

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS AIR FORCE SYSTEMS COMMAND
ANDREWS AIR FORCE BASE, DC 20334



REPLY TO
ATTN OF: SGP

28 SEP 1979

SUBJECT: Working Paper on Herbicide Exposure Criteria

TO: AMD/SG

1. AF/SGES (Maj Brown) has requested a working paper be developed on "Criteria for Determining Exposure Levels of Military Personnel to Dioxin During Vietnam War". The working paper is required to satisfy a request of the Veterans Administration Advisory Committee on health-related effects of herbicides. When final, the subject paper will be forwarded to the DOD representatives on the committee for staffing within DOD prior to release.
2. Request USAFSAM/EK develop the subject working paper. The paper should be limited to identifying "criteria" for exposure determinations, i.e. variables or parameters that must be known and quantified before exposure calculations could be considered. Do not attempt to develop models for calculating exposure.
3. Request a draft be submitted to AFSC/SGP by 12 Oct 79.

FOR THE COMMANDER


RONALD D. BURNETT, Lt Colonel, USAF, BSC
Command Bioenvironmental Engineer
Office of the Command Surgeon

1st Ind, HQ AMD/SG

1 OCT 1979

TO: USAFSAM/CC

1. Forwarded for your information and action.
2. Request your response be sent to HQ AMD/SG no later than 10 Oct 79.

FOR THE COMMANDER


RONALD E. WILDMAN
Capt, USAF, MSC
Asst Director of Medicine & Education

CRITERIA FOR DETERMINING EXPOSURE LEVELS OF MILITARY PERSONNEL TO DIOXIN AND HERBICIDE ORANGE DURING VIETNAM WAR

attempt to

Any ~~determining~~ exposure levels of military personnel to Herbicide Orange and its associated dioxin must be predicated on events that occurred at least ten years ago. Since there were no routine occupational or environmental sampling programs associated with the handling or dissemination of the herbicides in South Vietnam, a quantitative determination of exposure can only be subject to speculation. In addition, since specific no-effect criteria for comparison with actual or derived values do not exist, the calculation of theoretical exposure levels provides data in the absence of a means for assessing their significance. The approach taken in this document is to develop data points for determining "relative" exposure to Herbicide Orange and TCDD. The population at risk certainly did not include all ~~the~~ military personnel

who ~~that~~ served in South Vietnam. Moreover, within the military population at risk, the range in magnitude of exposure must have been great. Therefore, it is important to evaluate ~~those~~ ^{what} factors would have influenced the potential for ~~a~~ ^{a given} individual to be "at risk" and ~~what~~ ^{those that} factors would have influenced the magnitude of ~~an~~ ^{that} exposure? The following factors for determining relative exposure are proposed:

Time

When was the individual in South Vietnam?

Duty

What job(s) did the individual perform?

Exposure

What was the situation at the time of exposure?

What aircraft/vehicle was involved in the exposure?

How did the exposure occur?

V. HOW DID THE EXPOSURE OCCUR?

As previously noted, the population at highest risk was the RANCH HAND ^{group} ~~personnel~~ ^{since} as these individuals were ~~exposed~~ exposed to herbicides ^{on a daily basis}. Non-RANCH HAND support personnel that handled herbicides and performed secondary level maintenance were also at risk. Beyond these limited populations, the likelihood of other individuals being heavily exposed to herbicides was significantly less. The exposure of personnel could have occurred by essentially three routes:

1. Percutaneous absorption and inhalation of vapors/aerosols by direct exposure to sprays.
2. Percutaneous absorption and inhalation of vapors by exposure to treated areas following spray application, and
3. Ingestion of foods contaminated with the material.

As previously discussed, the use of Herbicide Orange in South Vietnam was for the purpose of denying the enemy the cover of dense jungle foliage. The areas normally sprayed were semi-populated, forested areas where very few if any U.S. military personnel would be, and the potential for exposure to direct spray of Herbicide Orange would have been ~~highly~~ unlikely. In addition, because of the dense canopy cover, the target of the defoliation operation, the amount of herbicide penetrating to the forest floor would have been small. The chemical and physical characteristics of Herbicide Orange and the spray as it would have occurred following dissemination from a C-123 are important factors in assessing relative exposures to the Herbicides and TCDD. Table 7 reviews the pertinent chemical and physical characteristics of Herbicide Orange and Table 8 reviews both the application parameters of the spray system used in the C-123 aircraft and the characteristics of the spray itself.