records found or DD Form 173 “Joint Message Forms” authorizing the shipment of tactical herbicides for any of these three ships.

**Investigation:** The search of the numerous archives and other record collections did not validate that the *USS Comet*, *SS Sea-Lift* or the *SS Transglobe* transported

Herbicide Orange to Okinawa. The *USNS Comet* (T-AK-269) was designated a “*Vehicle Cargo Ship/Roll-on/Roll-off Ship*” during the Vietnam-era. Such ships were not used for the transport of tactical herbicides. Likewise, the *SS Sea Lift* was also a vehicle landing ship. It was placed in service as the *USNS Sea Lift* (T-LSV-9) on 19 May 1967. In July of that year, it completed its maiden voyage from Oakland to Honolulu; then commenced runs to the Far East with cargo consigned to Vietnam. Her primary mission was the transportation of military vehicles for the Military Sealift Command in the Pacific. As noted by many veterans of the Vietnam War, the *SS Transglobe* participated extensively in the War. She did such a good job of transporting materials and troops along the coasts of Vietnam that she made the “Viet Cong’s most wanted list.” She was inducted into the National Maritime Hall of Fame in January 2009. There were no records found or DD Form 173 “Joint Message Forms” authorizing the shipment of tactical herbicides for any of the three ships.

As noted by Buckingham [29] and throughout the hundred or more DD Forms 173, the shipments of tactical herbicides to Vietnam were of the highest priority and always on an “expedited basis”. Logistically speaking, it made no sense to delay the shipments by sending them first to Okinawa, unloading, storing, reloading on vessels not suited for their transport to Vietnam. It made even less sense to transport “thousands of drums” to Kadena Air Base and place them on aircraft for air transport to Vietnam. The early drums used by the manufacturers of the tactical herbicides were made of 16-gauge steel whose weight when filled with the defoliant made them unacceptable for air transport (3, 20); thus, the reason that the tactical herbicides were transported by appropriate vessels of the Military Sea Transportation Service directly to Vietnam.

**Allegation Number 4:** *That shipments of the remaining surplus inventory of “25,000 barrels” of Herbicide Orange from Vietnam were sent to Okinawa prior to shipment to Johnston Island in 1972 during Operation RED HAT.*

**Assessment:** Herbicide Orange was shipped directly from South Vietnam to Johnson Island as part of Air Force Logistics Command’s Operation PACER IVY. The movement of the Herbicide Orange from Vietnam to Johnston Island was NOT part of Operation RED HAT. Operation RED HAT occurred in 1971 and involved the removal of nerve and mustard gas from Okinawa to Johnston Island.

**Investigation:** An article in the Japan Times for 7 August 2012 was titled “25,000 barrels of Agent Orange kept on Okinawa, US Army document says”. The article was written by Jon Mitchell. Text: “*The army report, published in 2003, is titled ‘An Environmental Assessment of Johnston Atoll’. Outlining the military’s efforts to clean up the tiny island that the U.S. used throughout the Cold War to store and dispose of its stockpiles of biochemical weapons, the report states, “In 1972, the U. S. Air Force brought about 25,000 55-gallon (208-liter) drums of the chemical Herbicide Orange (HO) to Johnston Island that originated from Vietnam and was stored on Okinawa.”*”

A close examination of the 26-page 2003 report “**An Ecological Assessment of Johnston Atoll**” [30] noted that the principal authors of this report were with the Boston University Marine Program and the Smithsonian National Museum of Natural History. The authors of the report were not DoD employees, nor were they likely familiar with the issues surrounding Herbicide Orange or its actual history of transport to the Island. The report described the history of Johnston Atoll as a collection of events without specific references [30]. Thus, the source of the comment noted in the article is not provided in the report.

A search of the United States Air Force records in the National Archives provided documentation that refuted the statement that 25,000 drums of Herbicide Orange were stored on Okinawa prior to shipment to Johnston Island in 1972. A key document was a 27 November 1971 message from CINCPAC (Commander in Chief, Pacific – the Commander of all US Forces in the Pacific, including Southeast Asia) that was directed to the Air Force Logistics Command’s San Antonio Air Materiel Area, San Antonio (SAAMA), Texas. (It should be noted that SAAMA had responsibility for the purchase and distribution of Herbicide Orange, and subsequently had responsibility for the final disposition of the herbicide). The subject of the 27 November 1971 message was “Herbicide Orange”, and noted “...*This Headquarters is staffing a request for approval to retain subject herbicide in RVN (Republic of Vietnam) until it can be routed directly to a disposition site.*”

In a 10 January 1972 message from the 7<sup>th</sup> Air Force, Tan Son Nhut Airfield, Republic of Vietnam, Subject: PACER IVY, it was noted: “*This is the seventh weekly report... A. At Phu Cat, the redrumming complete. B. At Bien Hoa,*

*there is a requirement for 2159 drums; 6124 drums in the holding area ready for shipment, the estimated completion is 31 Jan 72; C. At Da Nang 1995 drums in holding area for shipment. Contractor ahead of schedule on segregating/cleaning serviceable drums. Contactor behind on redrumming due to lack of serviceable drums. Serviceable drums should arrive about 11 Jan. Estimated completion on 31 Jan 72.”*

The next important message was related to LOGISTICS ACTION DIRECTIVE 72-3, HQ PACIFIC AIR FORCES, APO San Francisco 96553, 24 March 1972 [31]. “*This Logistics Action Directive (LAD) is designated PACAF LAD 72-3, Vietnam Orange Removal.*” Within the Background, it is noted that “Johnston Island will be used as an interim storage location.” It further noted that the relocation of the herbicide stock will be conducted in four phases; that a MSC vessel was secured for movement of the product from RVN directly to Johnston Island; and, that the product should not arrive at Johnston Island prior to 12 April, 1972.

On 7 March 1972...8,220 drums of Herbicide Orange were transported to the pier at Da Nang Air Base. The cargo ship, the *M/T TransPacific*, arrived at Da Nang on 10 March 1972. The ship departed the Port of Da Nang on 15 March and docked at Cam Ranh Bay to load the drums from Tuy Hoa Air Base (not Phu Cat) [18]. From there it sailed to the Port of Saigon to load Herbicide Orange on board from Bien Hoa Air Base. The ship departed Saigon on 1 April 1972 and arrived at Johnston Island, Central Pacific Ocean approximately 18 days later [18]. There were no records that indicated that the ship stopped in Okinawa.

Indeed the action by the Air Force Logistics Command in Operation PACER IVY was, as noted, carefully documented in Logistics Action Directive 72-3, dated 24 March 1972 [31]. A recent publication by Edwin A. Martini, in the *Journal of Military History*, further elaborated on Operation PACER IVY and the subsequent disposal of Herbicide Orange in Operation PACER HO [32].

**Allegation Number 5:** *That large quantities of Herbicide Orange were buried “in and around Chatan Town at Hamby Air Field, and/or “buried at White Beach near the Machinato Supply Depot (Service Area)”, and/or “buried near the Futenma Air Station near the city of Ginowan.”*

**Assessment:** There were no records or other evidence that Herbicide Orange had been found or buried on the Makiminato Service Area (MSA) shoreline or any mention of pesticides, Herbicide Orange, dioxin, or PCBs in the cleanup operations near the Futenma Air Station near the city of Ginowan.

**Investigation:** From the descriptions of burial sites identified in various newspaper reports, it was difficult to determine whether there were two or three alleged major burial sites of Herbicide Orange.

**MSA, Camp Kinser Site:** A report titled "Talking Paper on Possible Toxic Contamination at Camp Kinser" was prepared by the United States Forces Japan Environmental Branch (USFJ/J42E) on 30 July 1993 [33]. The Makiminato Service Area (MSA) shoreline was the site identified by US veterans formerly stationed in Okinawa where the US military was alleged to have buried surplus Herbicide Orange left over from shipments of Herbicide Orange to Okinawa during the Vietnam War. The 30 July 1993 report stated: "*There is no evidence that toxic dumping occurred off MSA – Urasoe. However, there is evidence of environmental contamination by heavy metals and pesticides caused by past hazardous material storage practices*" [33]. The chronology within the report noted that from 1945 to 1973, the US Army stored large amounts of hazardous materials/wastes in the open along the shoreline at MSA (now Camp Kinser). The chemicals were primarily retrograde shipments from Vietnam and those declared excess due to the phase down of the depot operation. The report noted that the chemicals included insecticides, rodenticides, herbicides, inorganic and organic acids, alkalis, inorganic salts, organic solvents, and vapor degreasers [33].

The 1993 Talking Paper also noted that From 1 April 1973 through 31 August 1973, a Joint Environmental Investigative Committee consisting of members from the Environmental Branch, the US Army Pacific Environmental Health Agency and the Okinawa Prefectural Government initiated a project to cleanup the MSA shoreline [33]. Cyanide compounds were neutralized, and 27,800 pounds of ferric chloride were disposed of on the MSA facilities in a 30-foot long x 10-foot wide x 5-foot deep trench. The inorganic acids and alkalis were neutralized and flushed over the adjoining lumber yard grounds. The organic solvents and petroleum substances were transferred to a 15,000-gal tanker for subsequent disposal, and the pesticides were repackaged from existing drums and were disposed of in a

designated landfill at “Camp Hansen”. All of the empty pesticide drums were disposed of by smelting. Although the clean up report mentioned the presence of herbicides and Vietnam retrograde cargo, that same report later indicated that no herbicides or dioxins were actually found or detected [33].

### **Hamby Air Field /Chatan Town Site:**

Thirty-one pages of articles, dated 2002, from one Okinawa newspaper were also received from the Environmental Branch, USFJ/J42E, Kadena Air Base, Okinawa documenting the contamination and subsequent cleanup of a 2002 excavation of a site where the US Army apparently buried several hundred drums of contaminated materials in 1975 following the dismantling of US Army’s Hamby Air Field near Chatan Town, Okinawa [34]. One “former” Army serviceman claimed that the site was actually where the Army offloaded “*dozens of dioxin-filled barrels of Agent Orange from an American cargo vessel that struck a reef in 1969 and were subsequently buried in a 45-meter-long trench at Hamby Air Field*” [1, 2] (also, see Allegation Number 6). Lastly, another US veteran claimed that a “massive stockpile” of Herbicide Orange drums were buried near the US Marine Corps Futenma Air Station. According to the veteran, hundreds of drums were dug up in 1981 and the “*barrels secretly loaded onto trucks by Okinawan workers and transported to an unknown location*”, perhaps the landfill at the Chatan Town Site [1, 2].

The 2002 newspaper articles (in Japanese) described in detail the excavation and cleanup of the Chatan Town Site [34]. The cleanup operations began on 8 February 2002 and continued through 13 June 2002. Site restoration continued through October 2002. The operation removed and properly disposed of 187 drums containing “coal tar” and “oil tar”, and the removal of 500 tons of contaminated soil. The total cost of the operation exceeded \$ 1 million US dollars [34].

**Allegation Number 6:** *That an American Cargo Ship was stranded on a reef near Naha and drums of Herbicide Orange were recovered and subsequently buried at one of the above sites.*

**Assessment:** No historical evidence of drums, Herbicide Orange, or the description of “other cargo” was noted from examination of the histories of the Military Sea Transportation Service vessels the *LST-600* or the *USS Current*.

**Investigation:** The Naval History and Heritage Command, Navy Yard, Washington DC, provided a copy of the Command History for 1969 for the Military Sea Transportation Service's activities in Okinawa [35]. The Command History confirmed that the *USNS LST 600* went aground at Kanno Se Reef near Naha on 22 December 1968 and was refloated on 17 January 1969. The vessel was an "Amphibious Tank Landing Ship" belonging to the Military Sea Transportation Service and placed in-service as *USNS T-LST-600*. The *USS Current* arrived on the scene on Christmas Day, and immediately rigged "beach gear" and with the assistance of a LCM-6 Landing Craft (typically used for transport of vehicles, cargo, and personnel from ship-to-shore), cargo was off-loaded to lighten the LST [35]. No mentions of drums, Agent Orange, or the description of "other cargo" were noted in either the history of the *LST-600* or the *USS Current*. It was noted that on New Year's Day (1969), the remaining fuel was off-loaded from the stranded LST. As previously noted, an LST would have been an inappropriate vessel for the transport of tactical herbicides from Mobile Bay, Alabama (the Port of Embarkation for the shipment of tactical herbicides in 1968-1969) to Vietnam. Moreover, the last shipment of Herbicide Orange to Vietnam was in May 1968 [18]. By mid-May 1968, the inventory of Herbicide Orange in Vietnam was such that the RANCH HAND Squadron requested Air Force Logistic Command to retain new stocks of Herbicide Orange at Mobile Bay, Alabama (subsequently the Naval Construction Battalion Center at Gulfport, Mississippi) until required [20].

**Allegation Number 7:** *That numerous US Vietnam-era veterans stationed in Okinawa handled and sprayed Herbicide Orange, or were witnesses to it being sprayed by a C-123. Moreover, some veterans claimed that they cleaned the contaminated aircraft at Kadena Air Base.*

**Assessment:** No evidence from 7<sup>th</sup> Air Force (RANCH HAND Quarterly Reports), AFPCB Trip Reports, or any Air Staff correspondence was found that Herbicide Orange was ever transported or sprayed in Okinawa. AFPCB records do validate that some aerial spray operations of insecticides were conducted at the direction of PACAF's Medical Service Wing.

**Investigation:** Major repair operations of the RANCH HAND UC-123B and K models were not conducted in Okinawa but rather in Taipei, Taiwan [21].

However, in July 1969, new UC-123K aircraft that were scheduled to join RANCH HAND in Vietnam received corrosion control treatment at Kadena Air Base [21].

While searching through US Air Force files at the Washington National Records Center, a single page was found that identified a C-123K aircraft (tail number 56-4371) that was deployed from Phan Rang, Vietnam to Kadena AB, Okinawa from January through July 1970. There was no additional information to explain why the aircraft was sent to Kadena for seven months. The presumption was that this aircraft was one of the RANCH HAND aircraft modified for the aerial dissemination of insecticides. A report prepared by the 1<sup>st</sup> Medical Service Wing (PACAF) in April 1971 had mentioned that a serious form of malaria had been introduced into Okinawa by US veterans returning to CONUS from Vietnam [36]. A contact was made with the Commander, Detachment 3, USAF School of Aerospace Medicine, Kadena Air Base. After a thorough search of Air Force records and a search of the Armed Forces Pest Management Records for Okinawa by Detachment 3 personnel, no event (e.g., an outbreak of a mosquito-borne disease) was identified that would have required the presence of UC-123K “Bug Bird”.

Accordingly, an inquiry was placed with the RANCH HAND VIETNAM Association, Destin, Florida. Records maintained by The Association's Historian, Dr. Paul Cecil (see Reference 21), confirmed that the aircraft had been assigned to Operation RANCH HAND and was classified as a UC-123K ("U" designated a spray aircraft). The records indicated that the aircraft in question (tail number 56-4371) had arrived in Vietnam in late 1969 at the time that USAF Headquarters had directed reduction of the number of aircraft assigned to RANCH HAND. Subsequently, the aircraft was reconfigured and reassigned for transport missions with the removal of the spray system. Dr. Cecil's records showed that 46 UC-123B and or UC123K aircraft served in RANCH HAND units during the period when tactical herbicides were sprayed. However, during Vietnam, there were also four (4) full squadrons (16 aircraft per squadron) of C-123B transport aircraft and two squadrons of specialized C-123 aircraft in South Vietnam at the same time as Operation RANCH HAND. These specialized transports all converted to the "K" models prior to RANCH HAND aircraft conversions [21]. One of the four squadrons was assigned at Phan Rang [21]. Thus, the assignment of a C-123K to Kadena Air Base had nothing to do with either defoliation operations i.e., RANCH



HAND, or insecticide operations, i.e., Operation FLYSWATTER [37]. The observations by veterans that they witnessed a C-123K flying around Kadena Air Base in the time period January-July 1970 was certainly possible, but it was not assigned to missions involving the spraying of Herbicide Orange or insecticides.

## **SUMMARY AND CONCLUSIONS**

The Department of Defense has previously stated that it could find no records validating allegations that Herbicide Orange was transported to, used, stored, or buried on Okinawa. The present in-depth report again confirms the earlier Department of Defense statements to the Japanese Government and to the US Department of Veterans Affairs.

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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*.

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