

# Presentation to the “Informal Agent Orange Working Group”

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by

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Brief Review of the  
2<sup>nd</sup> Agent Orange and Dioxin  
Remediation Workshop  
Hanoi, 18—19 June 2007



# Discussions on:

- Viet Nam Tactical Herbicide Mapping Project
- New Data on Quantities of Tactical Herbicides sprayed or spilled in Southern Viet Nam
- Re-assessment of Dioxin Data
- Operation FLYSWATTER (Use of insecticides to control mosquitoes in Southern Viet Nam)
- Recent Remediation Research



The focus of these Workshops was to assist the Vietnamese in the investigation of potential residual risks in present-day Viet Nam from War-time Viet Nam.

# Tactical Herbicide Mapping Project



History and Maps of the  
Former Tactical Herbicide  
Storage and Loading sites in Viet Nam


The term “tactical” refers to the herbicides that were used by the Allied Force (US, Australian, Korean, and ARVN units) in military operations. Thus, Agent Orange, Agent White, and Agent Blue were the primary Tactical Herbicides. The USAF sprayed 95% of the tactical herbicides in Operation RANCH HAND. The other 5% was primarily sprayed from helicopters by the US Army Chemical Corps (3-4%) and by Combat Engineers belonging to Australian, Korean or ARVN units.




# Operation RANCH HAND Bases

Six Operating Locations for  
RANCH HAND were identified

1. Tan Son Nhut Airport, 7 January 1962 – 1 December 1966
2. Bien Hoa Air Base, 1 December 1966 – 21 February 1970
3. Da Nang Air Base, 1 May 1964 – 7 January 1971
4. Phu Cat Air Base, June 1968 – May 1970
5. Nha Trang Air Base, June 1968 – November 1969
6. Phan Rang Air Base, 22 February 1970 – 28 February 1972



All crash maps and other material and notes were provided to the mapping experts with Battelle Memorial Institute. They obtained satellite images of seven bases in Southern Viet Nam acquired by either the Quickbird or Ikonos Satellites.



Each satellite image had a resolution of ~ one meter, and was pan-sharpened multi-spectral, and geo-referenced to geographic coordinates. The sites from the maps were overlaid on the images, and a legend prepared for each image.

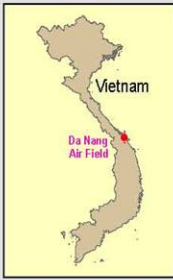
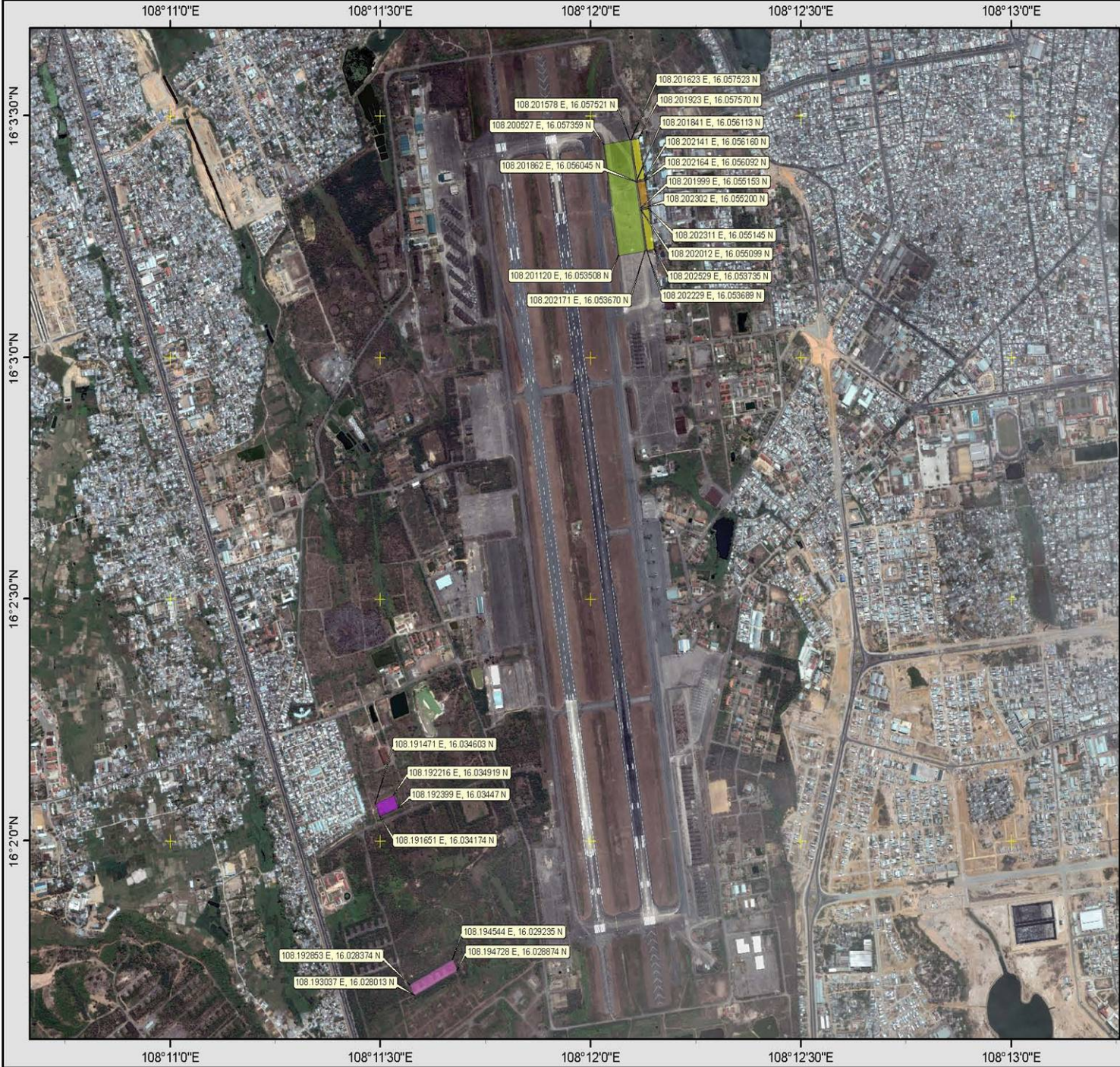


# Da Nang Air Field

## Quantities of Herbicides in Transient and Storage

Orange	52,700 drums
White	29,000 drums
Blue	5,000 drums

After April 1970      PACER IVY      8,220 drums of Orange



### Legend

- Aircraft Parking and Loading
- Drum Storage
- Herbicide Loading Operations
- Pacer Ivy Storage Area
- Pacer Ivy Re-Drumming Area

(All Locations are Approximate)

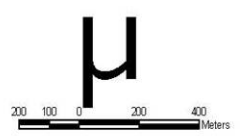
108.201623 E, 16.057523 N

Approximate Coordinates in Decimal Degrees, Longitude, Latitude WGS-1984

Notes:

Satellite Image acquired by QuickBird Satellite on June 25, 2006. Image is 2-foot resolution, Pan-sharpened Multi-Spectral (natural color), geo-referenced to Geographic Coordinates, WGS-1984.

Locations of operation areas are all approximate, and were supplied by former Base personnel.



## DA NANG AIR FIELD QUANG NAM PROVINCE VIETNAM

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In March 1967, the RANCH HAND Squadron was assigned the additional duty of spraying insecticide (malathion). Three C-123 aircraft were modified to spray the insecticide. From March 1967 through February 1972, RANCH HAND aircraft and aircrews were used in Operation FLYSWATTER, for mosquito and malaria control.







1968

The Silver “Bug Birds” as they were called, routinely sprayed insecticide on 14 major military bases and the associated civilian communities in Southern Viet Nam every nine (9) to fourteen (14) days.





When a RANCH HAND aircraft was seen spraying a chemical, it was *highly likely* that the aircraft was spraying insecticide!





From 21 February 1970 through February 1972, Operation FLYSWATTER was headquartered at Phan Rang Airfield. The Phan Rang Airfield satellite image identified the location of RANCH HAND aircraft and storage on insecticide.



**How much Agent Orange, and  
hence TCDD, would have  
remained at air bases  
supporting RANCH HAND  
Operations?**

The HERBS Tape was a US Military record of the tactical herbicide operations in Viet Nam, 1965—1971.

A recent re-analysis of HERBS indicated that approximately 330,000 drums of tactical herbicides **were sprayed** in RANCH HAND and Chemical Corps Operations, versus the 342,400 **sent** to Viet Nam and deployed (or about 96%).

Thus, only about 2-4% of the dioxin from Agent Orange would have remained in “hotspots”, or about 2-4 kilograms.

**This is a very different picture  
than previously visualized in  
Southern Viet Nam.**

What the Vietnamese Government must address are the **major sources** of dioxins in the Vietnamese environment; for example, the low temperature combustion of industrial and municipal wastes.

# Hatfield Consultant Data

Hatfield consultants claimed in March 2005 that they analyzed 21 soil samples from “near the former US Military Installation at Da Nang”.

Total TEQ: <1 – 269 pg/g with a maximum TCDD of 227 pg/g, indicating contamination of samples by other dioxins and furans. (no mean or STD indicated)

# Other Hatfield Sampling

Hatfield Consultants also sampled at

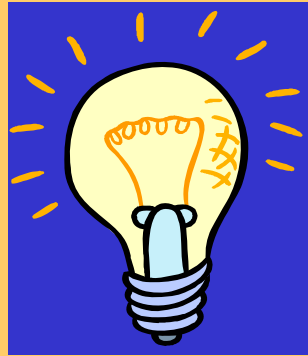
Can Tho

5 soil samples contained <math>2.04 - 70.4\text{ pg/g}</math>

Max TCDD = 68.7

*No recorded use of Agent Orange.*

# A more likely explanation:



Tanabe et al. examined Can Tho's municipal waste area and detected mean of 84 pg/g TCDD, total PCDDs of 320, PCDFs of 47, and PCBs of 910 pg/g.



Country: Vietnam  
Year: 2004  
Location: Can Tho



It is **highly unlikely** that Hatfield Consultants were detecting the TCDD from Agent Orange.