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**A Re-Analysis of Blue Water Navy Veterans  
And Agent Orange Exposure**

by John Rossie and Ray Melninkaitis  
*for The Blue Water Navy Vietnam Veterans Association*

# The Dioxin Triangle



# A Re-Analysis of Blue Water Navy Veterans and Agent Orange Exposure

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## Introduction

In October, 2009, the Department of Veterans Affairs (DVA) ordered a study to be completed by the Institute of Medicine (IOM) <sup>1</sup>concerning the exposure of Blue Water Navy veterans to Agent Orange-dioxin that was used on mainland crops and vegetation during the Vietnam War. Dioxin is known to cause certain illnesses. The objective of the study was to determine whether or not the Blue Water Navy personnel, stationed in the waters offshore Vietnam, had been exposed to dioxin.

The Committee set out to determine at the very least these two specific issues:

- Whether it was possible to demonstrate that Blue Water Navy personnel were or were not exposed to Agent Orange–associated TCDD (dioxin), and
- Whether it was possible to state with certainty that exposure of Blue Water Navy personnel, taken as a group, was qualitatively different from that of their brown water navy and ground troop counterparts.

In developing their report, <sup>2</sup>the IOM Committee quickly determined that they were unable to provide much of the data requested by the DVA. They state numerous times in the study <sup>3</sup>that they were not able to make scientific conclusions regarding any quantities of dioxin that may have caused harm because they had no basis for such measurements due to lack of any initial historical data. This fact was already well known among the medical and scientific community given previous studies that faced the same roadblock. Since no measurement data was available from the time the dioxin spray was in use, there was no measurement data available at this later point in time to specify quantifiable conclusions.

The IOM Committee had no data to either prove or disprove whether Blue Water Navy personnel were exposed to Agent Orange-associated TCDD at any specific measurable level. And, more importantly, the Committee had no data to either prove or disprove whether the brown water navy or the ground-based troops within Vietnam were exposed to Agent Orange-associated TCDD at any particular measurable level. It was impossible to state a demonstrable level of TCDD anywhere in the environment of the Vietnam War Zone including on the waters, in the air, or on the land. A necessary corollary, important to the DVA disability claims process, is that no data exist that can be used to disprove a claim from any Vietnam veteran for exposure to Agent Orange based on scientific measurement.

After admitting this limitation, the IOM Committee announced the report would provide a qualitative analysis based mainly on past primary source written observations and present anecdotal information that did not show measurements and compare numbers, but merely reflected various opinions of probability and possibility as to whether TCDD might have contaminated those who fought the Vietnam War on land, at sea and in the air. This IOM Study progressed no further than the conclusions reached when the Agent Orange Act of 1991 was written. They found no alternative to the established concept of “presumption of exposure” to justify a veteran’s disability claim for a dioxin-based disease.

The IOM Report could not demonstrate whether the Blue Water Navy was or was not exposed to TCDD dioxin. It could not state with certainty that the three specified groups of Vietnam veterans had qualitatively different exposures to TCDD dioxin. The Report could not provide an answer to either of the two specific issues it set out to determine.

One important thing we do know is that in 2012 and 2013, 40 years after the spraying of dioxin ceased, several areas within Vietnam still show high levels of dioxin that has persisted. Efforts are currently underway to remediate the environmental damage in some of these areas. There is an effort to stop the continuous contamination these areas have caused over the intervening years by blowing dust and entry into the animal food cycle. If those areas are still so dangerously contaminated after 40 years, they must have initially been far more contaminated when they were created.

### **What is presumption of exposure?**

Because it was not possible to know how much dioxin was originally present, or even to verify which individuals were exposed and which were not, it was taken as a given that any Vietnam veteran who demonstrated symptoms of any diseases found to be associated with dioxin was presumed to have been exposed to dioxin. This was reasonable because dioxin exposure was the only known causal agent common to all Vietnam veterans for the specific diseases they suffered whether they were in the "naval, military or air services." This initially allowed any veteran who had been in the Theater of Combat <sup>4</sup> to receive VA Health Care and Compensation benefits for identified medical conditions without a need for them to provide any documented proof of actual exposure.

This rule for presumption of exposure was the basic concept employed by Congress when they passed the Agent Orange Act in February, 1991. <sup>5</sup> It allowed a Vietnam War veterans to claim a 'service-connection' for health conditions recognized as being caused by active duty service. Having the designated disease was proof of exposure to Agent Orange-dioxin. Between 1991 and February, 2002, no Vietnam veteran who served on the land or on the inland waterways or off the coast of Vietnam was required to present any sort of documentation as evidence for actual dioxin exposure. They needed only to prove they were in the US Military between January 9, 1962 and May 7, 1975, and were honorably discharged; prove they served in the Combat Zone of Vietnam during that time; and prove they had a valid diagnosis of any of the diseases recognized by the DVA as being related to Vietnam service. <sup>6</sup> If they contracted any of the recognized diseases, they automatically received their medical care and compensation benefits from the VA with no further questions asked.

Congress established that criteria because all attempts to quantify levels of dioxin exposure for anyone who was in the Combat Zone of Vietnam proved impossible. Since no initial measurement of dioxin had been made for any location at any toxicity level during the time the Agent Orange-dioxin was used in Vietnam, no subsequent measurement comparisons could be made. This was a well-known scientific truth in 1991 and was even truer in 2009, 18 years later.

In February, 2002, the DVA changed their rules initially set forth in 1991 <sup>7</sup>, so that any Vietnam War veterans whose feet did not touch the ground of Vietnam, or any of its offshore islands, were suddenly excluded from the presumption of exposure and were consequently ineligible for the VA benefits of Health Care and Compensation even if they displayed symptoms of an Agent Orange-related disease. Offshore veterans already receiving benefits stopped receiving VA-provided health care as well as disability compensation payment. <sup>8</sup>

If a veteran was anywhere other than on the ground in Vietnam, they were now required to show documentation that they had, at some time during their active duty service, set foot on Vietnamese soil or had presence on an inland waterway – exactly what the Agent Orange Act of 1991 intended to avoid. Or they could provide even harder to find documentation verifying direct exposure to Agent Orange. Otherwise, they were no longer covered by the carefully constructed and thoughtful provisions of the rule of law for presumptive exposure.

The DVA's action in 2002 very obviously and quite pointedly eliminated veterans of the Coast Guard, Navy and FMF Marines afloat, <sup>9</sup> who fought the Vietnam War from offshore, from receiving their medical and compensation VA benefits. They suffer identical diseases as veterans with "boots-on-ground" unique to dioxin but are denied the presumption of an identical cause. They are now held to a much higher and more onerous standard in their requirement to document their exposure to dioxin if they expect to receive VA benefits for their service-connected dioxin injuries. That documentation is extremely hard to find and it is still not required of other veterans who served in the same Combat Zone of the Vietnam War, but on solid ground. At times, these servicemen were only separated by a few feet. <sup>10</sup>

### **The DVA's Federal Register Notice**

Based on a review of the stated objectives of the IOM Report of 2011, titled Blue Water Navy Vietnam Veterans and Agent Orange Exposure, in conjunction with an analysis of various comments on the conclusions of that study, the Blue Water Navy Vietnam Veterans Association (BWNVVA) believes that the information provided in the IOM Report is inadequate to support the position of the DVA and that the IOM Report is devoid of the necessary content to support the statements the DVA published in the Federal Register Notice Citation 77 FR 76170 <sup>11</sup> which appeared on December 26, 2012. DVA statements within that Notice are not only unfounded; they are false and misleading. <sup>12</sup>

Consequently, the DVA Notice stating that "Presumption of Exposure to Herbicides for Blue Water Navy Vietnam Veterans Not Supported" does not accurately reflect the findings of the IOM Study, which is specifically referenced. The Study does not contain enough factual evidence to support that conclusion, and the Study does not support the exclusion of offshore veterans from the presumption of exposure.

In examining the overall picture, it is quite obvious that the DVA is applying the same "lack of evidence for exposure" used to grant the

presumption of exposure to boots-on-ground veterans on the one hand to that exact same “lack of evidence for exposure” that is used to deny the presumption of exposure to offshore personnel.<sup>13</sup> In both cases, the veteran presents with a current disability by an Agent Orange-related disease, and in neither case, according to the IOM Study, does one veteran possess greater probability of exposure. The three populations of Vietnam veterans end up on equal footing as to their probability of viable exposure pathways and all populations are at least as likely as not to have the same cause for their identical disease.

### **Going Beyond the Painfully Obvious**

Granted, not everything the DVA deals with is starkly black and white, nor is absolutely everything presented in a veteran’s claim for benefits always fully documented. In the VA claims adjudication process, there actually is some value given to the logic of ‘relative probability’ that can reasonably weigh the case in the veteran’s favor.<sup>14</sup>

When the military documentation to back-up a veteran’s claim for benefits is simply not available, as is often the case with military personnel and health records, the DVA sometimes accepts a reasoned argument that concludes an event was ‘at least as likely as not’ to have occurred while the veteran was on active duty. When evidence to the contrary is just as or even more uncertain, VA Law requires that the benefit of the doubt be ruled in favor of the veteran. So there is some value to including multiple probable scenarios to support a situation that lacks the certainty of documentation.

### **Levels of Exposure**

Research that has been conducted, verified and peer reviewed<sup>15</sup> should put to rest the misconceptions that spray drift from Ranch Hand missions in Vietnam was unable to travel 50 to 100 miles to reach even the furthest ships from the Vietnamese shore and that airborne dioxin quickly settled or degraded. Given the infinitesimal amount of dioxin capable of causing extreme damage to living organisms,<sup>16</sup> off-the-cuff pronouncements referring to ‘non-harmful doses’ or ‘low levels of exposure risk’ to dioxin should be immediately ushered out the door along with anyone who utters them. Dioxin exposure occurs at levels far below detection.<sup>17</sup>

U.S. Law requires the EPA to determine the level of contaminants in drinking water at which no adverse health effects are likely to occur. But there is no base threshold and no known “safe” level for TCDD dioxin. There is only our technological limitation to deal with such microscopic measures. The EPA has non-enforceable health guidelines, based solely on potential health risks and cumulative exposure over a lifetime “with an adequate margin of safety.” These are called maximum contaminant level goals (MCLG). The MCLG for dioxin is zero. However, the EPA has set an enforceable regulation for dioxin, called a maximum contaminant level (MCL), at 0.0000003 mg/L or 30 ppq (30 parts per quadrillion or 30 x 10-raised to the 15th power).<sup>18</sup> This should be kept in the forefront of our minds when we hear statements about ‘safe’ levels of dioxin’ that offer no probability of causing long-term health problems in humans.

### **What You Don’t See Can Hurt You**

The IOM Report provided an analysis of possible pathway by which the three classes of Vietnam veterans could have been exposed to dioxin. One of those ways unique to Blue Water Navy personnel was the contamination of shipboard water. Because the technology of distilling water for use onboard ships did not allow for detecting and filtering out elements such as dioxin, and no one at that time even knew enough to be looking for it, contamination of the water supply is the primary suspect for causing the most widespread exposure to offshore veterans. In 2002, an Australian Study<sup>19</sup> found that the water distillation process, which used a high heat flash to evaporate the saltwater and to collect the condensation which would then be salt-free, would actually enhance the toxicity of any dioxin present in the original saltwater. The Australians currently provide care for their seagoing Vietnam veterans, who sailed in the same water at the same time with our Navy, based on this principle for any sailors who show symptoms of dioxin exposure.

Water was a constant need aboard ships of the vintage that served offshore Vietnam because of the steam-driven propulsion systems which were identical for US and Australian ships. Fuel oil was burned to heat water that created steam under pressure. The steam was used to turn generators which then powered the ‘screws’ that propelled the ship. Removal of salt from the sea water was required to minimize the corrosion of the piping and generator components. The presence of dioxin in that ‘feed water’ for the boiler plant was of no concern to this engineering process. But the fresh, potable water used for cooking, drinking, clothes washing and showering was taken from the desalinized feed water system when there was an excess amount to fill the fresh water tanks used by the crew. This fresh water contained the highly toxic dioxin that was enhanced during the desalination process.

The Australians originally estimated that the dioxin that exited the shipboard water processing became about four times as toxic as the original dioxin. The IOM studied this Australian report and did their own calculations. They confirmed that the heat process in desalination enhanced the toxicity of dioxin, but their estimates indicated that the enhanced dioxin could have been up to ten times as toxic as the original. And this is what ended up in the potable water on the ships. Not only would this expose everyone who ingested it or absorbed it through their skin; it would be equivalent to receiving 10 times the exposure level as the ground troops receiving. So shipboard personnel had a much higher level of exposure through this means than did the ground based or inland water-based Vietnam veterans.

Dioxin entered the sea water by a number of ways, including: the run-off of the millions and millions of gallons of herbicide sprayed on the land that drained by streams and rivers into the ocean; herbicide spray drift (up to 13% of what was sprayed) that settled onto the inland and offshore water surface; thousands of gallons that were periodically dumped into the ocean when the Ranch Hand spray planes had to eject

their loads in an emergency; and the aerial spraying of inland waterways and shoreline water. Additionally, brown water sailors sprayed the shorelines of the canals and rivers they patrolled.

When combined with several types of cancers that show up in a much higher percentage of offshore veterans <sup>20</sup>, one might consider this a strong evidence showing the exposure of offshore veterans to herbicide. But that is not how the DVA sees things. Because there is no actual proof that dioxin was in the water, and no one can provide an actual measurement of the amount of dioxin that was in the water, DVA claims that there was no dioxin in the water. Recall, however, that no measurements for actual proof that dioxin existed for any specific locations in-country. In that instance, the DVA did not conclude that there was no dioxin. Additionally, they claim that Ranch Hand-sprayed herbicide fell directly to the ground, and the 13% portion that did not could not have drifted off the shoreline out to the ships. We know from scientific and atmospheric studies that the drifting spray could easily travel a distance of 80 miles, if in fact there were any ships that far out from land. This is a strong example supporting the IOM Committee's conclusion in the Preface of their Report (page x) stating: *"Indeed the committee believes that given the lack of measurements taken during the war and the almost 40 years since the war, [the resolution of this issue] will never be a matter of science but instead a matter of policy."*

### **Taken as a group**

The IOM was directed to study possible transport routes for exposure of Blue Water Navy personnel "taken as a group," as required in the Statement of Work. The IOM states what they found would apply to all Blue Water Navy veterans. <sup>21</sup> However, if Blue Water Navy sailors are reviewed in select sub-groups, such as those who anchored in Da Nang Harbor, the potential for their exposure approaches 100%. The site-specific conditions within Da Nang Harbor were drastically different than for those of ships anywhere else in Vietnam regardless of their distance from shore. As stated in "The Da Hang Harbor Report," that specific body of water was so close to a major Ranch Hand facility that the daily operation of the spray missions resulted in a nearly constant drainage of Agent Orange-dioxin from the wash-down area into the Harbor. <sup>22</sup>.

Da Nang Harbor is the drainage point for two rivers in the watershed of one of the heaviest sprayed areas of the country and, because of its proximity to the Da Nang Airfield, should be considered a direct exposure area for every veteran who was in the Harbor or on land in the immediate vicinity for any amount of time whatsoever. At the very least, the Harbor itself should be considered an uncontested presumptive exposure area. The exposure of anchored ships to the vapors of water-borne dioxin was overwhelming, as reported by hundreds of naval personnel who were essentially trapped on their anchored vessels as waterborne dioxin surrounded them, kept buoyant by the fuel oil it was mixed with. Those Blue Water Navy veterans were forced to inhale vapors as the supply of floating dioxin was refreshed multiple times on a day by the constant drainage of Agent Orange from the Ranch Hand wash-downs required for the planes and the tarmac. This was augmented by the rinsing out of Agent Orange barrels that were put to other uses by the local population. <sup>23</sup>.

Da Nang Airfield and the wash-down area just off the north end of the runway, is one of the most dangerous "dioxin hot spots" in the country and has been the location of one of the largest and most intense dioxin remediation projects in the history of the world. <sup>24</sup>.

### **The Da Nang Air Base**

The Air Base at Da Nang was a principal point of departure for supplies and personnel bound for the ships off the coast of Vietnam. In the early days of the War, this occurred on a relatively unsupervised basis. This process of moving men and materials through Da Nang became so strategic from about 1966 onward that the Fleet Air Support Unit at Da Nang was established in October, 1969. <sup>25</sup>. The facility was located about 350 yards down the open, windswept runway from the Ranch Hand ramp and Agent Orange storage area. Orchestrating the pace and volume of this traffic by those manning this facility earned them the Navy Unit Commendation Award. During the three month period from October 6 to December 31, 1969, the facility handled over 2,000 passengers outbound for ships in the Fleet along with 73 tons of supplies and 275 tons of mail, all waiting on the tarmac, gathering dust and dirt, and bound for the ships of the 7th Fleet off the coast of Vietnam. <sup>26</sup>

Consider this simple scenario: The Ranch Hand ramp area was washed down multiple times, pushing the spilled Agent Orange herbicide onto the dirt toward a drainage ditch off the north end of the runway. The sun dried the dirt creating one of the most toxic sources of dirt and dust on the planet. Day after day, multiple times a day, thousands of packages, canvas mail bags, and men in dress and work uniforms collected the dust blowing around the FASU facility as they waited on the tarmac to board the near-continuous stream of COD planes that flew them directly out to aircraft carriers off the coast of Vietnam. All of this was unloaded on the carrier, where the men and equipment with their accumulated dirt and dust either stayed or were further flown by helicopter to one of the smaller ships in the Carrier Force.

In the almost 11 years that scenario was repeated, how much contaminated dust left Da Nang and ended up on the carriers and the other ships at sea? We know there will never be a specific number representing the pounds or tons of dust and dirt we are referring to. We don't know exactly which way the wind was drifting on any particular day in that exact location, although we know it blew generally out to sea. But we know that at that time, Da Nang Airfield was one of the busiest airports in the world. <sup>27</sup> Because of the intense jet engine and propeller-driven motion of the air at ground level and at low altitudes, there had to have been air motion at a local level around the Airbase that simply swirled around on the runways apart from any prevailing seaward winds. We can safely assume that anything that was light enough to be blown around was blown around, up and down and around the tarmac. Aircraft was taking off and landing, and helicopters were coming and going in the immediate vicinity. We know through common sense and experience that some amount of contaminated dirt originating just off the northern edge of the runway was blown around the Airbase. If the dust and dirt was blowing, and items were out on the runway, those



items ended up with dirt and dust on them. And extremely minute specks of dioxin-laden dust was enough to cause biological harm if it was inhaled or absorbed by some specific serviceman susceptible and just unlucky enough to be bioavailable at the time. Dirt and dust was carried from the Da Nang Airbase to the aircraft carriers via COD planes in this manner. From what common sense tells us about the world we live in, to deny that no contaminated dirt or dust moved in this manner from shore to ship would make Da Nang the most unique spot on Earth to be spared that occurrence. Like the IOM Committee, we can't specify any particular amount; we just know how hard it is to keep dust and dirt off the items we use in our daily lives, indoors or outside.

We also know that inhaling or having sweaty dermal contact with extremely small amounts of contaminated dust and dirt constituted 'exposure to dioxin-based herbicides in Vietnam.' Ever present dust is impossible to avoid, no matter where you are. The remediation work done at the Da Nang Airport site identified the dirt and dust from the "Hot Spot" as a continuing danger to the local residents and to the workers who stir it up during remediation.<sup>28</sup> There are measurements that put the current toxicity level of the dirt at over 200-times the highest internationally accepted "safe level" for dioxin.<sup>29</sup> We know that now, but we did not know that in the 1960s when this hot spot was being created. Forty years later, the dust still has the potential to contaminate, and the workers guard against that danger.<sup>30</sup> Workers are protected from dust inhalation as well as by full body coverings to keep the dirt away from their skin. When you work in the dust and dirt, you can't avoid taking some of it home with you. These precautions put this risk at a minimum. But no one told the servicemen while that contaminated dust was being made.

### **Spray Drift, Atmospheric Contamination and Direct Delivery**

The IOM Committee repeated well-publicized information: "It has been estimated that 87% of the Agent Orange sprayed in Vietnam reached the forest canopy, while the remaining 13% drifted and was subject to atmospheric transport or degradation processes." These numbers are based on a formula<sup>31</sup> that required the spray missions to operate under strict conditions of speed, altitude, cross-wind maximums, etc. The probability that these values stayed constant is slim. This estimated 13% could be off by several to tens of percentage points, which could increase the amount of spray that drifted as well as the distance it could travel. But even at 13% of 20 million gallons, 2.6 million gallons of herbicide given to the winds in a near-weightless molecular form of aerosol was enough to keep the atmosphere over the Republic of Vietnam well saturated over and beyond the life of the Ranch Hand Project.

That amount of dioxin-contaminated herbicide coming from spray drift is staggering. Add to that the amount of dioxin that was raised into the atmosphere by the smoke of napalmed foliage; by the intentional burning of sprayed areas such as during Operation Pink Rose<sup>32</sup>; by the dust plumes raised by bombing within the sprayed areas<sup>33</sup>; by the dust and other contaminated particles kicked up by the movement of men, equipment, helicopters and other instruments of warfare. Those events very easily created the atmospheric scenario that supports the results of The Blue Water Navy Association's study titled "Dioxin on the Carriers,"<sup>34</sup> which clearly demonstrates scientific facts supporting the constant contamination of the aircraft carriers and their crews by particles clinging to aircraft that flew through that atmosphere and brought contamination back to their ships. This study was written after the release of the IOM's 2011 Report, so could not be factored into the IOM's findings.

### **Spray Drift**

IOM reviewed some past attempts to create useful models of transportation and troop movement related to sprayed areas and wind drift, which all failed due to lack of data.

Many of the ideas referred to in the IOM's comments on spray drift are merely a blind repetition of estimates based on previous, disproved beliefs. The issue of spray drift was glossed over by the committee and left to the flaws of earlier assumption. But our information from FOOTNOTE 15 clearly shows that all the offshore ships at 80 to 100 miles from Vietnam's shores were at risk from the spray drift and other atmospheric deposition.

In examining the primary modes of dioxin transport studied by the IOM Committee, one finds a strong emphasis on the liquid form of herbicide that was released from the C-123 spray planes; how it could have drifted, how it could have contaminated the drinking water by flowing out of the streams and rivers. What was reviewed and reported were the same old ideas that have held back the study of dioxin contamination of the Seventh Fleet for the past 20+ years. There were no new ideas.

We believe that two critical elements were left out of the IOM's analysis, both having to do with atmospheric conditions and both having to do with transport of dioxin-contaminated particles from the mainland to the ships at sea. One would think that an examination of contaminated objects moving from the shore to the ships would be at the top of the suspect list in a search for possible routes of exposure. But in this case, it appears that those considerations were either ignored or overlooked.

The missing elements that need to be examined are contamination by particles brought onto aircraft carriers by the airplanes that flew through the atmosphere of South Vietnam and contamination by particulate matter suspended in the atmosphere, or "air pollution" in our current usage of the term, as it was carried by the predominantly offshore winds.<sup>35</sup>

### **Dioxin On The Carriers**

In February, 2012, almost nine months after the release of the IOM Study, the Blue Water Navy Vietnam Veterans Association published an analysis of the static electricity involved with objects moving through earth's atmosphere. The report provides irrefutable evidence that, given

the known or probable conditions of the atmospheric makeup over South Vietnam at the time, the laws of physics requires that contaminated airborne particulate matter clung to the skin of aircraft that constantly flew through that atmosphere and returned to their ships offshore. This is not too hard to imagine given the acknowledgement that there could have been several million gallons of sprayed herbicide that did not quite make it to the ground, combined with the knowledge we have of contaminated particles thrown into the atmosphere by the weapons of war.

Upon landing on a carrier, the planes were immediately covered by the sea-going 'ground crews' that literally swarmed over the outside of the planes like ants over food crumbs at a picnic. That, more likely than not, constituted a direct exposure of the plane crews. That report stands on its own, backed by irrefutable laws of physics. And there were other natural phenomena at work.

### **Air Pollution**

During the 1960s, the problems of air pollution were just becoming understood well enough to solidify the groundwork for what is now an annual \$300 Billion equipment sales industry that is growing larger each year. In 2011, the annual gross capital expenditure on equipment to abate air pollution amounted to about 2% of our gross domestic product, which reflects the market value of all finished goods and services produced in the United States in one year's time. <sup>36</sup> In other words, it is a major industry that should not be overlooked when dealing with toxic substances that have the potential to be spread by air. Such were the conditions in Vietnam in the 1960s and early 1970s.

The global focus on air quality standards was just gaining a foothold when the chemical warfare attacks on the Republic of Vietnam were taking place. Air quality monitoring was becoming big business. Air Quality monitoring is an assessment of airborne particles which are now known to be an integral part of the atmosphere. In fact, certain natural phenomena, including cloud formation, depend on the presence of fine particle elements suspended at various levels in the Earth's atmosphere. From the monitoring came the development of methods of sampling atmospheric pollution. We can speculate that, had any monitoring in or near Vietnam taken place, astronomical levels of toxins would have been found hundreds, if not thousands, of miles eastward, out to sea with the prevailing winds.

Now, forty years after our Vietnam War, we have well established methods and standards for monitoring and controlling toxic emissions. The science of toxin identification and tracking is a well advanced school of engineering practices. One of the basic premises of that science is that once foreign matter of any sort gets into the air, as aerosol, spray mist, fine particles or even heavy particles, it will move where the wind wills it. It becomes a captive of the weather conditions that prevail in that region. For dust to travel hundreds or even thousands of miles and deposit itself at any point along the journey is not an unusual concept for an air quality engineer. For contaminated dirt and dust to move from mainland Vietnam a mere 50 or 80 miles is a daily occurrence for an air pollution expert. <sup>37</sup>

Air quality science relies on wind movement to carry particulate matter from place to place, locally and globally. In Vietnam, the prevailing winds blow seaward, slightly to the northeast but with seasonal variations. In the 1960s, the typical shipboard command was aware of those gross atmospheric indicators, especially in regard to flight operations on the aircraft carriers. But they did not know that the daily wind brought with it many contaminated particles and droplets. They were not looking for them and had no means of detecting them, much less doing anything about it except, perhaps, to leave the general area. But that would have been counterproductive to the dynamic and vital part of the Vietnam War the offshore naval vessels played in the war effort. In the Historical Background Section of the IOM Report, starting at about page 32, there is what appears to be an attempt to 'marginalize' the role of the Navy in the Vietnam War. However, what is presented is a fairly clear picture of the key role of Naval combat history. Naval personnel, who did not have boots on ground but who provided these critical jobs in the South Pacific during WWII, for example, would take deep offence at being 'downgraded' by the IOM's write-up on the role of the Navy.

We know that one of the very predictable conditions of modern warfare is the explosions of bombs and other devices. In a sustained bombing or artillery attack, thousands of pounds of dirt, dust, leaves, trees, etc. can be lifted into the atmosphere. When contaminated materials burn, the smoke that rises can be so thick that visibility is absolutely zero; when the fire contains an incendiary such as napalm, the smoke can easily rise a thousand feet. When the targets have been pre-soaked in herbicide, all the particles carry those toxins with them as they lift skyward and become a thick haze. Ash from forest fires lands hundreds of miles from the blaze. Smoke and ash from volcanic explosions shut down the air industry thousands of miles from the source. Most of us have seen photos or real-life examples of these incidents so that visual aids are not needed to acknowledge the reality of that atmospheric phenomenon. Anyone spending long periods of time downwind of continued warfare is subject to inhalation of residual particles even as they settle back to Earth out of a clear blue sky. We had been aware of the basics of wind dynamics from observing natural phenomena like volcanic emissions and the smoke from forest fires. It's time now to apply that to the conditions offshore Vietnam. <sup>38</sup>.

From the crop dusting industry, we had an understanding of spray drift and spray droplet size. The masterminds of the Ranch Hand Project, which operated the C-123 aircraft fitted out with spray nozzle assemblies to do the majority of the herbicide dispersion throughout Vietnam, believed they had developed refined formulas to minimize the loss of herbicides released from the C-123s. These formulae dictated the optimal height for product release, the optimal droplet size and cross-wind and air speed limitations. They even computed beforehand what portion of the herbicide would be lost to the wind even under ideal conditions. In fact, when mixed with fuel to better adhere to the leafy vegetation, it was still predicted that only 87% of all herbicide released would fall directly to the targeted area.



That left about 130 gallons from each spray plane on every sortie each day to float free. With that liquid and aerosol attaching to some portion of the thousands of pounds of dirt and debris blown into the air from explosions on the ground every day, the perfect recipe for air pollution was born.

We know that molecular particles are deadly in a gaseous form, as vapor that was responsible for massive crop and tree damage in Vietnam, and we noted that two out of three of the most harmful conditions to humans from herbicide were by inhalation.<sup>39</sup> That makes 2.5 million gallons much more deadly because it appears in a liquid, a gas, and in solid form when attached to dust particles. There may never have been a more deadly concoction that blew directly from the mainland out onto the ships at sea.

How do we know that this atmospheric death-cloud reached the Blue Water Navy ships off the coast of Vietnam? We know by two irrefutable means:

- 1) The weather patterns that prevailed during the War, bringing all the toxins out over the Gulf of Tonkin; and
- 2) The fact that we have men presenting with identical symptoms as those who are identified as being poisoned by Agent Orange and covered by presumption of exposure.

### **Conclusions**

We believe this paper presents the most complete picture of probable pathways of exposure for Blue Water Navy veterans so far provided. The evidence is strong for each of the pathways, and there seems no way to avoid justification for providing the presumption of exposure for the men who served on ships of the 7th Fleet. At the very least, the benefit of the doubt is strongly in their favor.

In our minds, this paper presents the closure of the Great Triangle of Dioxin Migration faced by offshore Vietnam veterans. Their exposure came by sea through the contamination of the on-board water systems. The ship's evaporators took sea water already tainted with toxins from drainage and runoff into the bays and harbors and eventually to sea and greatly increased the toxicity levels. It came by air via the spray drift and the contaminated particles that electrostatically clung to the carrier-based aircraft during bombing missions. And it came from land by way of the massive amounts of contaminated dirt and dust delivered both directly on materials and personnel who travelled from Da Nang and other Vietnam shore locations to the ships, and by the particle suspension brought to the fleet by the prevailing atmospheric conditions including the west to east weather patterns.

This closes the Triangle of Contamination by Sea and Land and Air. It closes the Triangle of Contention between the DVA, the IOM and the Blue Water Navy by laying out most of the probable means of contamination. And it closes the Triangle of Confidence shattered for so long by myth, speculation and 'plausibility' arguments. This paper brings together and account for each of these elements and presents a clearer picture of the conditions that prevailed through the 1960s and early 1970s.

What this paper cannot do is repair the damage done to tens of thousands of water-based Vietnam veterans who suffer and have died from dioxin poisoning because the DVA withheld their rightful veteran benefits. The only apparent justifications are the placement of budgetary considerations above the health and lives of so many veterans and the 'corporate culture' that brought this shameful bit of history into being and held it there under the protests of so many. That culture of intimidation through adversarial confrontation has been fostered and held far too long by "the VA System." It has been noted by Congressional leaders, by investigative reporting, and by the public at large. Most importantly, it has been noted by veterans from the Vietnam War to the present.

The Blue Water Navy Vietnam Veterans Association calls for the immediate Public Censure of the Department of Veterans Affairs as a result of their distortion of the facts and selective reasoning regarding the IOM 2011 Report on Blue Water Navy contamination. We call for an immediate end to the "boots on ground" policy implemented by the DVA to restrict and deny the health care and compensation to veterans of the Vietnam War, either by Presidential proclamation, internal DVA change of regulations, or Congressional intervention by means of legislation (such as HR-543, currently in Committee) to correct this situation

By:

John Rossie

Ray Melninkaitis

## **RESOURCES, FOOTNOTES AND COMMENTS**

[1] Included at this link is a portion of the Statement of Work from Contract #V101(93)P 2136 between the DVA and the IOM ordering the study of offshore herbicide exposure for Blue Water Navy personnel.

### **Comments on the Statement of Work**

At issue is the question of whether ships of the Seventh Fleet serving offshore Vietnam between 1962 and 1975 were exposed to dioxin-containing herbicides used on the Vietnamese mainland. In one exercise to allegedly give this matter a full examination, the Department of Veterans Affairs (DVA) in 2009 ordered a study by the Institute of Medicine (IOM) to assess the possibilities of whether this actually happened and to what extent.

Under the Statement of Work for contract V101(93)P 2136, the wording for Task 1 of the Specific Mandatory Tasks And Associated Deliverables requires the IOM to determine if the Blue Water Navy experienced a comparable range of exposure to herbicides (focusing on dioxin) as the brown water navy on inland Vietnamese waters and the troops on the ground in Vietnam. (We have not been privy to the entirety of the SOW.)

This element of the study is not asking for an assessment of whether the Blue Water Navy was contaminated at all, but rather how any possible contamination was similar to or different than the 'range of exposure' experienced by ground-based and inland water-based veterans. If only one of several variables in that range was discovered to be different, the study could conclude yielding negative results. As it is, the results were favorable, if not just neutral.

That is precisely NOT what the study should have focused on. It should have focused on all possible elements that could reasonably be construed as a pathway of exposure to the ships offshore, without comparison to anything else. The most probable pathway of exposure was via the onboard water system. However, the most obvious element not previously examined that could have contaminated the ships offshore was the transport of dioxin directly from the land to the ship. Examining that would not have allowed the IOM to determine any quantitative measurements, but it certainly would have presented scenarios showing that the very forces of nature and laws of physics dictated that these additional mechanisms of exposure took place.

In one case, the quantity and magnitude of items that moved from the highly contaminated Da Nang Air Field to the ships at sea on a daily basis was massive. In another, the basic physics of weather moving contaminated particulate matter from the mainland directly to the ships offshore is overwhelming.

Much to the discredit of the Institute of Medicine and the dismay of thousands of Blue Water Navy veterans suffering and dying from dioxin-induced disabilities, neither of those two major transport mechanisms was addressed, with perhaps the minor reference to previous study conclusions addressing spray drift. On that issue, the IOM made a passive acceptance of some highly probable errors of the past studies based on faulty data that we believe was intended to continue presenting a warped picture of past reality.

When asked why the movement of contaminated materials from the mainland to the offshore ships was not considered by the IOM Committee, the response [from the Study Director] was *"...we were not asked to look at contamination that might have occurred on land in Vietnam and then have been transferred aboard ship."* But the DVA did ask for all potential contamination pathway scenarios. Our set of scenarios represents additional means by which dioxin found its way onto the ships at sea other than by water distillation, which is an extremely probable pathway. These additional exposure pathways, both the result of immutable natural laws, in conjunction with the conclusions of the "Da Nang Harbor Report" and "Dioxin on the Carriers," provide conclusive evidence that the exposure of the Blue Water Navy personnel was better than "more likely than not;" it shows such exposure was virtually certain.

The statement: *"VA has maintained that special eligibilities apply only to those veterans who served on the ground in the Country of Vietnam based in part on their relatively higher herbicide exposure. A recent Federal appeals court decision supported this position"* is patently false and is intended to mislead. The court never considered the issue of degrees of exposure of anyone. It dealt only with an Agency's prerogative to administer its own internal regulations.

The VA also states: *"It is not clear if Blue Water Navy herbicide exposure was more similar to that experienced by contemporaneous troops not deployed to Vietnam (e.g., serving CONUS), or to the much larger exposures by troops serving on the ground in Vietnam."* If the VA was not clear on this matter, they either reflect little or no knowledge of the issue of herbicide use and exposure, or they are admitting to far more herbicide use on state-side US Military Bases than has ever been previously disclosed.

The VA notes that as many as 800,000 veterans could be involved. Our research indicates that the total number of Blue Water Navy personnel who served from 1962 to 1975 did not exceed 250,000.

<http://bluewaternavy.org/Blue%20Water%20Contract%20SOW.pdf>  
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[2] The Blue Water Navy Vietnam Veterans and Agent Orange Exposure was released by the IOM in May, 2011. It is available on-line for no-cost download in .pdf format at <http://iom.edu/Reports/2011/Blue-Water-Navy-Vietnam-Veterans-and-Agent-Orange-Exposure.aspx>  
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[3] Because the IOM Committee was comprised of scientists and researchers who expected to be dealing with measurable quantities of dioxin, they started out with the premise that this data would be retrievable and would allow them to make quantifiable measurements for comparisons. They quickly found these measurements were never done and no such data existed. Glancing through this report will quickly show the types of statements reflecting their conundrum, as characterized below:

"... the committee could not find enough data..." Preface x

"...the committee could not clearly delineate ..." Preface x

"...input data... were not available." page 8

“...the committee could not determine...” page 114  
“...exposures that could not be assessed...” page 122  
“...it could not state with certainty...” page 133  
“...Few or no data exist to verify ...” page 136  
“...the committee could not be confident...” Summary, page 9

This list of examples demonstrates the point that the IOM Committee, due to no fault of its own, was severely limited in the kinds of statements of a quantifiable, scientific nature it could confidently make. This lack of ability to make definitive statements is what blocks the DVA from coming to definitive conclusions about the certainty of non-exposure based on anything stated in this Report. What we see being played out here was foreseen. As stated in the Report: *"Indeed, the committee believes that given the lack of measurements taken during the war and the almost 40 years since the war, [conclusions on this issue] will never be a matter of science but instead a matter of policy."* The IOM Committee did as best it could with the fallback elements it examined as qualitative evidence. But they certainly did not provide the DVA with strong enough evidence to support the DVA conclusions of December 26, 2012. And they certainly did not review all the possible avenues of exposure.

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[4] Theater of Combat.



On April 24, 1965, President Lyndon Johnson signed Executive Order 11216, which designated the Vietnam area as a combat zone retroactive to January 1, 1964 and this designation actually remained in effect until President Clinton signed Executive Order 13002 terminating it on June 30, 1996. This area extending seaward approximately 100 nautical miles off the eastern coast of Vietnam includes the land area which extended north and west to the land boundaries of the country. The Combat Zone is also referred to as the Theater of Combat. It leaves no doubt that the Navy, Coast Guard and FMF Marines afloat operated within the Theater of Combat during the Vietnam War.

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[5] The Agent Orange Act of 1991 (Public Law 102 -4 (HR 556) in Section 2, (a)(3), passed on February 6, 1991, (and repeated in The United States Code, 2011 Edition, Title 38 – Veterans’ Benefits, Part II – General Benefits, Chapter II, - Compensation for Service-Connected Disability or Death. Subchapter II – Wartime Disability Compensation, Sec. 1116 - Presumptions of service connection for diseases associated with exposure to certain herbicide agents; presumption of exposure for veterans who served in the Republic of Vietnam), provides a straightforward definition of the “presumption of exposure” as follows:

*(3) For the purposes of this subsection, a veteran who, during active military, naval, or air service, served in the Republic of Vietnam during the Vietnam era and has a disease referred to in paragraph (1)(B) of this subsection shall be presumed to have been exposed during such service to an herbicide agent containing dioxin or 2,4-dichlorophenoxyacetic acid, and may be presumed to have been exposed during such service to any other chemical compound in an herbicide agent, unless there is affirmative evidence to establish that the veteran was not exposed to any such agent during that service.*

The entire Act is available at <http://bluewaternavy.org/PL%20102.doc>

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[6] At present the diseases associated with Agent Orange exposure are:

- *AL Amyloidosis*  
A rare disease caused when an abnormal protein, amyloid, enters tissues or organs
- *Chronic B-cell Leukemias*  
A type of cancer which affects white blood cells
- *Chloracne (or similar acneform disease)*  
A skin condition that occurs soon after exposure to chemicals and looks like common forms of acne seen in teenagers. Under VA's rating regulations, it must be at least 10 percent disabling within one year of exposure to herbicides.
- *Diabetes Mellitus Type 2*  
A disease characterized by high blood sugar levels resulting from the body's inability to respond properly to the hormone insulin
- *Hodgkin's Disease*  
A malignant lymphoma (cancer) characterized by progressive enlargement of the lymph nodes, liver, and spleen, and by progressive anemia
- *Ischemic Heart Disease*  
A disease characterized by a reduced supply of blood to the heart, that leads to chest pain

- • Multiple Myeloma  
A cancer of plasma cells, a type of white blood cell in bone marrow
- • Non-Hodgkin's Lymphoma  
A group of cancers that affect the lymph glands and other lymphatic tissue
- • Parkinson's Disease  
A progressive disorder of the nervous system that affects muscle movement
- • Peripheral Neuropathy, Acute and Subacute  
A nervous system condition that causes numbness, tingling, and motor weakness. Currently, it must be at least 10 percent disabling within one year of herbicide exposure and resolve within two years. VA proposed on Aug. 10, 2012, to replace "acute and subacute" with "early-onset" and eliminate the requirement that symptoms resolve within two years.
- • Porphyria Cutanea Tarda  
A disorder characterized by liver dysfunction and by thinning and blistering of the skin in sun-exposed areas. Under VA's rating regulations, it must be at least 10 percent disabling within one year of exposure to herbicides.
- • Prostate Cancer  
Cancer of the prostate; one of the most common cancers among men
- • Respiratory Cancers (includes lung cancer)  
Cancers of the lung, larynx, trachea, and bronchus
- • Soft Tissue Sarcomas (other than osteosarcoma, chondrosarcoma, Kaposi's sarcoma, or mesothelioma)  
A group of different types of cancers in body tissues such as muscle, fat, blood and lymph vessels, and connective tissues

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[7] A review of the changes that took place in the wording describing a veteran who is eligible for treatment for an herbicide-related disease is enlightening. The original description of that veteran from the Agent Orange Act of 1991 reads:

“... a veteran who, during active military, naval, or air service, served in the Republic of Vietnam during the Vietnam era and while so serving was exposed to that herbicide agent, [the disease] shall be considered to have been incurred in or aggravated by such service, notwithstanding that there is no record of evidence of such disease during the period of such service.”

[This link shows a series of changes](#), instigated by the Department of Veterans Affairs, which occurred from this initial, rather simple, statement of January, 1991 to the last change, which occurred in February, 2002, suddenly required “boots on ground.” The M-21-1 Manual contains all the rules for rating a veteran's compensation claim. The date of the change is hand written atop each page and the printed heading of the page provides the date of the M21-1 that received the change.

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[8] From the The American Legion, National Commander's Testimony before the Senate and House Committees on Veterans' Affairs by Fang A. Wong, American Legion National Commander September 21, 2011, which also appeared in the American Legion Magazine, on page 24 [HERE](#) as well as [HERE](#)

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[9] When a battalion from the Third Marine Division (usually between 900 and 1,200 Marines) and if reinforced by attached, specialized units [engineers, recon, landing party, etc] went aboard ship in the port of Naha (Okinawa) for duty on Yankee Station in the South China Sea, that battalion was "afloat". They operated on as many as 10 US Navy ships (LSTs, LPHs, AKAs and APDs) as required to accommodate the "float battalion". "Float Battalions" came only from the combat-ready battalions and Regiments (3 battalions to a regiment) stationed on Okinawa.

"Fleet Marines" were hand-picked (usually during boot camp - as are the Marines who end up on ceremonial duty at Eighth & I in Washington) - for their bearing and "sharpness" and had to graduate from a specialized school at MCRD - San Diego. "Fleet Marine" service ended in 1998.

The term "Fleet Marines" applies only to those Marines stationed aboard larger ships as permanent party for security (usually carriers, battleships [e.g., USS New Jersey, BB-62] and ships carrying flag officers). "Fleet Marines" are also referred to as "sea-going Marines" or "sea-going bellhops" (they always wore dress blues when on duty aboard ship).

There were approximately 30,000 to 35,000 "FMF Marines afloat" between 1959 and 1967.

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[10] The VA recognizes that ships docked at piers in Vietnamese ports and harbors. However, if the individual never left the ship and never stood on the pier, they are denied the presumption of exposure. Those who left the ship, or anyone working at pier facilities, who are now

considered as having boots-on-ground, could be close enough to touch the individual on-board the ship, but that individual on the ship is denied presumptive status.

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[11] From [The Federal Register](#):

### **Presumption of Exposure to Herbicides for Blue Water Navy Vietnam Veterans Not Supported**

A Notice by the Veterans Affairs Department on 12/26/2012

**Action:** Notice.

#### **Summary**

On May 20, 2011, at the request of the Department of Veterans Affairs (VA), the Institute of Medicine (IOM) of the National Academy of Sciences issued a report titled, "Blue Water Navy Vietnam Veterans and Agent Orange Exposure." The IOM reviewed a wide range of data sources including peer-reviewed literature, exposure and transport modeling, interviews with veterans, ship deck logs, and other government documents, and concluded that there is insufficient evidence to determine whether Blue Water Navy Veterans were exposed to Agent Orange-associated herbicides during the Vietnam War. After careful review of the IOM report, the Secretary determines that the evidence available at this time does not support establishing a presumption of exposure to herbicides for Blue Water Navy Vietnam Veterans. VA will continue to accept and review all Blue Water Navy Vietnam Veteran claims based on herbicide exposure on a case-by-case basis.

#### **FOR FURTHER INFORMATION CONTACT:**

Dr. Terry Walters, Department of Veterans Affairs, 810 Vermont Ave. NW., Washington, DC 20420, telephone (202) 461-1020. (This is not a toll-free number.)

#### **SUPPLEMENTARY INFORMATION:**

During the Vietnam War, the U.S. military used various tactical herbicides as defoliants to help military personnel identify enemy transportation and communication routes and camps, reduce cover for enemy forces, and kill crops that might be used by the enemy. The best known and most widely used herbicide was Agent Orange. Agent Orange was contaminated with the highly toxic chemical 2, 3, 7, 8-Tetrachlorodibenzo-p-Dioxin (TCDD). Numerous adverse health effects in veterans who served in Vietnam have been attributed to exposure to Agent Orange. The Agent Orange Act of 1991, 102, 105 Stat. 11, established a presumption of herbicide exposure for veterans who had served in Vietnam and who developed a disease associated with Agent Orange exposure. The presumption applies to those who served in the Republic of Vietnam on the ground (ground troops) or on its inland waterways (Brown Water Navy Veterans). Veterans who served in deep-water naval vessels off the coast of Vietnam during the Vietnam War are referred to as Blue Water Navy Veterans. Claims filed by veterans who served on only Blue Water Navy vessels based on herbicide exposure are accepted and reviewed on a case-by-case basis.

On May 20, 2011, the Institute of Medicine (IOM) of the National Academy of Sciences issued a report titled, "Blue Water Navy Vietnam Veterans and Agent Orange Exposure." The report was issued and the underlying study was conducted at the request of the Department of Veterans Affairs (VA) and neither was required by law. VA requested the study in response to veteran concerns and the recommendations in the IOM report "Veterans and Agent Orange: Update 2008." VA tasked the IOM with establishing a committee to determine whether Blue Water Navy Vietnam Veterans experienced exposures to herbicides and their contaminants (focusing on dioxin) comparable to those of ground troops and Brown Water Navy Vietnam Veterans.

For the study, the IOM reviewed a wide range of data sources including peer-reviewed literature, exposure and transport modeling, interviews with veterans, ship deck logs, and other government documents. After reviewing and analyzing available data, the IOM concluded that ground troops and Brown Water Navy Veterans had qualitatively more pathways of exposure to Agent Orange-associated TCDD than did Blue Water Navy Veterans. The IOM found that a paucity of scientific data concerning potential exposures for Blue Water Navy Veterans made it impossible to determine whether these veterans were exposed to Agent Orange-associated TCDD and, therefore, that exposure of Blue Water Navy Vietnam Veterans to Agent Orange-associated TCDD cannot be reasonably determined.

After careful review of the IOM report, "Blue Water Navy Vietnam Veterans and Agent Orange Exposure," the Secretary has determined that the evidence available at this time does not support establishing a presumption of exposure to herbicides for Blue Water Navy Vietnam Veterans. VA will continue to accept and review all Blue Water Navy Vietnam Veteran claims based on herbicide exposure on a case-by-case basis. The Secretary's determination not to establish a presumption of exposure does not in any way preclude VA from granting service connection on a case-by-case basis for diseases and conditions associated with Agent Orange exposure, nor does it change any existing rights or procedures.

#### **Signing Authority**

The Secretary of Veterans Affairs, or designee, approved this document and authorized the undersigned to sign and submit the document to the Office of the Federal Register for publication electronically as an official document of the Department of Veterans Affairs.

John R. Gingrich, Chief of Staff, Department of Veterans Affairs, approved this document on December 19, 2012, for publication.

Dated: December 19, 2012.

Robert C. McFetridge

Director, Office of Regulation Policy and Management, Office of the General Counsel, Department of Veterans Affairs

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[12] Please see [Call for Public Censure](#) for additional information from the Blue Water Navy Vietnam Veterans Association.

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[13] This can be easily understood with the following diagram. Please try to ignore the ambiguity. It was an element introduced by the DVA:



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[14] The VA will accept strong, grounded probability that indicates “it is at least as likely as not” that a specific set of circumstances existed, barring proof to the contrary. It essentially results in a 50%-50% proposition, when all positive and negative evidence is in equipoise. This is when the veteran is given “the benefit of the doubt,” which is a Standard of Proof set forth in the Federal Code. The entry for 38 USCS 5107(b) allows that “when there is an approximate balance of positive and negative evidence regarding any issue material to the determination of a matter, the Secretary shall give the benefit of the doubt to the claimant.”

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[15] A study that [tracks dioxin from Mexico to the Canadian Arctic](#)

Another study about [long distance atmospheric travel](#)

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[16] This web site is the [ideal place to learn all the detail about dioxin](#), from the Environmental Justice Activists' Network

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[17] An excellent example of such statements can be found in a letter from Mr. Thomas Murphy, Director of VA Compensation Service. The letter has been highlighted to show both the strength of expert opinion supporting a veteran's claim and the [level of misunderstanding or disinformation](#) reflected within the DVA regarding TCDD dioxin exposure.

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[18] [EPA measurement data](#)

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[19] [NRCET Water Report](#)

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[20] <http://bluewaternavy.org/WHY%20DO%20WE%20SAY.doc>

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[21] One of the two key objectives for this study is stated as: “Whether it is possible to state with certainty that exposure of Blue Water Navy personnel, taken as a group, was qualitatively different from that of their Brown Water Navy and ground troop counterparts.” IOM Study, Page 3.

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[22] [Da Nang Harbor Report](#)

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[23] [Da Nang Harbor Report](#)

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[24] The Hatfield Associates aerial photo shows a pink DOT just off the runway for the location of the Hot Spot, which lies to the right of the runway's north end, very near the original herbicide storage area and the area where rinse-off water settled following the wash-downs of the planes and the tarmac after herbicide spills during spray plane loading.

In addition to the dot, there are red lines drawn at two locations on the photo. These lines are meant to match the location of the red lines found on the lower photo.





That photo of the Da Nang Airfield, circa 1967, shows the locations of the various structures and areas around the Airbase. The topmost line is under the NAME for the Fleet Air Support Unit building. The building itself is located a short distance above that line.

The lower line is under the marking showing the Herbicide Storage Area. When you line up these two photos together, you can see the proximity of the FASU Building to the Ranch Hand area. What you see on the lower photo you can imagine on the top photo. You can also see that the red dot marking the dioxin Hot Spot is just to the right of the area indicating the Ranch Hand facilities. These photos are shown in different scale, but it is not difficult to see how they overlap.



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[25] [“FASU Da Nang.”](#) Naval Aviation News, Sept 1970, pg 30 – 31

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[26] An excerpt from the FASU Unit Citation citing the amount of cargo flown in and out of the Da Nang Fleet Air Support facility in less than three months.



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[27] Several sources claim that Da Nang Airbase was one of the busiest airports in the world.

[Example 1](#)

[Example 2](#)

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[28] [Hatfield Consultants, 2010 Report on Vietnam Airfield Contamination:](#)

“Given the high environmental levels of dioxin recorded in the southern and southwestern Airbase area, the human population of [Da Nang] City likely continues to be exposed to dioxin from contaminated food (especially fish), and also absorbs dioxin through the skin and lungs as a result of direct exposure to contaminated soils, sediments, and dust from the Airbase.

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[29] “In conclusion, levels of dioxin in the former Storage Area remain extremely high, and are as much as several hundred times higher than internationally-accepted standards. Dioxin contamination results are comparable to those from Da Nang (Hatfield/Office 33, 2007), where over 365,000 ppt TCDD was recorded in samples collected.” Evaluation of Dioxin Hot Spots - Final Report, page 14, prepared by Viet Nam – Russia Tropical Centre, Ha Noi, Viet Nam with Technical Support Provided by: Hatfield Consultants, West Vancouver, Canada, June 2009

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[30] Photos of the remediation workers wearing air filter masks and hazmat suits. Typical of toxic site remediation work such as was done at the Da Nang Airfield, workers are cautioned against inhaling any of the contaminated dirt and dust that gets kicked up or letting it contact their skin. Here we see workers wearing protective breathing and clothing apparatus. This precaution was even more important during the 1960s and 1970s (and for all the years intervening) when the toxicity of the dirt and dust at the hot spots in Vietnam was far higher than it is today.



[Very recent photos of the work at Da Nang.](#)

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[31] Formula for the Spray Drift speed, height, etc. The creators of the Ranch Hand spray project had a [set of "rules"](#) that, as they believed, if followed to the letter would reduce drifting spray residuals and optimize the coverage of the target area. Unfortunately, in addition to some of these assumptions being highly questionable, rules such as the altitude of the aircraft at 150 feet or lower were rarely met. If the spray was released from a higher altitude, the amount and distance of the spray drift drastically increased, which lessened the amount of spray landing on target. These various formulaic tradeoffs accounted for much of the disinformation reported on the effectiveness of the Ranch Hand Spray Project.



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[32] Information on [Operation Pink Rose](#)

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[33] Maps showing the areas most heavily sprayed with Agent Orange and the areas most bombed during the Vietnam War. Each map shows only the region of South Vietnam (The Republic of Vietnam during the War.)



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[34] [Dioxin on the Carriers](#), a Blue Water Navy Association study

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[35] [Animated simulation](#) of offshore disbursement with developed with NOAA software

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[36] Economics: A Contemporary Introduction, William A. McEachern, Cengage Learning, Dec 16, 2010, Page 383

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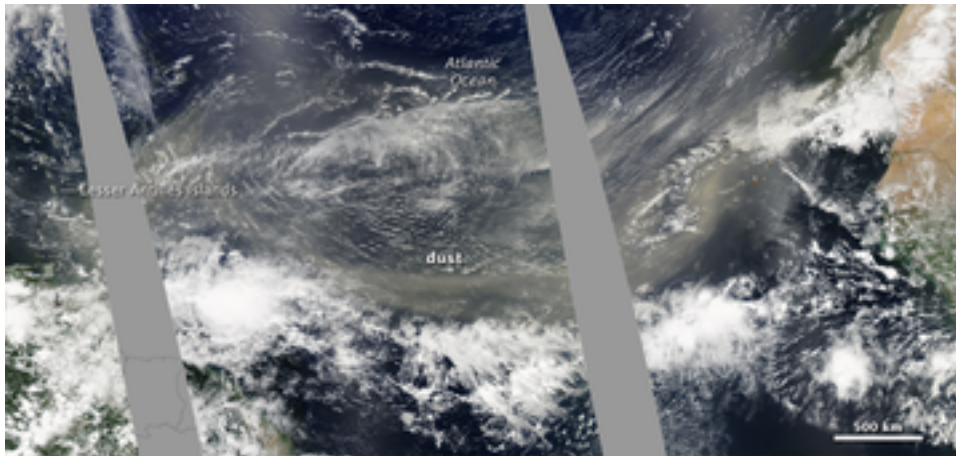
[37] Interview with David C. Rogers, Ph.D. Cloud Physicist and Atmospheric Scientist with the University Corporation for Atmospheric Research (UCAR), <http://www2.ucar.edu/>

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[38] This dynamic image shows forest fires in Southeast Asia at some particular time in the past. Note the updraft along the western edge that will curl back east and smoke from central Cambodia and Laos and all of Southern Vietnam flowing eastward out to sea where the 7th Fleet was located during the War. This weather pattern has remained consistent since the 1960s, when all the airborne debris traveled from the mainland directly out to sea onto the ships of the 7th Fleet.



Another example of the common capability of dust to routinely move through the atmosphere is seen by the movement of dust from the [Sahara Desert of Africa to the Caribbean](#) as tracked by the NASA Aqua Satellite. Please put all thoughts of the incapability of dust (and lighter) particles to travel long distances fully out of your mind when dealing with this scenario as it relates to movement of contamination from the mainland Vietnam to the ships offshore Vietnam.



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[39] 1979 Air Force Report Statement re: [three ways humans can die from Exposure to Agent Orange](#)

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