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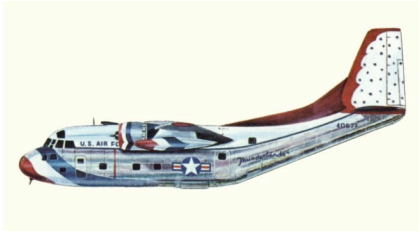
"A SCIENTIFIC REVIEW OF AGENT ORANGE IN C-123 AIRCRAFT"
Scientific? Oh, Really?

By Wesley T. Carter, Chair, The C-123 Veterans Association

"*Science*: A body of facts and knowledge from which reasonable conclusions can be made."



Can something from the Department of Veterans Affairs be called "scientific" if written solely to insure a group of veterans is excluded from VA medical coverage? Can something be called scientific if "researched" only to give voice to the policy requirements of the agency, and not with an even-handed attitude of "let's see where the evidence takes us?" No…the VA didn't want to allow the C-123 veterans to qualify for Agent Orange exposure benefits so VA set out to write a few Internet pages to give themselves a foundation for that injustice.

In this instance, C-123 Air Force veterans find it difficult to understand the "scientific review" and "investigation" to which the VA refers in their various Internet pages which deal with C-123 exposure, because those pages provide little detail and our Freedom of Information Act Request brought back the curious response that the VA insists it has no documentation dealing with the issue…and VA has even denied their own Internet pages exist.

Do you see the question raised? How can "scientific review" and "investigation" be done adequate to compel the VA to take such a severe position as to deny service connection claims, and yet VA insists there are no documents, emails, marginal notes, presentations, publications, studies, investigations, reviews, letters…nothing at all on the subject! VA's Public Health and Post-Deployment Health experts maintain C-123 veterans weren't exposed to C-123 dioxin because there was no "bioavailability" – and yet have no materials at all. How can VA claim to have conducted a "thorough review" without noting that there are thousands of references confirming C-123 veterans' exposure? How can VA claim to have dealt with this issue "scientifically" and yet bar review of VA materials from peer review?

No, this wasn't science. It was policy. Or at best, maybe "weird science" or something like that. The VA has had enough of Agent Orange-exposed veterans lined up for care and benefits to which they are entitled, and VA managers clearly want to bring this to an end. How? By pretending no other veterans were exposed, regardless of evidence to the contrary and by simply citing VA "studies" which are instead policy announcements.

But lets look into what can be found. The only examples the VA's work on C-123 veterans' exposure are the VA's very few Internet pages, and limited copes of correspondence with veterans, congressional representatives, and outside experts.

So, lets first look at their Internet pages. The basic one is titled *"Scientific Review of Agent Orange in C-123 Aircraft."* Here VA Office of Public Health claims to have "thoroughly reviewed" existing scientific studies and says post-Vietnam War veterans' are unlikely to have been exposed at levels to affect health.

The first and most glaring issue is that ***none*** of the studies which might prove the C-123 veterans case for having been exposed are listed. Carefully, the VA selected only articles and studies they felt best destroyed the veterans' case. Ignored were countless juried articles, which we'll detail in a moment or two. Next, the VA attacked and dismissed the multitude of Air Force tests over the decades that established dioxin contamination of the C-123 fleet. "Heavily contaminated" read one report, and "A danger to public health" another. Even 29 years after their last Agent Orange spray missions the airplanes stored in the Air Force desert bone yard still showed trace to low levels of contamination of dioxin, for which any detectable levels are considered unsafe.

Therefore, to minimize or dismiss the most relevant evidence for veterans' exposure, VA simply declared the Air Force tests, completed by both commercial expert firms and the military's own toxicologists, to have been done incorrectly and in a manner that released toxins otherwise not available to expose the aircrews. Dismissed was the fact that the tests were completed by highly reputable experts with doctorates in the field, and that the tests were done using well-established standard procedures called hexane wipes. In tests completed in the 2000-2009 time frame, water wipes were also used with similar results, so the VA ignores these results so as to better focus on the hexane wipes which they then dismissed to provide a basis for trashing all the contamination test reports.

Having constructed such a barrier around the confirming evidence, VA then turned to a claim to have consulted peer-reviewed literature. The first thing that stands out is the age of some VA references, ranging between ten to thirty years old. The next observation is the name of Al Young, infamous among Agent Orange victims for his career spent developing military applications for Agent Orange, and also for his decades spent claiming Agent Orange is harmless to humans. Young's article cited by the VA was actually his claim that Vietnam veterans weren't exposed and if they were, such exposure would allow little bioavailability. This point, and ones made subsequently in Young's article, form the basis grasped by the VA to deny C-123 veterans' disability claims,

Importantly, Young claims that actually no veterans were "exposed" or had "bioavailability" other than the crews actually handling or having direct contact with liquid herbicide. Of course, the National Academy of Sciences Institute of Medicine challenges this and Young's position is not at all the generally accepted view among toxicologists and epidemiological scientists, but it provided VA something to wave as its "proof."

Al Young has another point of contact regarding C-123 veterans. In 2010 the Air Force needed to resolve storage concerns about contaminated C-123s in storage. Young's input was sought and he recommended immediate destruction of the airplanes and reminded Air Force leaders that unless the destruction was done quietly, veterans might learn of the contamination and their exposure in earlier years, and seek medical care for their Agent Orange illnesses.

Again that important point – these veterans had ***already*** been exposed and Young's official recommendation made as the Senior Agent Orange Consultant to the Office of Secretary of Defense, was to quietly destroy the toxic evidence before the veteran/victims learned anything. Young's advice was repeated along the Air Force chain of command and provided the "final solution" for these toxic, aged warplanes in 2010 as they were shredded and smelted into aluminum ingots.

Young's advice was certainly NOT that of a neutral, independent observer in any of his activities. Referring to the C-123 veterans again, Young described them as "trash-haulers, freeloaders looking for a tax-free dollar from a sympathetic congressman. I have no respect for them." Young is well-known among veterans for his persistent insistence that Agent Orange causes no harm, a position he has espoused for decades as one of the principal architects of the use of the toxin in the Vietnam war.

C-123 veterans, most of whom (unlike Young) saw combat in their flying careers, and indeed, like any scientist considering Young's writings, cannot accept any conclusions from this man who flaunts such a tainted, one-sided perspective about the veterans he writes about.

What about the other references cited by the VA? Veterans managed to locate Professor (now Emeritus) L.W. Weber at Oregon State University, but Dr. Weber stated his study had nothing to contribute to any understanding of aircrew exposure and asked it not be used in that context.

Another reference cited was written by Dr. Linda Birnbaum, who is famous in the field of dioxin research, and now Director, National Institutes of Health/NEIHS and Director, National Toxicology Program. Dr. Birnbaum in recent years reviewed the Air Force test reports and other contemporary studies such as Technical Guide 312 from the Department of Defense, and has concluded that the C-123 veterans actually were exposed! So that has left the VA citing Dr. Birnbaum's article to support their pretense veterans weren't exposed, yet Dr. Birnbaum herself states veterans were indeed exposed!

The last element of the VA's "scientific review" was the Air Force School of Aerospace Medicine C-123 Consultative Letter released May 2012. Here the Air Force basically disowned its own decades of testing and posited that C-123 crews were unlikely to have been exposed. This report has received very close scrutiny from scientists such as Dr. Birnbaum and others, who fault it for the basic claim of

unlikely exposure yet also the Air Force claim that they didn't have enough information or data to make any conclusion. So how could a conclusion be reached that veterans weren't exposed when the Air Force admits not having enough data to make such as conclusion at all? A paradox…or a muddled attempt to blend USAF and VA perspectives.

Continuing examination of this Consultative Letter led to the Air Force Surgeon General stating that it must not be used by the VA to deny benefits to any veteran! Challenges to the Air Force C-123 Consultative Letter continue from many corners, including the National Institutes of Health and even the Air Force itself, and leave the whole issue an embarrassment for the Air Force and its earlier reputation for scientific integrity, earned over the decades by its famous USAF Armstrong Laboratories.

Now lets examine the errors of the VA's own "Scientific Review of Agent Orange in C-123 Aircraft" point-by-point. It might be helpful while considering this to have first downloaded and printed the article, easily Googled using that title.

1. "may be detected by sophisticated laboratory techniques many years after its use" reads the report.
   How deceptive! VA implies that only use of "sophisticated equipment" permits dioxin on these airplanes, yet standard equipment by qualified technicians are all that's required…and that's exactly what was done over the decades in which C-123 aircraft consistently tested positive, and "heavily contaminated" with Agent Orange. VA was also deceptive in using the word "may" when in fact, the proper word should be "was". "May" in scientific reports implies only a possibility, or a vagueness or basic "less likely to than now" but the actual record with C-123 Agent Orange exposure reads WAS DETECTED! And "residual TCDD," regardless of being residual or whatever was meant by that phrase, is still TCDD.
   Finally, VA states that the available reports and studies lead their own Public Health officials to conclude there was a "low probability" of exposure. This was their objective, and so they marched towards it, as was their plan in the first place. Clearly, VA spent much more time with their clever wording of this Internet page than they did actually studying the potential for C-123 claims having any validity! No effort was made to weigh pro and con evidence…as only VA evidence was admitted.
2. The next point in the VA sheet is "unlikely to have occurred at levels that could affect health." Here they have no foundation for the statement other than Young's tainted views. In fact, other federal agencies such as the Agency for Toxic Substances and Disease Registry and the National Toxicology Program and the US Public Health Service disagree and opine C-123 veterans' health is affected.
   ATSDR even states these veterans have a 200-fold greater cancer risk than the screening value! And in any case, the 1991 Agent Orange Act and other requirements only read "exposed" with no mention of levels, colors, flavors,

kinds, bioavailability - nothing other than a statutory requirement to establish exposure. Incidentally, bioavailability of dioxin by dermal route is 3% according to ATSDR, compared to 87% for inhalation…lower, and with dioxin, "it all adds up."
And the VA here agrees that inhalation of dust particles to which dioxin had become bound is at least a "low probability" – which other, more independent scientists maintain to be a ***high*** probability.

3. Regarding routes of exposure, veterans, and non-VA scientists who have evaluated the situation, claim dermal, inhalation and ingestion routes of veterans' exposure. VA dismissed inhalation of TCDD as an aerosol, yet dioxin binds readily to dust, which was ever-present. VA dismissed dermal exposure but there is a plethora of articles (none cited by the VA which ignored them all) expressing scientific agreement for the skin being a likely exposure route and both the Army and Air Force use dermal exposure models. Here VA uses more deceptive wording, stating that a solvent (hexane) was required to dislodge the dioxin in tested airplanes.
In fact, hexane is the standard wipe test used in all such situations – for instance, it would be used today at Wal-Mart, at the Post Office, an airplane, the local high school, or at any other setting where a surface contaminant needed to be studied. Further, testing by the Air Force and contracted laboratories done between 2000 and 2009 used both hexane and water wipes with similar confirming results.
4. The VA claims it will continue to review new findings relevant to this issue as they become available. Many indeed have become available, including recent expert opinions confirming C-123 veterans' exposure from a large number of other agencies, universities and independent medical and scientific experts. Ignored by the VA, or grouped by them in what they call "unacceptable lay evidence" are the following:
A: Dr. Jeanne Stellman, Professor Emerita of the Mailman School of Public Health, Columbia University*. "Veterans were exposed."*
B. Dr. Fred Berman, Director Toxicology Program, Oregon Health Sciences University. "*Veterans were exposed."*
C. Captain (Dr.) Aubrey Miller, US Public Health Service, Senior Medical Advisor to the National Toxicology Program. "Veterans were exposed."
D. Dr. Arnold Schecter, Professor of Medicine, University of Texas Medical School. *"Veterans were exposed."*
E. Dr. Linda Birnbaum, Director, National Toxicology Program and Director, National Institutes of Health/NEIHS. *"Veterans were exposed."*
F. Dr. Christopher Portier, Director, CDC/Agency for Toxic Substances and Disease Registry. "*Veterans were exposed."*
G. Dr. Wayne Dwernychuk, Chief Scientist Emeritus, The Hatfield Group Environmental Consultants. *"Veterans were exposed."*
H: EPA – "concur with ATSDR" re: *veterans were exposed*

It strikes the observer that here, that so many conclude veterans have been exposed. None of these agencies have policies about exposure one way or another, and none

of the persons providing opinions was paid to do so, unlike the VA staff assigned to prevent veterans claims from being accepted.

But, there's still much more. In other VA Internet pages about the C-123, they claim to have "thoroughly reviewed all available scientific information." Ignored, however, was every opinion, findings and other document that would have supported the veterans' claim for exposure, such as the standard guide for surface contamination, *Technical Guide 312*, considered the gold standard in this field. Other experts, using TG312, conclude C-123 veterans were indeed exposed. So the VA ignored it. Ignored, also, were publications like the CDC Dioxin Bulletin "Current Intelligence Bulletin 40" which made clear dermal dioxin exposure was happening to the veterans. Ignored, like hundreds of other scientific and medical challenges to the VA prejudice against the C-123 veterans.

Perhaps the VA, dedicated to preventing consideration of C-123 veterans claims for dermal dioxin exposure, did not favor the CDC observation that exposure was possible by simple contact, or the CDC observation that both water and hexane wipes are appropriate surface testing procedures. Nope…the CDC bulletin and other such publications do nothing to support the VA position and everything to support that of C-123 veterans, so the VA authors of "A Scientific Review" obviously felt it best to be ignored….consulted perhaps, but only to be ignored and never officially mentioned once it worked against the VA case.

Google Scholar and other Internet search engines, especially those focused on medical issues, provide more than enough support for the C-123 veterans' claim for dioxin exposure, so VA avoided mentioning them. In particular, to make sure dermal exposure was eliminated as a route of dioxin harming the veterans, even though most peer-reviewed scientific articles, such as dangers of inhalation, ingestion AND dermal exposure. You can do it yourself…Google "dermal dioxin exposure" and you'll see articles from EPA, NIH, foreign governments, state governments, commercial laboratories…the list is so very long…long and ignored by VA authorities veterans had foolishly expected to go where the science led them!

Speaking of lists, a truly resourceful observer might want to compare the CVs of the scientists who have confirmed C-123 exposure with those who in the VA deny exposure of the veterans. It would be interesting to compare, but the CVs of the VA writers are virtually invisible in academia and science.

Further, but totally ignored by the VA writers, dioxin articles frequently stress the fact that dioxin accumulates over time, and long-term exposure is more harmful than short-term, because the body can't rid itself of the toxin fast enough before reintroduction by re-exposure. Why is this important to C-123 veterans? Because these aircrews, flight nurses and flight mechanics flew the C-123 for ten years. Not only flew it, but the crews ate in it, repaired it, loaded and unloaded, slept aboard during tactical deployments (so much more comfortable than some Army tent in the dirt alongside a runway!) Exposed and re-exposed, for a full decade.

In November of 2012, sixteen concerned physicians and scientists joined Dr. Jeanne Stellman of Columbia University in bringing their professional concerns about the scientific basis for VA decisions regarding C-123 veterans exposure to military herbicides. Writing Undersecretary for Benefits Allison Hickey, they explained problems with the VA approach denying dermal absorption, because dermal exposure to dioxin is well-proven and indeed skin absorption is a primary occupational route of exposure. In general, this respected group dismissed the entire VA policy prohibiting C-123 veterans exposure claims.

"Unfortunately,' they wrote, "the VA Public Health Office, in turn, bases its conclusion on several erroneous assumptions about routes of entry of dioxin to the body, as well as other scientific misapprehensions." "We have carefully examined 'Scientific Review of Agent Orange in C-123 Aircraft' and find it seriously flawed. We feel obliged to point out the scientific shortcomings in the VA appraisal."

Mr. Thomas Murphy of the VA's Compensation Service rejected their letter on behalf of Undersecretary Hickey. Noted for his denial of a veteran's Agent Orange claim because, as Mr. Murphy wrote (and maybe even actually believed, given his professional background is not in medical issues but as an executive at Home Depot), "no long-term harm has been shown to be caused by TCDD," (TCDD is the toxin element of Agent Orange). The scientists were told that VA stands by its C-123 position, regardless of however many university, independent expert or other federal agencies saying otherwise – VA Public Health had already predetermined C-123 veterans to not have been exposed. No proof to the contrary was acceptable.

Clearly, however, C-123 veterans have firmly established the validity of their Agent Orange claims to the satisfaction of the medical and scientific communities, and to the satisfaction of other federal agencies as well…including those with the statutory responsibility for making the call about the exposure! We earned combat pay for going to war in our airplanes over the decades we flew for the Air Force, but we didn't know we should also have asked for "Agent Orange Exposure Pay" for that hazard over the years we flew the toxic C-123!

The C-123 veterans don't need any new laws or regulations, because we are fully qualified to receive VA medical care under the 1991 Agent Orange Act, various CFRs and in particular, the 8 May 2001 Federal Register in which VA explains that non-Vietnam veterans who were exposed to military herbicides will be treated the same as the Vietnam veterans. Either VA has opted to ignore this or has ruled that C-123 veterans are uniquely exempted from the protections of the law.

No part of the VA "Scientific Review of Agent Orange in C-123 Aircraft" can be considered science. The writers, having culled out from their references any publication which might argue for the veterans' claims, merely produced a one-sided policy statement which would never be accepted in a peer-reviewed journal. The VA writers involved did nothing to enhance their professional reputations with

this exercise! VA produced a product contributing nothing to science and upon which no other scientist should ever rely. And the VA knows it.

We need your help. Your senators and congressional representatives need to contact Mr. Brooks Tucker of Senator Richard Burr's staff. Senator Burr has taken the lead on this bicameral and bi-partisan issue with Mr. Tucker doing the hard work. Ask your representatives to insist to the VA that our veterans need only one thing from that agency – that it follows the law!

A hard copy of this discussion can be downloaded at www.c123kcancer.blogspot.com, including hotlinks to cited references.

UNITED STATES
DEPARTMENT OF VETERANS AFFAIRS

PUBLIC HEALTH

Scientific Review of Agent Orange in C-123 Aircraft

VA's Office of Public Health has investigated the potential exposure to Agent Orange among crew members of C-123 aircraft used previously in spraying missions during the Vietnam War.

Although residual TCDD – the toxic substance in Agent Orange – may be detected in C-123 aircraft by sophisticated laboratory techniques many years after its use, the Office of Public Health concluded that the existing scientific studies and reports support a low probability that TCDD was biologically available in these aircraft. Therefore, the potential for exposure to TCDD from flying or working in contaminated C-123 aircraft years after the Vietnam War is **unlikely to have occurred at levels that could affect health**.

To address the concerns expressed by crew members, the Office of Public Health reviewed available scientific reports and peer-reviewed literature related to potential adverse health effects, such as:

- Physical properties of TCDD (2,3,7,8-tetrachlorodibenzo-p-dioxin)
- Routes of exposure (inhalation, ingestion, dermal) and bioavailability (ability to enter the body) of TCDD over extended periods
- Known levels of safe exposure and threshold levels of TCDD toxicity

Properties of TCDD

TCDD may be inhaled as an aerosol. The reports and literature demonstrated that in the vapor stage, TCDD has an atmospheric lifetime of only about three days. Dried TCDD on interior aircraft surfaces does not aerosolize when exposed to temperatures found inside aircraft during any conceivable use. There is a low probability that dried TCDD would aerosolize during routine crew use and present a risk to health by inhalation. Also, there are no data from the U.S. Air Force or other sources confirming dioxins in air samples taken from post-Vietnam C-123 aircraft.

Routes of exposure

Ingestion as a route of exposure on these aircraft would require that TCDD would need to have entered the mouth through contaminated food or water or by hands contaminated with TCDD. There is a low probability that transfer of TCDD in food or water or from hand-to-mouth could occur among these crew members, especially given that the sampling for TCDD on the aircraft surfaces required use of a solvent (hexane) to displace and dissolve any residue.

Solid TCDD can be extremely stable in the absence of direct sunlight. Once TCDD dries on hard surfaces, such as on an aircraft, it does not readily cross through human skin. Even if the dried material were to come into contact with perspiration or oils on skin, the skin would act as a barrier prohibiting further penetration of TCDD. There is a low probability that TCDD penetrated through the skin of these aircrews.

Scientific review and analysis

The Office of Public Health reviewed the following studies and reports, and will continue to review new findings relevant to this issue as they become available.

Air Force sampling reports

- "Aircraft Sampling: Westover AFB, MA." Prepared by W.W. Conway, USAF Occupational and Environmental Health Laboratory, Brooks AFB, TX; 1979.
- "Memorandum for 645 MedGrp/SGB: Consultative Letter AL/OE-CL-1994-0203, review of Dioxin Sampling results from C-123 Aircraft, Wright-Patterson AFB, OH and Recommendations for Protection of Aircraft restoration Personnel." (444 KB, PDF) Prepared by WH Weisman and RC Porter, Armstrong Laboratory, Brooks AFB, TX; 1994.
- "Memorandum for HQ AFMC/SGC: Consultative Letter, AL/OE-CL-1997-0053, Cleanup of Contaminated Aircraft, Aerospace Maintenance and Regeneration Center." (140 KB, PDF) Prepared by RC Porter, Armstrong Laboratory, Brooks AFB, TX; 1997.
- "Dioxin and Herbicide Characterization of UC-123K Aircraft – Phase I." Prepared for Director of Operations, 505 Aircraft Sustainment Squadron and Hazardous Waste Program Manager, 75CEG/CEVC, Hill AFB, UT (prepared by Select Engineering Services, Layton, UT); 2009.

Peer-reviewed literature

- Buffler PA, Ginevan ME, Mandel JS, Watkins DK. The Air Force health study: an epidemiologic retrospective. Ann Epidemiol 2011; 21:673-87.
- Diliberto JJ, Jackson JA, Birnbaum LS. Comparison of 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) disposition following pulmonary, oral, dermal, and parenteral exposures to rats. Toxicol Appl Pharmacol 1996; 138:158-68.
- Karch NJ, Watkins DK, Young AL, Ginevan ME. Environmental fate of TCDD and Agent Orange and bioavailability to troops in Vietnam. Organohalogen Compounds 2004; 66:3689-94.
- Keenan RE, Paustenbach DJ, Wenning RJ, Parsons AH. Pathology reevaluation of the Kociba et al. (1978) bioassay of 2,3,7,8-TCDD: implications for risk assessment. J Toxicol Environ Health 1991; 34:279-96.
- Michaud JM, Huntley SL, Sherer RA, Gray MN, Paustenbach DJ. PCB and dioxin re-entry criteria for building surfaces and air. J Expo Anal Environ Epidemiol 1994; 4:197-227.
- Newton M, Norris LA. Potential exposure of humans to 2,4,5-T and TCDD in the Oregon coast ranges. Fundam Appl Toxicol 1981; 1:339-46.
- Weber LW, Zesch A, Rozman K. Penetration, distribution and kinetics of 2,3,7,8-tetrachlorodibenzo-p-dioxin in human skin in vitro. Arch Toxicol 1991; 65:421-8.
- Young AL, Giesy JP, Jones PD, Newton M. Environmental fate and bioavailability of Agent Orange and its associated dioxin during the Vietnam War. Environ Sci Pollut Res Int 2004;11:359-70.

Risk assessment reports

- Doull J. Acceptable levels of dioxin contamination in an office building following transformer fire. Washington, DC: National Academy Press, 1988.
- Kim NK, Hawley J. Risk assessment: Binghamton State Office Building. (285 KB, PDF) Albany, NY: New York State Department of Health, 1982.
- University of California [Davis]. Department of Environmental Toxicology. Risk Science Program (RSP). Intermedia transfer factors for contaminants found at hazardous waste sites: 2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD). (118 KB, PDF) Sacramento, CA: Department of Toxic Substances Control, 1994.
- United States Air Force (USAF) School of Aerospace Medicine. Consultative Letter, AFRL-SA-WP-CL-2012-0052, UC-123 Agent Orange Exposure Assessment, Post-Vietnam (1972-1982). (2.3 MB, PDF) Wright-Patterson Air Force Base, Ohio: Air Force Research Laboratory, Department of the Air Force, April 27, 2012.

Summaries of TCDD

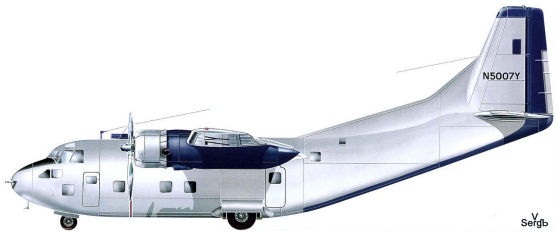
- 2,3,7,8-Tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD) - US Environmental Protection Agency, Air Toxics Website
- Chlorinated dibenzo-p-dioxins and chlorinated dibenzofurans chronic toxicity summary (46 KB, PDF) - California Environmental Protection Agency, Office of Environmental Health Hazard Assessment
- Intermedia transfer factors for contaminants found at hazardous waste sites: 2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD) (118 KB, PDF) - California Department of Toxic Substances Control; Risk Science Program, University of California, Davis

U.S. Department of Veterans Affairs - 810 Vermont Avenue, NW - Washington, DC 20420

Reviewed/Updated Date: June 19, 2012

C-123 Agent Orange Timeline

(greatly abbreviated)



1961-1971
1972
C-123s spray Agent Orange, return to USA in 1972

1979
USAF toxicological tests confirm "military herbicide" residue of Agent Orange, others

1994
USAF confirms C-123 "heavily contaminated' by dioxin

2008
All C-123s ordered into special HAZMAT quarantine

Apr 2011
Veterans first learn of C-123 dioxin contamination

Jan 2012
CDC/ATSDR agrees C-123 veterans likely exposed to TCDD.

1 2 3 4 5 6 7 8 9 10 11 12

1972-1979
Aircrews complain of extreme chemical stench in C-123

1982
C-123s all retired to desert storage at Davis-Monthan AFB AZ

1996
USAF JAG orders dioxin info "kept in official channels only"

2010
USAF orders all C-123s "quietly" smelted as toxic waste

May 2011
C123 Veterans Association formed. American Legion endorses veterans' claims

Sept 2012
VA denies C-123 dioxin exposure claim, suggests "TCDD harmless"

AGENT ORANGE

1961-1971: C-123 transports sprayed Agent Orange in Vietnam and became contaminated with dioxin. The warplanes were flown by the USAF until 1982, then retired. In 2000 USAF confirmed in Federal court C-123 fleet remained "heavily contaminated' and "a danger to public health."

Health Consultation: A Note of Explanation

A health consultation is a verbal or written response from ATSDR or ATSDR's Cooperative Agreement Partners to a specific request for information about health risks related to a specific site, a chemical release, or the presence of hazardous material. In order to prevent or mitigate exposures, a consultation may lead to specific actions, such as restricting use of or replacing water supplies; intensifying environmental sampling; restricting site access; or removing the contaminated material.

In addition, consultations may recommend additional public health actions, such as conducting health surveillance activities to evaluate exposure or trends in adverse health outcomes; conducting biological indicators of exposure studies to assess exposure; and providing health education for health care providers and community members. This concludes the health consultation process for this site, unless additional information is obtained by ATSDR or ATSDR's Cooperative Agreement Partner which, in the Agency's opinion, indicates a need to revise or append the conclusions previously issued.

You May Contact ATSDR Toll Free at
1-800-CDC-INFO
or
Visit our Home Page at: http://www.atsdr.cdc.gov

DEPARTMENT OF HEALTH & HUMAN SERVICES

Public Health Service

Centers for Disease Control
and Prevention (CDC)
Atlanta, GA 30341-3724

March 6, 2013

Domenic A. Baldini
Chief, Joint Services Records
Research Center US Army
Records Management and
Declassification Agency
7701 Telegraph Road
Room 2C12, Kingman Building
Alexandria, Virginia 22315-3860

Dear Mr. Baldini:

On January 25, 2012, the Agency for Toxic Substances and Disease Registry (ATSDR) sent the attached letter to Wesley T. Carter, USAF Retired. Major Carter had contacted ATSDR seeking an opinion about his potential exposure to 2,3,7,8 tetrachlorodibenzo-p-dioxin (TCDD) while piloting C-123 aircraft from 1972-1982. The letter represented the opinion of ATSDR and our subject matter experts.

The ATSDR letter to Major Carter included several important findings. Information contained within parentheses have been added for explanation:

- ATSDR calculated an average value of 6.36 ng TCDD/100 cm^2 for the three C-123 interior wipe samples collected on November 20, 1994. This calculation was based on information from a consultative letter from Capt Wade Weisman & Ronald Porter (see footnote 3 in correspondence to Major Carter).
- This value is 182 times higher than the screening value established by the United States Army Center for Health Promotion and Preventive Medicine – Technical Guide 312. (see footnote 2 in correspondence to Major Carter.) [Levels below a screening value are often considered acceptable. Levels above the screening value are often considered unacceptable because of an associated health risk.]
- ATSDR pointed out that the average value of the three wipe samples represented a 200-fold excess cancer risk above the screening value established by the Department of the Army.
- ATSDR stated that the office worker scenario used in Technical Guide 312 likely underestimates the daily exposures of Air Force flight personnel inside confined contaminated aircraft but that this depends upon exposed skin surface area, duration of exposure, hand washing, and food intake [as well as airborne dust].

- ATSDR stated that TCDD levels on-board contaminated planes were likely higher in 1972-1982 than in 1994 when samples were taken.
- ATSDR stated that it could not exclude inhalation [or ingestion] exposures to TCDD while working on contaminated aircraft.
- Based upon the available information, ATSDR concluded that aircrew operating in this, and similar, environments were exposed to TCDD.

I hope this information is useful. Please contact Thomas Sinks, Ph.D., Deputy Director at 770 488-0604 if you have any questions.

Sincerely,

Christopher J. Portier, Ph.D.
Director, National Center, and
Environmental Health, and
Agency for Toxic Substances and
Disease Registry

Glossary

Agency for Toxic Substances and Disease Registry (ATSDR)	The principal federal public health agency involved with hazardous waste issues, responsible for preventing or reducing the harmful effects of exposure to hazardous substances on human health and quality of life. ATSDR is part of the U.S. Department of Health and Human Services.
Cancer Risk	A theoretical risk for developing cancer if exposed to a substance every day for 70 years (a lifetime exposure). The true risk might be lower.
Cancer Risk Evaluation Guide (CREG)	The concentration of a chemical in air, soil or water that is expected to cause no more than one excess cancer in a million persons exposed over a lifetime. The CREG is a *comparison value* used to select contaminants of potential health concern and is based on the *cancer slope factor* (CSF).
Cancer Slope Factor	A number assigned to a cancer causing chemical that is used to estimate its ability to cause cancer in humans.
Carcinogen	Any substance that causes cancer.
Comparison value	Calculated concentration of a substance in air, water, food, or soil that is unlikely to cause harmful (adverse) health effects in exposed people. The CV is used as a screening level during the public health assessment process. Substances found in amounts greater than their CVs might be selected for further evaluation in the public health assessment process.
Contaminant	A substance that is either present in an environment where it does not belong or is present at levels that might cause harmful (adverse) health effects.
Dermal Contact	Contact with (touching) the skin (see route of exposure).
Dose (for chemicals that are not radioactive)	The amount of a substance to which a person is exposed over some time period. Dose is a measurement of exposure. Dose is often expressed as milligram (amount) per kilogram (a measure of body weight) per day (a measure of time) when people eat or drink contaminated water, food, or soil. In general, the greater the dose, the greater the likelihood of an effect. An "exposure dose" is how much of a substance is encountered in the environment. An "absorbed dose" is the amount of a substance that actually got into the body through the eyes, skin, stomach, intestines, or lungs.

Environmental Media Evaluation Guide (EMEG)	A concentration in air, soil, or water below which adverse non-cancer health effects are not expected to occur. The EMEG is a *comparison value* used to select contaminants of potential health concern and is based on ATSDR's *minimal risk level* (MRL).
Environmental Protection Agency (EPA)	United States Environmental Protection Agency.
Exposure	Contact with a substance by swallowing, breathing, or touching the skin or eyes. Exposure may be short-term [**acute exposure**], of intermediate duration, or long-term [**chronic exposure**].
Hazardous substance	Any material that poses a threat to public health and/or the environment. Typical hazardous substances are materials that are toxic, corrosive, ignitable, explosive, or chemically reactive.
Ingestion	The act of swallowing something through eating, drinking, or mouthing objects. A hazardous substance can enter the body this way [see route of exposure].
Ingestion rate	The amount of an environmental medium that could be ingested typically on a daily basis. Units for IR are usually liter/day for water, and mg/day for soil.
Inhalation	The act of breathing. A hazardous substance can enter the body this way [see **route of exposure**].
Inorganic	Compounds composed of mineral materials, including elemental salts and metals such as iron, aluminum, mercury, and zinc.
Lowest Observed Adverse Effect Level (LOAEL)	The lowest tested dose of a substance that has been reported to cause harmful (adverse) health effects in people or animals.
Media	Soil, water, air, plants, animals, or any other part of the environment that can contain contaminants.
Minimal Risk Level (MRL)	An ATSDR estimate of daily human exposure to a hazardous substance at or below which that substance is unlikely to pose a measurable risk of harmful (adverse), noncancerous effects. MRLs are calculated for a route of exposure (inhalation or oral) over a specified time period (acute, intermediate, or chronic). MRLs should not be used as predictors of harmful (adverse) health effects [see **reference dose**].

No Observed Adverse Effect Level (NOAEL)	The highest tested dose of a substance that has been reported to have no harmful (adverse) health effects on people or animals.
Oral Reference Dose (RfD)	An amount of chemical ingested into the body (i.e., dose) below which health effects are not expected. RfDs are published by EPA.
Organic	Compounds composed of carbon, including materials such as solvents, oils, and pesticides that are not easily dissolved in water.
Parts per billion (ppb)/Parts per million (ppm)	Units commonly used to express low concentrations of contaminants. For example, 1 ounce of trichloroethylene (TCE) in 1 million ounces of water is 1 ppm. 1 ounce of TCE in 1 billion ounces of water is 1 ppb. If one drop of TCE is mixed in a competition size swimming pool, the water will contain about 1 ppb of TCE.
Reference Dose Media Evaluation Guide (RMEG)	A concentration in air, soil, or water below which adverse non-cancer health effects are not expected to occur. The RMEG is a *comparison value* used to select contaminants of potential health concern and is based on EPA's oral reference dose (RfD).
Route of exposure	The way people come into contact with a hazardous substance. Three routes of exposure are breathing [inhalation], eating or drinking [ingestion], or contact with the skin [dermal contact].
Toxic Equivalent (TEQ)	Is defined as the sum of the products of the concentration of each compound (e.g., dioxin and furan compound) multiplied by its Toxic Equivalent Factor (TEF) value.
Toxic Equivalency Factors (TEFs)	It is an estimate of the toxicity of the compound relative to 2,3,7,8-Tetrachlorodibenzo-*p*-dioxin (TCDD). Each dioxin/furan is multiplied by a TEF to produce the dioxin TEQ. The TEQs for each chemical are then summed to give the overall 2,3,7,8-tetrachlorodibenzo-*p*-dioxin TEQ.
Volatile organic compound (VOC)	Organic compounds that evaporate readily into the air. VOCs include substances such as benzene, toluene, methylene chloride, and methyl chloroform.

CHRONOLOGY OF SUPPORTING DOCUMENTS (*generally newer to older*): note: About one-quarter of all C-123K/UC-123K aircraft were used for spraying Agent Orange in Vietnam until 1971. Most Vietnam-based aircraft returned USAF Reserve inventory in 1971-1972, then flown until 1982 when most were sent to Davis-Monthan AFB AZ for storage with some diverted to museum use. 42% of all post-Vietnam C-123 aircraft had been Agent Orange spray airplanes during the war. VA awards service connection to veterans evidencing a source of Agent Orange contamination, exposure to that contamination, and an Agent Orange-presumptive illness; Title 38 3.09 VA opposes C-123 veterans by refusing to recognize exposure. Full documentation & discussion at *http://www.c123cancer.org*

14 Mar 13, *VA Rating Decision (Denial), Major Wes Carteral)*, Portland VARO, denied veteran's claim re: service connection for Agent Orange exposure while flying the dioxin-contaminated C-123, 1974-1980

11 Mar 13. *Official NIH Letter*, CAPT Aubrey Miller MD MPH, US Public Health Service/NIH, Senior Medical Advisor to National Institutes of Health National Toxicology Program. "Veterans were exposed."

6 /Mar 13. *Official Finding/Consultation*, Dr. Christopher Portier, Director, CDC/Agency for Toxic Substances and Disease Registry, to Director, Joint Services Records Research Center, "Veterans were exposed" and "200-fold greater cancer risk."

28 Feb 13 *VA Rating Decision (Denial) LtCol Paul Bailey of Bath NH*, Manchester NH Regional Veterans Administration Office; denied veteran's claim re: service connection for Agent Orange exposure while flying the dioxin-contaminated C-123, 1974-1980. Rejected NIH, CDC, EPA, US Public Health expert findings as "unacceptable lay evidence."

10 Jan 13. *Letter*, Mr. T. Murphy Director VA Compensation Services to Dr. J. Stellman, refuting Dr. Stellman's and colleagues' findings confirming C-123 veterans' exposure, repeats denial of exposure citing "scientific literature" relied upon by VA's Health Benefits Administration study.

3 Jan 13. *Independent Medical Opinion*, Arnold Schecter M.D., Univ. of Texas School of Public Health; "aircrews were exposed."

29 Nov 12. *Experts' Joint Letter*, Ten scientists & five physicians challenge to VA re: poor scientific procedures used to deny Agent Orange exposure finding to C-123 veterans, cover letter authored by Dr. Jeanne Stellman.

25 Sept 12. *Advisory Opinion,* Mr. Thomas Moore, VA Director Compensation Services. Asserted TCDD is harmless, scientists' expert opinions are unacceptable when considering C-123 veterans' claims.

6 May 12. *Agent Orange - 50 Years History and Newest Concerns* , Dr. T. Irons & others, poster display (no peer review or juried evaluation) at San Francisco SOT, argued against C-123 veterans exposure via "dry dioxin transfer."

1 May 12. *Memorandum Post Vietnam Aircraft Agent Orange Exposure*, MG Thomas Travis MD CFS, Deputy Surgeon General USAF, reviews USAFSAM report which minimizing exposure; opts not to inform veterans to avoid "undue distress" to exposed populations

6 Mar 12. *Independent Scientific Opinion*, Dr. Jeanne Stellman, Mailman School of Public Health, Columbia University. Confirmed aircraft contamination and aircrew exposure.

4 Mar 12. *Independent Scientific Opinion*, Dr. Fred Berman, Director, Toxicology Department , Oregon Health Sciences University. Confirms aircraft contamination and aircrew exposure therein. With attachments.

22 Feb 12. *Scientific Review of Agent Orange in C-123 Aircraft* , VA Public Health announcement of low probability of crew TCDD exposure and unlikely long-term health problems from the contamination.

26 Jan 12. *Official Letter*, Dr. T. Sinks, Deputy Director Agency for Toxic Substances and Disease Registry, that C-123 aircraft were contaminated, aircrews exposed, and exposure even higher before first test were completed.

I9 Dec 11. *Independent Scientific Opinion*, Dr. J Goeppner (LtCol, USA Chemical Corps, Ret), confirming aircrew exposure to harmful levels of dioxin.

9 Jun 11. *Official Letter*. Dr. Linda Birnbaum, Director Nat'l Institute of Environmental Health, and Director National Toxicology Program, concluding "exposure is assumed based on wipe-tests demonstrating high dioxin concentrations in the C-123Ks.

1 June 11. *HQ, Air Force Reserve Command FOIA Response re: C-123 Agent Orange Background*, report confirms aircraft assigned to 731st TAS dispersed "chemical defoliants" over Southeast Asia.

15 Dec 09. *Email,* Mr. Karl Nieman to Mr. Wayne Downs, re: value of C-123 engines and possible parting-out. *Herbicide Characterization of UC-123K Aircraft,* Phase I.

12 Nov 09. *Memorandum* and Support Paper for AMARG/CC from Mr. Wm. Boor, requesting "special handling for UC-123K aircraft because of Agent Orange." All C-123s were smelted as toxic waste May 2010.

27 Jul 09. *Memorandum*, Dr. Alvin Young to Mr. Wm. Boor, re: disposal of UC-123K aircraft. Recommends no add'l sampling to safe money and to avoid necessity of designating more aircraft as toxic if tested contaminated.

July 09. *Final Dioxin & Herbicide Report Characterization of UC-123K Aircraft, Phase I*, Dr. W. Downs 75CEG HAZMAT Program Manager.

26 Jun 09. *Memorandum*, Dr Alvin Young to Mr. Jim Malmgren, 505th ACSS re: Decision Memo for Contaminated UC-123K Aircraft. Discussed disposal of aircraft, preventing veterans' awareness re: claims.

24 Jun 09. Memo for the Record. Summarizes Jim Malmgren's presentation and response to comments.

24 Feb 09. *Decision Memorandum on Contaminated C-123K Airplanes* Dr. Alvin Young to Major C. McCrady. Suggests need for speedy destruction of aircraft, proper wording of pre.ss release for media.

Mar/Aug 08. *UC-123 HAZMAT Safety Plan*, Mr. Wayne Downs, 75ABW/CEG and Mr. Karl Neiman, Select Engineering Layton, UT. Reviewed contamination & dioxin tests, C-123s moved into AMARG quarantine area

5 Nov 07. *Board of Veterans Appeals Citation 0734812*. Award of Agent Orange service connection claim to C-123 veteran, Hanscom & Westover AFB

13 Jun 07. *Board of Veterans Appeals Citaton 0717857*. Award of Agent Orange service connection claim to C-123 veteran, Pittsburgh Air Reserve Station

31 Jul 03. *Study Memorandum* for AOO-ALCD/LCD from AFIOS. 100% contamination of all surfaces tested at Air Force Museum; contamination of remaining surplus planes, concerns about contaminated ground soil, etc.

05 Aug 97. *Memorandum* for Secretary of the Air Force/IA from Vice Commander, Air Force Security Assistance Center, WPAFB, Ohio. Details of C-123K aircraft provided allied military forces under Military Assistance Program.

18 Mar 97. *Memorandum* for AFCM/SG from Dr Ron Porter, Toxicologist Health Risk Assessment/Armstrong Laboratory. Concludes "potential for individual exposure to associated with residues of past mission activities".

10 Jan 97. *Memorandum* for AMARC/CD, from Brig. Gen. D. Haines, disposition of contaminated C-123 aircraft. Discusses sale by State Department & other agencies of toxic airplanes. Directed AF to seal all remaining C-123s.

8 Jan 97. *Memorandum of Caution* from Ms. Peggy Lowndes, General Services Administration to Major U. Moul, Staff Judge Advocate, AF Office of Environmental Law; describes GSA sales of dioxin aircraft to Disney.

30 Dec 96. *Note,* Brigadier General O. Waldrop Staff Judge Advocate HQ AFMC to BG Harris, "the political risk, cost of litigation and potential tort liability of third parties make FMS disposal of contaminated aircraft imprudent."

26 Dec 96. *Memo* from Brigadier General Todd Stewart HQ/AFMC/CE to Brigadier General Hanes, HQ AFMC/LG regarding sale of contaminated aircraft as inappropriate, unjustified double standard.

18 Dec 96. *Letter*, Major U. Moul to Mr. Doug Boylan GSA Sales, advising GSA of need to cancel sale of ten surplus UC-123K due to Agent Orange contamination

5 Dec 96. *Memorandum,* Ralph Shoneman Executive Director to HQ AFMC/LGH, Disposition of Dioxin Contaminated C-123 Aircraft.

31 Oct 96. *JAG Memorandum* from Major S. Gempote, Office of the Command Surgeon AFMC. Addresses contaminated C-123K at AMARC, concerns re: military and civilian workers and C-123 dioxin contamination.

31 Oct 96. *Memorandum* for HG AFMC/LtGen Farrell from Mr. R. Schoneman, Executive Director AMARC, re: "disposal contaminated C-123 aircraft" Dioxin-contaminated C-123K aircraft sold by GSA to general public.

30 Oct 96: *Memo*, HQ AFMC/LOG/JAV to ESOH C&C: JAG attorney Major Ursula Moul, endorsed by Colonel John Abbott, recommends, *"I do not believe we should alert anyone outside official channels of this potential problem."*

30 Oct 96. *Staff Summary*, Brigadier General G. Haines to staff, decontamination and legal liabilities mentioned. Memo recommended "*for information only*."

16 Aug 96. *Industrial Hygine Survey C-123 Aircraft,* DO Consulting Ltd for AMARG. Tested presence of 2,4-D and 2,4,5-T. Water wipes confirmed herbicide contamination present 25 years after last Vietnam spray missions.

17 Apr 96. *Memo,* Mr. Wm. Emmer, Chief of Safety 355AMDS, directed personnel HAZMAT protection IAW AFR and USAF Surgeon General standards around all stored Davis-Monthan AFB stored C-123K airplanes.

19 Dec 94. *Memorandum* for 645 Med Group/USAF Museum, Capt. Wade Weisman & Dr. Ron Porter, AF Staff Toxicologists. Tested C-123 Tail #362 as "*heavily contaminated on all test surfaces."* Recommended HAZMAT protection, decontamination. Dr. Porter testified "*a danger to public health*" in a federal court action.