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ACCIDENTAL HERBICIDE DAMAGE

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VIETNAM

LESSONS LEARNED No. 74

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HEADQUARTERS
UNITED STATES MILITARY ASSISTANCE COMMAND, VIETNAM
APO 96222

MACJ3-053 **15 September 1969**

SUBJECT: Vietnam Lessons Learned No. 74: Accidental Herbicide Damage

SEE DISTRIBUTION

1. Attached for information is a Lessons Learned from recent experiences in the Republic of Vietnam (RVN).

2. This information may be of value for direct application to training or to reinforce, review, or revise existing doctrine based on experiences in the RVN.

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FOR THE COMMANDER:

J.F. Harris

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Major, USA
Asst AC

3 Incl
1. Lessons Learned No. 74
2. Distribution
3. Index of Lessons Learned

VIETNAM LESSONS LEARNED NO 74

ACCIDENTAL HERBICIDE DAMAGE

1. (U-FOUO) GENERAL. Herbicides have been used successfully in the support of tactical operations in the Republic of Vietnam (RVN) since 1961. As it is the case with any weapon or support system herbicides can be misused. This misuse, coupled with careless handling and disposition of used containers, can cause extensive damage to crops and desirable vegetation.

2. (U) PURPOSE. The purpose of this Lessons Learned is to cite two recent examples of accidental herbicide damage and to review the measures that can be taken to eliminate the causes of the damage.

3. (U-FOUO) BACKGROUND.

a. Objectives of the Herbicide Program. The enemy in the RVN uses the natural concealment of the jungle and grasses to a considerable tactical and logistical advantage. The herbicide program has two objectives:

(1) Defoliation to remove natural concealment and expose the enemy, making him vulnerable to our reconnaissance and firepower, and providing better security to our own facilities and lines of communications (LOC).

(2) Destruction of the enemy's crops to weaken the enemy by restricting his food supply and forcing a manpower diversion to food cultivation, procurement, and transportation.

b. Herbicides Used. A herbicide is any preparation used to inhibit the growth of plants, or to remove their leaves prematurely so as to enhance visual reconnaissance. There are three types of herbicides in use in the RVN. They are all liquids and, to avoid technical terms, each one has been given a color designation: ORANGE, WHITE, or BLUE. For identification of contents, a 4-inch band of the particular color appears on the 55-gallon drums in which herbicides are contained (see figure 1, page 2). These are issued through the Army of the Republic of Vietnam (ARVN) supply channels.

(1) ORANGE is used against broadleaf plants. After spraying, plants show discoloration in seven to ten days and defoliation is at its peak effectiveness after four to six weeks. It will remain effective for about 12 months.

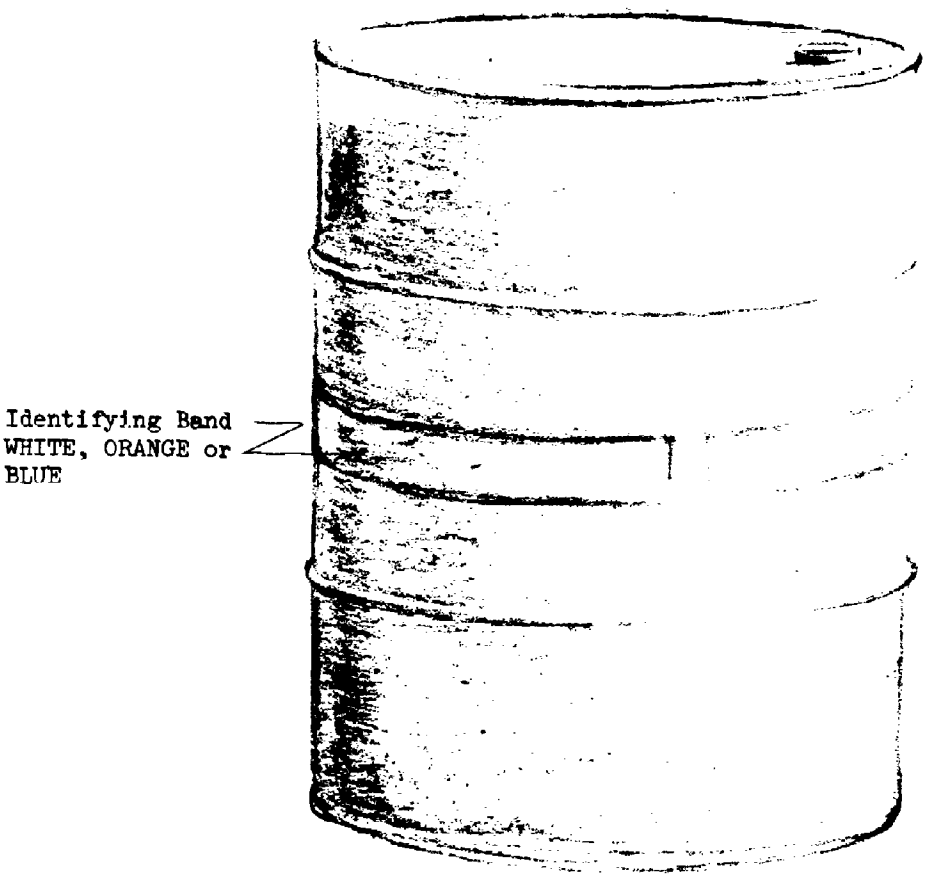


FIGURE 1

(2) WHITE is similar to ORANGE but is slower acting and takes from 10 to 14 days for discoloration and six to eight weeks for effective defoliation.

(3) BLUE is used against narrow leaf vegetation, such as rice, bamboo, banana, or grass. Discoloration occurs within 24 hours and leaves wilt in two to four days.

c. Toxicity and Persistence. All these herbicides present low risks to humans and animals. They have been widely used in the US for more than 20 years on food and other crops, rangeland, and forests. No special precautions are needed by air or ground crews and friendly troops are often sprayed without ill effects. None of the herbicides is persistent in soil, and areas must be resprayed periodically to kill regrowth, if the tactical situation requires it.

d. Methods of Application. By far, most herbicides are sprayed by 1000-gallon spray apparatus mounted in U.S. Air Force aircraft. Herbicides are also applied using a variety of other devices on helicopters and ground equipment.

4. (U-FOUO) ACCIDENTAL DAMAGE. The following recent examples are cited as being typical accidental herbicide damage. Their effects, causes, and remedies will be presented.

a. In early 1969 large numbers of shade trees in Da Nang appeared to be dead or dying. Garden plots in the city were also damaged. There were strong indications that the damage was caused by herbicides either by drift or leakage from spraying aircraft, or from herbicide drums brought into the city. Investigation ruled out the aircraft leakage or drifting spray. In every case of damage however, drums which were considered empty were either present or had been moved through the area. Herbicides are pumped from 55-gallon drums into the spray aircraft. The method of pumping leaves a residue of two to three gallons in each drum. In the case at hand, the bungs were generallly not replaced (or at best loosely replaced) and the drums were loaded onto trucks, hauled into Da Nang (often dripping herbicide along the route), and sold to commercial concerns. The herbicide that remained in the drums after sale was usually drained onto the ground at numerous points throughout the city. Even if completly

drained at the air base, the vapors from the drums can cause serious plant damage. Cleaning the drums is difficult, if not impossible, as some herbicides have an oily base and the small bung hole limits access to the inside of the drum. These drums should be kept under control and not released or reused indiscriminately.

(2) Similar herbicide supply operations were carried out at Nha Trang, Bien Hoa, Phu Cat, and Saigon. Damage to crops was also noticed at these locations.

b. Xuan Loc District of Long Khanh Province.

(1) In June 1969 the Long Khanh Province Chief and his senior advisor became concerned about what appeared to be herbicide damage to crops along route QL 20 north of Xuan Loc. They suspected spray drift from a UC-123 target to the west. Investigation along the highway as far north as Tuc Trung revealed that very few crops, other than beans which are highly sensitive, were affected. It was noted that the intensity of damage was greatest in and near the towns and gradually decreased with distance away from the towns. This is not characteristic of herbicide drift.

(2) Further investigation of the towns' perimeter defenses, outposts and gun emplacements revealed the presence of large stocks of WHITE and some ORANGE for ground spray operations. These installations, located on high ground overlooking the towns, contained leaking drums and many undrained "empty" drums. Leaking and "empty" drums were being moved along route QL 20. The usual wind speeds in this area at this time of the year are too high for safe herbicide operations.

(3) In Xuan Loc itself, one of the major compounds contained a large stock of WHITE in which there were several leaking drums and many empty drums. Extensive damage to trees and other vegetation was noticed. Many empty drums were seen around many private houses in each of the towns.

(4) It was therefor concluded that the herbicide damage in Xuan Loc and north from it along route QL 20 was probably caused by improper hand spraying techniques and improper handling and storage of herbicide drums.

5. (U-FOUO) LESSONS LEARNED.

a. Extreme care must be exercised when handling herbicides. Unless properly controlled, herbicides can cause extensive damage to crops, trees, and other vegetation.

b. The number of storage and mixing points should be kept at a minimum. These should be isolated from cultivated and desirable vegetation.

c. Where defoliation by hand spray must be done near crops or other desirable vegetation, contaminated JP-4 or diesel fuel should be used without the addition of the herbicide.

d. Ground spray with herbicides should be closely controlled and done only where essential.

e. For ground spraying, ORANGE should be mixed with 10 to 20 parts of JP-4 or diesel fuel (contaminated fuel is acceptable); WHITE should be mixed with 50 parts of clear water; and BLUE should be mixed with 20 parts of clear water.

f. Spraying should be done only between dawn and about 1000 hours, at ambient temperatures under 30°C (86°F) and in calm or extremely low wind conditions. These temperature inversion conditions will result in the most effective use of herbicide and cause minimum drift.

g. Herbicide drums should be completely drained at the storage site, rinsed with large amounts of water, resealed, and returned to supply points. (Rinse water must also be controlled).

h. At supply points, the empty drums should have holes punched in both top and bottom and their further use should be limited to construction of revetments and other military defensive positions. (A recommended alternate use is for the construction of flame field expedients as outlined in Chapter 6 of Dept of the Army Field Manual 20-33, "Combat Flame Operations". For this use, holes must <u>not</u> be punched in the drums but care must be exercised in handling them.)

i. A warning, such as "<u>Danger - Vapor from contents of these drums can damage plants and trees</u>", should be posted at storage sites and stenciled in Vietnamese on each drum.

j. Detailed instructions on the proper use of herbicides, handling of leaking drums, draining and cleaning of drums after use, and drum disposal procedures should be disseminated to all users of herbicides.



EFFECTS OF DEFOLIANTS ON A COCONUT PALM

FIGURE 2

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6. DOA Working Paper 69/18, Directorate of Tactical Analysis, HQ, Seventh Air Force, undated, "Herbicide - Defoliation Program 7AF 1967-Feb 1969" (Informal Paper).

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9. Message, UNCLAS EFTO FOUO 85/69 (J3), HQ, USMACV, DTG 20 1124Z Jul 69, subj: Control of Herbicide.

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MACV LESSONS LEARNED INDEX

NUMBER	DATE	SUBJECT
1	30 Mar 62	Helitorne Operation Cai Ngay, An Xuyen Province
2	30 Mar 62	Airmobile Operation in I Corps
3	11 Apr 62	Operation JUNGLE JIM
4	11 Apr 62	Ranger Task Force Operation in Vinh Binh Sector
5	11 Apr 62	Multi-Battalion Operation in Northern Tay Ninh Province
6	11 Apr 62	Operations in Phuoc Thanh Sector to Relocate Civilians
7	18 Apr 62	Operation DAN TIEM VIII
8	23 Apr 62	Operation CA CHEP
9	27 Apr 62	Operation in Kien Hoa Sector
10	1 May 62	VC Ambush-Trung Lap, Binh Duong Province
11	5 May 62	Operation TIGER HUNT
12	10 May 62	Operation RAINDROP
13	16 May 62	Operation NGUYEN HUE
14	Undated	Operation SON CA
15	15 Jun 62	Ambush Techniques
16	19 Jun 62	Review of Lessons Learned 1 - 15
17	25 Jun 62	Techniques Dealing with Airmobile Assaults
18	24 Jul 62	Tips and Combat Experiences
19	31 Jul 62	Operation SUNRISE

20	27 Aug 62	Indiscriminate Use of Firepower
21	28 Aug 62	Ambush Techniques
22	8 Sep 62	Operations of US Army Helicopters
23	5 Oct 62	Operation BINH TAY
24	13 Nov 62	Airmobile Raids Against Superior Forces
25	17 Dec 62	Search Techniques
26	18 Jan 63	M113 Operations
27	28 Feb 63	Ambushes
28	18 Apr 63	Guidelines for Advisors
29	17 May 63	Ambush in BINH GHANH
30	17 Aug 63	Psywar and Civic Action Operations
31	27 Sep 63	Artillery Organization and Employment in Counterinsurgency
32	19 Oct 63	Eagle Flight Operations
33	29 Oct 63	Utilization of Military Dogs
34	30 Nov 63	Railway Security
35	10 Jan 64	Clear and Hold Operations
36	4 Feb 64	Fire and Maneuver
37	10 Feb 64	Vehicle Convoy Organization and Control
38	12 Mar 64	Area Saturation Operations
39	11 Mar 64	Ambush Operations
40	23 Mar 64	Corps Psywar/CA Operations Center
41	28 Jul 64	Operations of Seabee Technical Assistance Teams
42	7 Oct 64	VC Employment of Land Mines

43	22 Dec 64	Combat Tips I
44	23 Jan 65	Elimination of Viet Cong Infrastructure
45	12 Feb 65	Viet Cong Tunnels
46	3 Mar 65	Recent Operations
47	30 Mar 65	River Assault Group Operations
48	7 Apr 65	Combat Tips II
49	13 Apr 65	Operation HOAI AN
50	13 Apr 65	Naval Conduct of Amphibious Operations
51	24 Apr 65	Operational Employment of Riot Control Munitions
52	22 Nov 65	Operational Employment of the Mity Mite Portable Blower
53	29 Sep 66	Viet Cong Improvised Explosive Mines and Booby Traps
54	27 Jan 66	The Battle of Ky Phu
55	15 Mar 66	The Battle of Annihilation
56	18 Apr 66	Operations Against Tunnel Complexes
57	25 May 66	Pursuit
58	20 Jun 66	Operation HAPPY VALLEY
59	13 Jul 66	Employment of Image Intensification Devices
60	5 Oct 66	Defense Against Mortar/Recoilless Rifle Attacks
61	27 Jan 67	Salient Lessons Learned
62	11 Mar 67	Salient Lessons Learned
63	25 Apr 67	Search and Rescue Operations
64	15 Sep 67	Imitative Communications Deception

65	20 Oct 67	Population and Resources Control
66	10 Nov 67	Countermeasures for 102mm, 122mm and 140mm Rockets
67	4 Apr 68	Defense
68	20 Jul 68	Viet Cong Base Camps and Supply Caches
69	10 Sep 68	Analysis of Enemy Positions at Khe Sanh and Evaluation of the Effectiveness of Weapons Systems Against Enemy Fortifications
70	17 Oct 68	Friendly Casualties from Friendly Fires
71	13 Mar 69	Salient Lessons Learned
72	16 Nov 68	Aerospace Rescue and Recovery in South East Asia
73	20 Nov 68	Defeat of VC Infastructure
74		Accidental Herbicide Damage