

# Insecticide deceit?: the truth about insecticides used at Nui Dat

By John Mordike\*

## Introduction

Over the last two years I have undertaken a study on the use of insecticides at the 1 ATF base at Nui Dat, the home of the Australian and the New Zealand fighting force in Vietnam. The most important finding of this study is that much of the truth about insecticide use by 1 ATF has never been revealed.

Taking a broad perspective, my study has revealed the roles played by the Army, the Department of Veterans' Affairs and the Department of Primary Industry in the examination and reporting of the use of insecticides by the Australian Army in Vietnam.

This article narrows the focus. It presents a synopsis of the findings of my study in relation to the use of insecticides at Nui Dat.

The article is based on primary source documents from Army's Vietnam records. The records are held by the Research Centre, Australian War Memorial, Canberra, and are available to the public for research under the terms of the Archives Act (1983).

After the passage of forty years and a Royal Commission in 1983-5, it is time the truth was revealed.

## Developments at Nui Dat in 1970

In August 1970, the Officer Commanding Detachment 1 Field Hygiene Company at Nui Dat realised that very serious errors were being made with the use of insecticides. He brought his concerns to the attention of Headquarters 1<sup>st</sup> Australian Task Force (HQ 1 ATF), Nui Dat. In turn, HQ 1 ATF wrote to Headquarters Australian Force Vietnam (HQ AFV), located in Saigon, with the advice that:

*'All insecticides/pesticides containing **DIELDRIN** are to be withdrawn from issue, as in the Hygiene Officer's opinion **the use of this chemical in any form is dangerous to humans ...**'*

The Hygiene Officer's advice about Dieldrin was correct. He subsequently advised that Dieldrin's toxicity was officially rated as '*Extremely Toxic*'. Dieldrin was a very dangerous chemical and it posed real dangers for human health and the environment. But there were other very dangerous insecticides being used at Nui Dat, such as Chlordane, Lindane and Diazinon.

How toxic were these insecticides?

On 22 May 2001, delegates from 120 nations, including Australia, signed an international treaty banning **twelve of the world's most dangerous chemicals** in Stockholm. The dangerous chemicals were described as *'persistent organic pollutants [which] are among the most dangerous of all manufactured products and toxic wastes which cause fatal diseases and birth defects in humans and animals'*.

Dieldrin was one of those chemicals. Chlordane was another.

Both of these insecticides were used regularly at the 1 ATF base at Nui Dat.

The Hygiene Officer's advice should have brought a stop to the use of Dieldrin, at least, in 1970. But it did not.

### **Army's Supply Policy on Insecticides was Flawed**

Although Dieldrin and Chlordane were banned internationally in 2001, their extreme toxicity and danger to human health were known in the 1970s. Yet Army supply policy failed to reflect this.

When the Hygiene Officer's advice to cease using Dieldrin was considered at HQ AFV in August 1970, it was realised that Army's official supply policy placed no restrictions on the issue and use of Dieldrin and any other insecticides with *'extremely toxic'* and *'very toxic'* ratings. According to Army's documented supply policy, any unit could request these highly dangerous insecticides. Furthermore, personnel dispersing them required no qualifications or training. It was a very serious policy error.

My research has shown that, as a result of the policy and lack of awareness, *'extremely toxic'* and *'very toxic'* insecticides were dispersed at Nui Dat over a period of years in alarming volumes. An indication of the quantities involved will be given later in this article.

Remarkably, the realisation in August 1970 that the Army's supply policy was wrong produced no changes in the issue and use of Dieldrin, Chlordane and other dangerous insecticides at Nui Dat. The same insecticides were used again without restriction in 1971.

### **Two Classes of Insecticides**

To assist in understanding what happened at Nui Dat, it is necessary to understand how insecticides are classified and how they work.

Insecticides are divided into two classes which dictate the way in which they are intended to be used:

- Knockdown Insecticides; &
- Residual Insecticides

Everyone will be familiar with Knockdown Insecticides. They are the insecticides that we use in our homes in pressure-pack spray cans. The insecticide is released into the air in the form of an aerosol or vapour. Knockdown insecticides are also dispersed by mosquito coils and, for larger areas, by fogging and misting. The insect comes into physical contact with the vapour or aerosol, generally when in flight. The pyrethrum in the spray paralyses the insect while another mild toxic element kills the insect. Because of their low toxicity, Knockdown Insecticides are relatively safe to use in areas of human habitation.

Residual Insecticides function differently. This class of insecticides is designed to be sprayed or applied directly to hard surfaces, sometimes plants but generally buildings, where it forms a film which eventually dries and crystallises. When the insect alights on, or crawls over, the treated surface and remains in contact with the treated surface for a period of time, it is poisoned and dies. To be effective, Residual Insecticides require a high degree of toxicity and they also need to be persistent, that is, they need to be long lasting. Only properly trained personnel should use these insecticides in special circumstances under close supervision.

Significantly, documents show that when the Hygiene Officer's representations were considered at HQ AFV in August 1970, it was realised that the Army had no bulk Knockdown Insecticide in its inventory. It never had. Therefore, all area spraying and fogging at Nui Dat was executed with Residual Insecticides alone. This supply problem was never rectified. The only Knockdown Insecticide available was in the hand-held pressure-pack spray can.

The following table lists the range of Residual Insecticides used by the Army in Vietnam. The toxicity rating of each – taken from the Hygiene Officer's documents at the time – are also shown. It will be noted that Dieldrin and Chlordane were two of the most toxic insecticides.

Residual Insecticide	Toxicity Rating
Dieldrin	Extremely Toxic
Chlordane	Extremely Toxic
Lindane	Extremely Toxic
Diazinon	Very Toxic
DDT	Moderately Toxic
Malathion	Slightly Toxic

Although Malathion was rated as '*slightly toxic*' in the 1970s, in July 2006, the United States Environmental Protection Agency reported the results of research that: "*Malathion ... is converted to its metabolite, malaoxon ... in insects and mammals*". The US EPA reported that

tests on rats showed that Malaoxon was *'61x more toxic to adults [rats] than malathion'*. When Malathion was dispersed it could convert to Malaoxon through oxidation in water treatment processes or through reaction with ambient air. It was inevitable that Malathion dispersed from aircraft over Nui Dat would settle on Rowe's Lagoon, the open water supply for Nui Dat. During the wet season, Residual Insecticides would also have found their way into the water supply through run-off.

### Further Developments at Nui Dat in 1970

In September 1970, a month after he first raised the issue of insecticides, the Hygiene Officer wrote to HQ 1 ATF and HQ AFV with the advice that:

*'Residual insecticides are **dangerous poisons** and therefore are issued and used only by trained Army Health personnel.'*

Apparently, the Hygiene Officer did not know that Army supply policy permitted the *'dangerous poisons'* to be issued freely to any unit and to be dispersed by unqualified personnel. The officer then explained briefly how Residual Insecticides worked and highlighted the problem with the use of insecticides at Nui Dat:

*'It has been the incorrect practice in the past to use Residual insecticides in a knock down capacity.'*

Dispersing Residual Insecticides as though they were Knockdown Insecticides was a largely ineffective method of eradicating insects, but, significantly, as the Hygiene Officer pointed out to HQ 1 ATF and HQ AFV, it was *'**somewhat dangerous to humans'***.

Toxic insecticides could enter the human body through inhalation, ingestion and absorption through the skin.

As a result of the Hygiene Officer's advice, a senior medical officer was alerted to the problem with insecticide use at Nui Dat. He commented that:

*'It is obvious that previous insecticide practice in 1 ATF is [sic] unsound.'*

And again in his end-of-tour report the same medical officer noted that:

*'Use of insecticides in 1 ATF has not been subject to adequate control.'*

Before leaving Vietnam on 23 December 1970, the senior medical officer directed the Hygiene Officer to prepare an AFV policy document on the use of insecticides.

In the draft policy document, the Hygiene Officer recommended that:

*'the chlorinated hydrocarbons, CHLORDANE, LINDANE, DDT and DIELDRIN and any other of this group of insecticides be removed from the scale of issue to Aust forces in Vietnam'.*

There is no evidence that the AFV insecticide policy document was ever promulgated. But, sadly, there is abundant evidence that the same errors with insecticide dispersal were made at Nui Dat during the next wet season in 1971; Residual Insecticides continued to be dispersed in a knockdown capacity. Indeed, it is evident the method of dispersal in 1971 was somewhat more dangerous for human health than it had been in the past.

### **The Wet Season of 1971 at Nui Dat**

On 15 May 1971, the Commander of 1 ATF issued Routine Order Part 1, Serial 28, Number 111. The subject of the Order was *'Medical – Prevention of Insect-Borne Diseases'*.

In the introductory paragraph, the Order explained that insect-borne diseases had caused high manpower loss in previous wet seasons and, therefore, a co-ordinated campaign had been designed for 1971 to combat the insect threat. Spraying insecticide from Australian aircraft was to be the centrepiece of the campaign. In previous years, US fixed-wing aircraft had sprayed insecticide over Nui Dat.

According to the Routine Order, the 1971 campaign was based on *'the latest medical advice'* and was to consist of the following measures:

- '(1) **Residual** spraying by fixed and rotary-wing aircraft initially at fortnightly and later at weekly intervals.*
- (2) **Residual** spraying of bunkers and building interiors.*
- (3) Ground fogging of unit areas with **residual** and knock down sprays.'*

Remarkably, the campaign was based almost entirely on the use of Residual Insecticide and, of most concern, the aerial dispersal of Residual Insecticide.

Unfortunately, the Hygiene Officer who had warned in September – just 8 months previously - that Residual Insecticides were *'**dangerous poisons**'* and that using them as though they were Knockdown Insecticides was *'**somewhat dangerous to humans**'* was no longer serving at Nui Dat. He had returned to Australia on 7 April.

Veterans who served at Nui Dat in 1971 recall that, each week, the aerial spraying was executed by Iroquois helicopters from 9 Squadron RAAF. Documents show that the helicopter spraying commenced on 25 May 1971.

My research has revealed that the documented medical advice given to the Commander 1 ATF, like the Commander's subsequent Routine Order, failed to specify a particular insecticide to be used in the aerial and ground spraying or fogging dispersal campaign. The medical advice simply stated that the class of Residual Insecticides was to be used in both aerial and ground dispersal. The lack of specific advice opened the door for the use of dangerous insecticides.

## Two Veterans Speak Up

In 1982, one veteran, who served at Nui Dat with 3rd Battalion RAR as a member of the regimental hygiene squad, submitted a statutory declaration to a Senate Enquiry on pesticide use in Vietnam. The veteran said his duties *'included dispersing Malathion and Dieldrin with a swing fog device'*. He went on to explain that he *'did not dilute any chemicals'* during his service at Nui Dat from February to October 1971. *'Nor did any of the men I worked with to the best of my knowledge.'* The veteran continued:

*'We sprayed to kill mosquitoes, cockroaches, scorpions and snakes. The fog was dispersed under floorboards of tents, into tents occupied by soldiers, between sandbags around tents, around grease pits and rubbish cans, and kitchen waste areas.'*

While undertaking this spraying, the veteran stated that he wore no protective clothing, nor did his workmates. The veteran also stated that after returning from Vietnam he had *'suffered from a number of medical problems including depression, nervousness and many bouts of irrational behaviour'*. His sons also had *'medical problems'*. The veteran died in May 2011, aged 66.

Another veteran, who had served with 12 Field Regiment based at Nui Dat in 1968-69 and again, in 1970, for a total of eight months with the Detachment 1 Field Hygiene Company at Nui Dat, gave evidence to the same Senate Enquiry observing that:

*'The high incidence of malaria and encephalitis caused operators and supervisors to lift concentrations to very high toxicity to achieve a kill. Many sprays were over three times the usual concentration and mixed into cocktails of different chemicals.'*

This veteran died in 1994 at the age of **46**

## What Quantities of Insecticides were used at Nui Dat?

On 15 October 1968, a Supply and Transport staff officer on HQ 1 ATF, wrote to the Deputy Assistant Director of Supply and Transport on HQ AFV, informing him of the results of a survey of certain expense supplies that were demanded by units at Nui Dat over a three-month period. The quantities of insecticides being consumed at

Nui Dat were included in the survey and they are presented in the following table.

Insecticide	Amount Used at Nui Dat in 3 Months - 1968	Toxicity Rating
Dieldrin	600 gallons	Extremely Toxic
Chlordane	520 gallons	Extremely Toxic
Lindane Powder	216 two-ounce cans	Extremely Toxic
Diazinon Liquid	600 gallons	Very Toxic
Diazinon Powder	300 pounds	Very Toxic
DDT	222 gallons	Moderately Toxic
Malathion	520 gallons	Slightly Toxic

The supply officer who completed the survey recommended that these usage rates be adopted to establish the working stock levels for supply units at Nui Dat.

These are alarming quantities. In a three-month period in 1968, 1,120 gallons of *'extremely toxic'* Dieldrin and Chlordane alone had been dispersed at Nui Dat. Remember that both of these chemicals were among **the world's twelve most dangerous chemicals** that were banned internationally in 2001.

It should be remembered that while the Australians were dispersing these quantities of insecticides at Nui Dat from ground-based equipment, US fixed-wing aircraft were also aerially spraying the base with either Malathion, or, perhaps, DDT, each fortnight.

The quantities of insecticides being used in 1968 were not an aberration. Other Australian supply documents from Vietnam show that in mid-1970 there were 285 gallons of Dieldrin in stock with a further 300 gallons on order, 35 gallons of Chlordane with a further 100 gallons due in, 100 gallons of Lindane Liquid with 300 gallons due in, and so on with similar amounts for the other Residual Insecticides.

### **Why hasn't this information come to light before?**

Responding to the public controversy over the spraying of herbicides in early 1982, Army Headquarters, Canberra, established a research project to examine its 21,000 working files from the Vietnam war – the very same records used to write this article. While the original aim of

the Army's research project was to determine what herbicides had been used, the scope of the project was expanded to include insecticides and other chemicals that had been used by the Army in Vietnam. Although this was essentially an Army project, Department of Veterans' Affairs also played a part in the research and writing.

The work of the research project was completed in May 1982. The findings were incorporated in a large, complex document which was known thereafter as the Army Report. But the original May version of the Army Report was subject to some amendment action before Minister of Defence Mr Ian Sinclair presented the report to Parliament in December 1982. Mr Sinclair had already explained in October that the *'original version of the report [had] been revised to add information where a more detailed description was felt necessary; [to] make minor corrections such as spelling and typographical corrections; and [to] make other editorial changes to improve the flow of the report.'*

The December version of the Army Report became an evidentiary base for information on the exposure of Australian veterans to Agent Orange, insecticides and other chemicals. Indeed, in relation to insecticides, the Army Report was used by, and quoted extensively in, the final report of the Royal Commission.

What becomes clear as a result of my recent study is that, on the subject of insecticides, the Army Report is a most unsatisfactory document. Indeed, I have discovered it to be riddled with obfuscation, omissions and misleading comments. For the sake of brevity, only three examples are considered here.

**Failure to Report Aerial Spraying in 1971** When the Army Report examined the contents of the medical advice given to the Commander 1 ATF in May 1971 to implement an insect eradication campaign, the report gave precedence to the ground spraying program and simply failed to mention the aerial dispersal element. Likewise, when the Army Report mentioned the Commander's subsequent Routine Order to implement the campaign, it reported that the order detailed *'the contents of a coordinated campaign against insect-borne disease'*. And that is all. The contents of the campaign were not reported.

Therefore, in a remarkable omission, the Army Report failed to mention the aerial spraying program of Residual Insecticides that was undertaken on a weekly basis using 9 Squadron RAAF helicopters. Aerial dispersal was the centrepiece of the whole campaign. This was a critical omission because it had implications for veterans' health.

The Royal Commission accepted the Army Report as it stood, so it too failed to report that RAAF helicopters had undertaken a weekly



spraying campaign of Residual Insecticide at Nui Dat, commencing on 25 May 1971.

Thus Vietnam veterans were denied the possibility of Repatriation medical treatment and benefits for illnesses that may have been caused by exposure to these Residual Insecticides.

**Obfuscation over Amount of Dieldrin Dispersed** Similar unsatisfactory reporting was evident when the Army Report detailed the quantities of insecticides dispersed at Nui Dat.

The Army Report claimed that it could report accurately the quantities of each insecticide used at Nui Dat on a monthly basis from December 1967 to September 1971 because a detailed set of 1 ATF accounting records existed. So the Army Report listed all of the insecticides in all their forms that were used at Nui Dat. For example, there were 133,557 large pressure-pack aerosol cans, 2,832 pounds of Diazinon powder, 123,502 three-ounce bottles of insect repellent and 2,360,350 packs containing 150 Dapsone tablets. It was also reported that 2,792 gallons of Malathion and 2,940 gallons of Chlordane were dispersed by Australians at Nui Dat. Yet in the midst of all this accounting accuracy, it was remarkable that Dieldrin alone was the exception.

In the Army Report that was submitted to Parliament in December 1982, the amount of Dieldrin issued at Nui Dat over the four-year period was simply listed as 430. But 430 what? The units of quantity were not mentioned.

To claim that detailed Army accounting records did not designate what quantity of Dieldrin was being issued, while all other insecticides were accurately accounted for, is nonsense. While I have never been able to locate the detailed accounting records cited in the Army Report, I have found a number of documents in the Army records held by the Australian War Memorial that show that Dieldrin came from a US source in 5 gallon drums and that the Australian unit of issue was the gallon.

Further highlighting the unsatisfactory reporting of the quantity of Dieldrin issued, readers will also recall that the survey of usage rates at Nui Dat reported that 600 gallons of Dieldrin had been issued at Nui Dat in just a three-month period in 1968. The Army Report, however, did not mention this documented fact.

Was this misreporting, incompetence or something more?

Again, the Army Report misled the Royal Commission. The final report of the Royal Commission reproduced the usage rates listed in the Army Report showing that 430 had been issued at Nui Dat, while noting '*quantity not specified*'. Obviously, the commission took

no further action to find out the truth on this matter; it simply accepted the Army Report without question.

***A Significant Deletion in the Army Report*** As already explained, there were two versions of the Army Report. The first was completed in May 1982, but, before being submitted to Parliament in December, some amendments were made.

In the following extract from the original May version of the report, I have emphasised in bold type certain words. These words were used to describe the 1 ATF Hygiene Officer's initial concerns about the use of insecticides at Nui Dat:

***'The concern, that untrained personnel were apparently using toxic insecticides without any knowledge of concentrations, dilution factors, human toxicity factors and general safety precautions, resulted in the intended publication in Routine Orders of information on safe insecticide practice.'***

Note : *A draft routine order was discovered but it is not known whether it was actually published.'*

This statement was a succinct, realistic assessment of the situation.

But the statement was amended before submission to Parliament. And the amendment was certainly beyond the scope of the revisions explained to Parliament by Minister of Defence Mr Ian Sinclair in October.

The words I emphasised in bold type from the original May version were deleted and the following statement substituted in the December version:

*'The 1 ATF Hygiene officers [sic] concern that practices for the use of toxic insecticides needed improvement resulted in the intended publication in Routine Orders of information on safe insecticide practice.'*

Note : *A draft routine order was discovered but it is not known whether it was actually published.'*

Who deleted the words *'that untrained personnel were apparently using toxic insecticides without any knowledge of concentrations, dilution factors, human toxicity factors and general safety precautions'*?

On 25 November 1982, Mr Phill Thompson, National President of the Vietnam Veterans' Association of Australia put out a press release claiming that Department of Veterans' Affairs officers were *'currently revising'* the original May version of the Army Report before its submission to Parliament in December. Further evidence

from an Army officer working in Army Office at that time supports this claim.

Whoever the culprits, it is clear they intentionally removed vital information describing a longstanding dangerous misuse of toxic insecticides. Why? The original words highlighted negligent practice in the use of insecticides that could have led to searching questions during the Royal Commission. It is also clear that the original words would have helped veterans pursue claims for medical treatment and compensation.

## **A Concluding Comment**

The above examples raise key questions. Was information about the use and misuse of toxic insecticides deliberately omitted or deleted from the Army Report and to what end? Were any omissions and deletions made to protect those guilty of possible negligence or to deny exposed veterans grounds for their lawful benefits? And exactly what part did the Department of Veterans' Affairs play?

Given the rates and methods of dispersal of Residual Insecticides and their toxicity and persistence in the environment, it is clear that the Nui Dat base was an increasingly toxic and dangerous environment for human habitation. Consequently, it is highly probable that the health of Australian and New Zealand veterans was adversely affected. I believe that a thorough examination of the morbidity of these veterans is warranted.

As a final comment, it is certain that the Australian Army will never again use herbicides – at least not on the scale and in the way that they were used in Vietnam – but the Army will be using insecticides. It is essential that the protocols developed for the use of these chemicals consider the safety and well-being of soldiers as the first priority.

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3 September 2013

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