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**Item ID Number** 04100



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**Report/Article Title** Memorandum: From Arthur P. Caldwell, Chief, Consultant Services Division, USAF regarding attached USAF OEHL Comments to the Draft USAF Statement of Operational Nedd (SON) 2-81 for Reclamation of Herbicide Orange-Contaminated Sites (IAW Atch 3, AFR 57-1), dated May 20, 1981

**Journal/Book Title**

**Year** 1981

**Month/Day** May 20

**Color**

**Number of Images** 4

**Description Notes**

20 MAY 1981

EC

Draft USAF SON 2-81, Reclamation of Herbicide Orange-Contaminated Sites

HQ AFSC/DLWM

1. We have reviewed the subject draft Statement of Need (SON). Our comments (attached) follow the format of Attachment 3, AFR 57-1, to the extent applicable.

2. We generally concur in the need for the work described in the SON; however, our several comments, particularly those regarding the "no-effect" level and an "end point" for the effort, should be considered as the program is developed.

FOR THE COMMANDER

SIGNED

ARTHUR P. CALDWELL, Colonel, USAF, BSC  
Chief, Consultant Services Division

1 Atch  
Comments

Cy to: HQ AMD/RDX  
AMD/SG  
AFAIRL/TH

ECE CCT 19<sup>5</sup>/<sub>81</sub>

USAF OEHM COMMENTS TO THE  
DRAFT USAF STATEMENT OF OPERATIONAL NEED (SON) 2-81 FOR  
RECLAMATION OF HERBICIDE ORANGE-CONTAMINATED SITES  
(IAW Atch 3, AFR 57-1)

1. MISSION:

Technically speaking, Herbicide Orange itself was not tested. The equipment used to deliver the Herbicide Orange, via aerial application, was tested. This inaccuracy occurs elsewhere also.

2. OPERATIONAL NEED:

2.1. On lines 8 and 9, the statement, ". . . but the toxic contaminant, TCDD, has remained. . . ." gives the impression that there has been no degradation of TCDD.

Suggest: ". . . herbicide is rapidly degrading; however, the toxic contaminant, TCDD, has not shown the same rapid rate of degradation and currently some levels of TCDD remain where the herbicide can no longer be detected. . . ."

2.2. Insuring that TCDD does not move off-site is taking the "zero" discharge attitude and that may not be attainable. Insuring that off-site movement of TCDD is reduced to the lowest level economically feasible, and is below an accepted "no-effect" level, should be set as goals.

The resolution of conflicting reports on transport mechanisms and degradation rates could be stated more clearly to emphasize the problems associated with sampling and interpretation of data. For example,

a. There are very large variations in the levels of contamination at any one location.

b. Once a sample is removed, that exact site is no longer available for sampling.

c. There is a normal level of data scatter. The ranges of this data scatter have not been fully developed.

d. There is some degree of variance in analytical methodology that also contributes to data scatter.

The conflicting reports on transport mechanisms and degradation rates are found in the open scientific literature and are not a peculiarity of Air Force studies.

In developing the systematic monitoring program, a full-scale evaluation and scoping of these variables should be considered and elucidated.

When developing methods to destroy TCDD in the soil matrix, it is important to note that, over time alone, a reduction in TCDD levels will occur. It is, therefore, important to quantify any TCDD-destroying methods over time, and also state what the end-point level is expected to be. A "zero" level is not realistic. It is suggested that parameters, such as levels in soil profile, time and final "no-effect" soil levels, be fully quantified.

### 3. OPERATIONAL DEFICIENCY:

It may be cheaper to close and duplicate Hardstand 7 than to decontaminate. Use of Test Area C-52A is not completely denied. Recommendations regarding its use were provided to AD/CC by AMD/CC in a letter, dated 31 Mar 1981. They included the following:

- a. The northern one-half of Test Area C-52A can be used in an unrestricted fashion for mission support activities.
- b. The southern one-half of Test area C-52A can be used to support mission activities with the only restriction being that of limiting off-road vehicular traffic.
- c. All efforts should be extended to prevent erosion-causing activities on Grid I.

These recommendations take into account: (1) the fact that the last known, highest concentrations of dioxin in Test Area C-52A/Grid I were well below the known "no-effect" level of dioxin in laboratory rodents, and (2) that man appears to be much more resistant to the toxic effects of dioxin than are lower animals.

The primary concern, therefore, deals with disturbing the fragile vegetative environment of these two regions. Since Grid I is closer to existing streams than is TA-C52A, Lt Col Thalken recommends that every effort be made to "protect" Grid I from erosion-causing activities. Although of lesser concern, the southern portion of TA-C52A is very subject to wind and water erosion. Heavy equipment operations off the roads on TA-C52A would severely damage existing plant life and further increase the problems with erosion and movement of TCDD-contaminated soil.

When these minimal recommendations are placed into effect, the Air Force will have made a significant and prudent move toward preventing the unwanted future movement of TCDD-contaminated soil, particularly the movement toward Choctawhatchee Bay.

An additional area of operational deficiency not addressed in this SON is referenced in message R130127Z from Commander, Johnston Atoll/FCJ, Subject: Release of Herbicide Orange Area at Johnston Atoll for Alternate Test Site Launch Research and Development. The proposed programs at Johnston Atoll and the efforts described in this draft SON should be considered together.

## MISSION ELEMENT NEED ANALYSIS (MENA)

### 1. MISSION:

1.b.(1). As noted in 2.2 of previous section, it is important to recognize that the variability in samples and analytical procedures may produce a profile of results rather than a consistently predictable degradation pattern.

1.b.(2). Under natural degradation processes, several variables need to be considered, such as: sunlight, ion exchange, ultraviolet light, particle size and composition of soil matrix, contamination dispersal within soil matrix, solubility in different soils, and biodegradation techniques.

1.b.(3). As stated in 2.2 of previous section, the degradation products need to have "no-effect" levels established. A "zero" discharge level is neither realistic nor economically feasible since "zero" changes as analytical methodology is improved.

1.b.(4). The extent and rate of TCDD movement needs to have stated parameters and levels in order to have an end point instead of an open-ended study.

1.b.(5). Particle size data are needed to provide information for developing the most effective translocation control measures.

1.b.(6). Enhancement of TCDD degradation can only be accomplished if parameters, time profiles, and end points are stated so that goals can be set. Again, a "zero" level is not economically feasible.

1.b.(7). Just as in 1.b.(6) above, parameters, time profiles, and end points need to be established.

### 2. EXISTING AND PLANNED CAPABILITIES:

2.a. If one accepts the published "no-effect", or "threshold effect", level of dioxin, which occurs in laboratory rats at approximately 2000 parts per trillion (ppt) when fed daily in the diet over a period of one year, then, indeed, there may be no need to decontaminate areas that fall below that level since humans appear to be more resistant than do lower animals to the toxic effects of TCDD.

2.b. A proposed acceptable level of TCDD might more realistically be placed at about 2000 parts per trillion, based on information provided in 2.a. above. A complete review of the animal toxicology data can be found in OEHM TR 78-92, The Toxicology, Environmental Fate, and Human Risk of Herbicide Orange and its Associated Dioxin, Oct 1978; specifically, Chapter IV, The Toxicity of 2,4-D, 2,4,5,-T, and TCDD in Animals, Part IV, Review of TCDD Toxicity in Animals, pp IV-50 to IV-72.