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## Agent Orange one of world's most toxic Effects of chemical linger for decades

**AGENT ORANGE FLIGHT:** A U.S. military aircraft sprays the jungle in North Vietnam with

Agent Orange during the Vietnam War in the sixties. SUBMITTED PHOTO

**JOEL O'KANE**

*The Daily Gleaner*

Experts say Agent Orange, a notorious Vietnam War herbicide once tested at Canadian Forces Base Gagetown in 1966 and now being blamed for a host of veterans' ailments and cancers, is one of the most toxic substances known to humans and lingers for decades after its use.

It's been a few weeks since the federal government admits compensation may be available for Canadian veterans afflicted by their exposure at the nearby base, but questions remain around exactly what conditions follow Agent Orange exposure.

Only recently have scientists begun to unravel the deadly nature of the herbicide and its toxic by-product, a form of dioxin called 2,3,7,8-TCDD. The substance's chemical makeup is so stable and stubborn that it won't break down for hundreds of years.

"The chemical has been rated as one of the most toxic chemicals ever produced by man," said Dr. Wayne Dwernychuk, vice-president of Hatfield Consultants Ltd. in British Columbia.

For 10 years, Hatfield Consultants has been studying Agent Orange's deadly and long-lasting effects in Vietnam, where the U.S. Army dumped millions of litres of the herbicide on the dense jungle to reveal enemy hiding spots.

Dwernychuk said the chemical still exists in Vietnam and is being blamed for thousands of cancer and birth defect cases.

Once Agent Orange is released into an environment, great steps must be taken to keep it out of the food and water supply.

In Vietnam, it's spreading from generation to generation through breastmilk and the food chain, Dwernychuk said.

If it still exists and causing problems in Vietnam, he said, it's logical to assume it

might still be in New Brunswick.

"There's a very good chance that some of the residues, (such as) dioxin, are probably still in the soils of the base," Dwernychuk said. "Depending on topography and drainage patterns, where did all this stuff go? Did it go into lakes, where people were fishing? Did it go into rivers and eventually transported out to sea? Where did this stuff accumulate?"

Agent Orange's wartime use in Vietnam was the culmination of an accidental discovery in the Second World War, when a University of Chicago scientist named Dr. E.J. Kraus found tichlorophenoxyacetic acid (2,4-D for short) could kill certain species of plants.

Further U.S. Army testing in the 1950s found that by mixing 2,4-D with another acid, 2,4,5-T, one could create a powerful chemical that could destroy plants almost instantly.

What they didn't know is this chemical's manufacturing process also created the toxic dioxin by-product TCDD.

The herbicide, called Agent Orange because of the tell-tale orange coding on its barrel, was perfect for clearing thick vegetation in Vietnam.

For nine years as part of Operation Ranch Hand, U.S. aircraft dropped over 70 million litres of Agent Orange over 14,000 kilometres of South Vietnamese jungle. That's equivalent to over a million automobile gas tanks full of Agent Orange being dropped on an area a fifth of the size of New Brunswick.

But Dwernychuk said the aerial spraying wasn't the worst of it. Agent Orange was kept at U.S. military bases in Vietnam where it was repeatedly handled and likely spilled.

He said his research team has found soil around the former bases in Vietnam where concentrations of TCDD are hundreds of thousands of times higher than its concentration in United States' soil.

The Vietnamese have been complaining of cancers and birth defects since the war, but it turns out there's a little TCDD in all of us.

"It is a very persistent molecule that will glob on to little particulates of soil and dust, so you can inhale it," Dwernychuk said. "That's probably why there's probably some in all of us, in very little concentrations of course."

Most people in industrialized countries have concentrations of TCDD ranging from three to seven parts per trillion. Some Vietnamese have concentrations exceeding 400 parts per trillion in their bodies, an 80-fold increase.

The U.S. Institute of Medicine has been studying Agent Orange's effect on veterans for years and releases a bi-annual report on its findings.

So far, the institute has linked TCDD to chronic lymphocytic leukemia, soft-tissue sarcoma, non-Hodgkin's lymphoma, Hodgkin's disease and chloracne. There is still no conclusive link between TCDD and most cancers American veterans complained about following their service in Vietnam.

Because of uncertainties around Agent Orange's use in Vietnam and how veterans were exposed, "only general assertions can be made about risks to Vietnam veterans" the institute's 2004 report concludes.

The quest for compensation continues for over 300,000 U.S. veterans claiming to be affected by Agent Orange in Vietnam.

But what about New Brunswick and Canadian veterans? Why did the U.S. military bring Agent Orange to CFB Gagetown in 1966, four years after Operation Ranch Hand started in Vietnam?

And when did they know about its dangers?

According to declassified information in U.S. Admiral E.R. Zumwalt Jr.'s report to the secretary of Veterans Affairs in 1990, some scientists knew its deadly secret as early as the 1960s.

"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," writes Dr. James Cleary, a former government chemical weapons scientist, in the Zumwalt report.

"... However, because the material was to be used on the 'enemy,' none of us were overly concerned. We never considered a scenario in which our own personnel would become contaminated with the herbicide. And, if we had, we would have expected our own government to give assistance to veterans so contaminated."

Just exactly when Agent Orange's secret was known is the question for New Brunswickers, Dwernychuk said.

"How that links into when this was known with regard to the testing in New Brunswick is a very interesting issue," Dwernychuk said. "... If that was known, why was not some precautions taken with the experimentation on New Brunswick?"

The U.S. came to CFB Gagetown with Agent Orange in 1966. It's believed they

thought the large base, full of dense and uninhabited forest, was perfect for testing the herbicide.

Department of National Defense spokesperson Mike Considine said a "minimal number" of Canadian soldiers were used to mark where the American aircraft should release Agent Orange.

As far as he knows, they weren't in the test's drop zone, but they weren't wearing any protection either.

"They were just used to cordon off the place," he said. "They were not tested and (Agent Orange) wasn't sprayed on them. It was to spray on the foliage - the leaves and trees. One could also assume they never got into contact with it, because whoever sprayed took care not to put it on them."

Dwernychuk said proper protection against Agent Orange should resemble what firefighters use when fighting chemical fires.

As for when officials knew Agent Orange was harmful to humans, Considine doubts the U.S. military knew in 1966.

"It was only later on, well after the fact when we tested it on small areas of Gagetown ... that people started to study Agent Orange and the chemicals inside it that it became common knowledge (it might be harmful)," he said.

As for lingering effects in the base's environment, Considine said a comprehensive soil test in 1985 found no contamination.

"They did some studies in the area when that was done and found no contamination in the water and the soil around that area," he said. "I think one could make the assumption that the area's safe."

As the issue flared up again recently with the federal government admitting it gave compensation benefits to two veterans for Agent Orange exposure, Considine said the important thing to remember is for former soldiers to contact Veterans Affairs immediately.

"We're there certainly to help our veterans and our currently serving people," he said.

The Department of Veterans Affairs can be reached at (866) 522-2122.

## **Timeline traces chemical use from early forties to Vietnam**

**BY JOEL O'KANE**  
*FOR THE DAILY GLEANER*

A timeline of Agent Orange use:

Early 1940s: During the Second World War, University of Chicago professor Dr. E.J. Kraus discovers an acid called 2,4-D. Kraus observes it could kill certain plants.

1950s: The U.S. Army successfully experiments with 2,4-D in Panamanian and Malaysian forests and adds it to their chemical arsenal. Scientists note a mixture of 2,4-D and 2,4,5-D can cause an immediate negative effect in plants.

1954-57: French colonial army defeated, Vietnam split in two by peace settlement. North Vietnam attacks South Vietnam. U.S. aids South Vietnam in fight but denies official involvement until Gulf of Tonkin incident in 1964.

1961: Chemical herbicides shipped to Vietnam, including Agent Orange, Agent Blue and Agent White, among others. They were named so because of the colour-coded stripes on their barrels.

1962-71: The U.S. military launches Operation Ranch Hand to defoliate the dense Vietnamese jungle and take cover away from the enemy. Over the next nine years, over 80 million litres of herbicide was used in southern Vietnam. Most of this was Agent Orange.

1965: Dow Chemical's scientists express private concerns about Agent Orange's effect on humans.

1966: The U.S. military douses parts of CFB Gagetown with Agent Orange to test its effects. Canadian soldiers were on the ground during the aerial spraying.

1969: Bionetics Research Laboratories exposes dioxin, a by-product of the Agent Orange manufacturing process, as the cause of deaths and stillbirths in laboratory animals. The Food and Drug Administration releases the report and the White House ordered a partial scale-back of Agent Orange use in Vietnam.

1971: The U.S. Surgeon General regulates Agent Orange use at home. Agent Orange use officially ceases in Vietnam.

1973: Vietnam War ends for American troops.

1981: Canadian committee finds no evidence of health problems due to Agent Orange use at CFB Gagetown. The media are invited to view the sprayed areas.

1984: Seven American chemical companies pay \$180-million to settle a class action suit by U.S. veterans, who claimed the defoliant caused cancer and birth defects.

1990: The Zumwalt report to the U.S. Department of Veterans Affairs finds some links between Agent Orange use and thousands of Vietnam veterans who complained of health problems.

2004: The Canadian Department of Veterans Affairs quietly awards disability compensation to two former soldiers at CFB Gaagetown.

2005: After years of trying to get compensation for its citizens, a U.S. court throws out a class action lawsuit on behalf of millions of Vietnamese who claim they were affected by Agent Orange use during the Vietnam war.

May 2005: Canadian officials publicly admit the compensation claims and subsequent lack of publicity. They also admit not knowing how many people are affected and urge soldiers who served at CFB Gaagetown during the spraying to come forward.

## **Summary of effects**

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*The Daily Gleaner*

A summary of Agent Orange health effects, according to Veterans and Agent Orange: Update 2004 by the U.S. Institute of Medicine.

Sufficient evidence of association: Chronic lymphocytic leukemia, soft-tissue sarcoma, non-Hodgkin's lymphoma, Hodgkin's disease, Chloracne.

Limited or suggestive evidence of association: Respiratory cancers, prostate cancer, multiple myeloma, early-onset transient peripheral neuropathy, porphyria cutanea tarda, Type-2 Diabetes (mellitis), spina bifida in offspring of exposed individuals.

Inadequate or Insufficient Evidence to determine association (partial list): Hepatobiliary cancers, oral and nasal cancers, bone and joint cancer, skin cancers, breast cancer, female reproductive cancer, testicular cancer, urinary bladder cancer, infertility, birth defects, neurobehavioural disorders.

Limited and suggestive evidence of no association: Gastrointestinal tumours, brain tumours.