# AGENT ORANGE: AN OVERVIEW

In a laboratory at the University of Chicago during the Second World War, Dr. E.J. Kraus discovered that causing plants to experience rapid growth through high doses of 2,4-tichlorophenoxyacetic acid (2,4-D) could kill certain species of plants. This was the beginning of Agent Orange …

The US Army experimented with 2,4-D during the 1950s. Subsequent to evaluating its effectiveness in defoliating Panamanian and Malaysian forests, the herbicide was introduced into the Army's chemical arsenal. Scientists noted that a mixture of 2,4-D and 2,4,5-trichlorophenoxyacetic acid (2,4,5-T) sprayed on plants would cause an almost immediate negative effect. What they didn't realize was that 2,4,5-T contained a toxic substance, dioxin, an unintentional by-product of the manufacturing process.

After limited scientific and industrial evaluation, a variety of chemical herbicides were shipped to Viet Nam in 1961. An arsenal of herbicides were labeled by the colour-coded stripes on their shipping barrels: Agent Blue, Agent White, Agent Purple, Agent Pink, Agent Green, and the combination of 2,4-D and 2,4,5-T, namely Agent Orange.

The code-named 'Operation Ranch Hand' was kicked off on January 13, 1962, with the goal to defoliate South Viet Nam's jungles using C-123 aircraft. By September 1962, the spraying program intensified. Over the next nine years, in excess of 80 million litres of herbicide were released into the environment of southern Viet Nam. Approximately 60% of this total was Agent Orange. The US military command in Viet Nam insisted that the defoliation program was successful, and had little adverse impact on the economy of the villagers who may have come into contact with it.

Herbicides in the US, regulated by the EPA for use in domestic products, were usually highly diluted with water or oil, and measured in parts per trillion. However, herbicides shipped to Viet Nam contained up to 50 times the concentration suggested by manufacturers.

Reports began to emerge from Viet Nam that Vietnamese in areas where Agent Orange was being used were experiencing birth defects and a variety of health problems. These frequent reports were relegated to the category of 'communist propaganda' by the US. Unknown to Vietnamese civilians (and to US and allied soldiers who were living, eating and bathing in areas where herbicides were used) was that herbicide manufacturers were aware of and conducting studies on its toxic effects, but suppressed the information, fearing a negative backlash from government and the public.

Concerns over dioxin were kept quiet and largely out of public view while the US Government and chemical companies presented a united front on the issue of defoliation. Claiming it was a military necessity to deprive the Viet Cong of hiding places and food sources, the herbicides,

particularly Agent Orange, were said to cause no adverse economic or health effects to those who came into contact with them.

But scientists involved in Operation Ranch Hand and documents uncovered in the US National Archives, present a different picture. There are strong indications that not only were military officials aware as early as 1967 of the limited effectiveness of chemical defoliation in military strategy, they also knew of the potential long-term health risks of frequent spraying and sought to censor relevant news reports.

Dr. James Clary, Air Force scientist in Viet Nam, says the Air Force knew Agent Orange was far more hazardous to the health of humans than anyone would admit at the time: *"When we* [military scientists] *initiated the herbicide program in the 1960s, we were aware of the potential for damage due to dioxin contamination in the herbicide. We were even aware that the military formulation had a higher dioxin concentration than the civilian version, due to the lower cost and speed of manufacture. However, because the material was to be used on the enemy, none of us were overly concerned."* (1988 letter from Clary to a member of Congress)

In the US, the chemical companies continued to insist that Agent Orange had no adverse effects on humans, despite Dow Chemical's internal concerns about human exposure to Agent Orange in 1965, which was hidden from the government, and despite evidence that workers suffered unusual health problems at factories producing Agent Orange.

The spraying continued unabated even though, according to military records, it apparently was having minimal effects on the enemy. A series of memoranda uncovered in the National Archives, and now declassified, indicate that defoliation itself was successful but had little effect on military operations. Col. John Moran, chief of the Chemical Operations division of MACV, wrote a memorandum dated October 3, 1968, titled "Advantages and Disadvantages of the Use of Herbicides in Viet Nam" that provides some key insights into the results of the defoliation program: *"The effect of defoliation on the enemy, in itself, is of little military value. Its military potential is realized only when it is channeled into selected targets and combined with combat power ... The herbicide program carries with it the potential for causing serious adverse impacts in the economic, social, psychological fields."* Ecologically, according to the memorandum, *"Semi-deciduous forests, especially in War Zones C and D* [mangrove forests] *have been severely affected. The regeneration of these forests could be seriously retarded by repeated applications of herbicide."*

The use of herbicides was not limited to the triple canopy forests of southern Viet Nam. They were widely used to suppress vegetation around the perimeters and mine fields of military bases and, in many instances, the interiors of those bases. They were also used to destroy rice crops. The use of Agent Orange throughout Viet Nam was widespread through much of 1969; late in the year, a study done by Bionetics Research Laboratories exposed dioxin as the cause of deaths and stillbirths in laboratory animals. The tests revealed that as little as two parts per trillion of dioxin in the bloodstream was sufficient to cause death and abnormal births in laboratory animals.

When the Food and Drug Administration released the report, the White House, on October 29, 1969, ordered a partial curtailment of the use of Agent Orange in Viet Nam. On November 4, 1969, a message went out from the Joint Chiefs of Staff to Commander in Chief Pacific and MACV: *"A report prepared for the National Institute of Health presents evidence that 2,4,5-T can cause malformation of offspring and stillbirths in mice, when given in relatively high doses. This material is present in the defoliant (Agent) Orange. Pending decision by the appropriate department on whether this herbicide can remain on the domestic market, defoliation missions in South Viet Nam using Agent Orange should be targeted only for areas remote from population."*

Despite growing regulation over Agent Orange in Viet Nam, troops continued to use it when they ran out of the other herbicides.

In early 1971, the US Surgeon General regulated the use of Agent Orange for home use, given its harmful effects. Consequently, all spraying was officially stopped in Viet Nam. Over 30 years later Agent Orange dioxin remains in the ecosystem. Studies on Agent Orange in Viet Nam (1994-2000) by Hatfield Consultants Ltd. of West Vancouver, Canada, and the 10-80 Division (Ministry of Health, Viet Nam) have shown that former US military installations are probably the most highly contaminated areas in southern Viet Nam. Their multi-year investigation has shown that nearly 30 years after cessation of hostilities, dioxin remains at alarmingly high concentrations in soils, foods, human blood and human breast milk in adults and children inhabiting areas in close proximity to a former US military installation.

A recent publication by US scientists has provided more disconcerting evidence that the quantity of Agent Orange released into the Vietnamese environment during the conflict was **substantially underestimated**, and that the concentration of dioxin in Agent Orange was **significantly higher** than originally thought.

The US Department of Veterans Affairs financially compensates US veterans of the Viet Nam war, who experienced certain health problems and can show they were in contact with Agent Orange during their tours of duty in Viet Nam. However, the same health conditions experienced by Vietnamese who continue to reside in areas of high dioxin contamination are not recognized and victims receive no compensation from the US Government.

Bilateral relations between the US and Viet Nam regarding the Agent Orange dioxin issue have improved; however, progress on addressing the concerns of the Vietnamese people, regarding health issues, moves very slowly. The US continues to maintain the position that there is no unequivocal scientific proof that Agent Orange dioxin is the cause of health problems in Viet Nam. The story continues, 30+ years later …