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Report/Article Title Letter: From Alvin L. Young, to Margaret M. Breinholt,
Office of the General Counsel, United States
Department of Agriculture (USDA), regarding testimony
by Alvin L. Young and testimony attachments, dated
June 30, 1980

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DEPARTMENT OF THE AIR FORCE
USAF SCHOOL OF AEROSPACE MEDICINE (AFSC)
BROOKS AIR FORCE BASE, TEXAS 78235



30 June 1980

Ms Margaret M. Breinholt
Attorney at Law
US Department of Agriculture
Office of the General Counsel
Washington DC 20250

Dear Ms Breinholt

Please find attached 14 copies of my testimony. I have included 2 exhibits not previously sent to you. Exhibit 3 is a recent Technical Report from Eglin. I've enclosed a copy for you to reproduce and distribute. Exhibit 4 is the draft article by Lee from the VA. Dr. Gross previously used this for an exhibit.

I hope that you find the testimony cohesive and reasonably complete. If you should need to contact me, my number in Laramie, Wyoming is 307-742-2066.

I look forward to working with you at the Administrative Hearings.

Sincerely

SIGNATURE

ALVIN L. YOUNG, Major, USAF, PhD
Consultant, Environmental Sciences

2 Atch
1. Testimony (14 copies)
2. Technical Report

QUESTION 1. WHAT HISTORICAL DATA ARE AVAILABLE ON THE CONCENTRATION OF THE TCDD CONTAMINANT IN FORMULATIONS OF 2,4,5-T?

a. Some samples of 2,4,5-T produced in either the late 1950's or very early 1960's were significantly contaminated with TCDD. One drum of Purple contained 45 ppm TCDD. The 2,4,5-T used in that formulation must have contained 90 ppm TCDD.

b. Samples of 2,4,5-T produced after 1964 contained much lower levels of TCDD. Drums of Herbicide Orange stored at NCBC, Gulfport, Mississippi, were found to contain levels of TCDD from ≤ 0.02 to 15 ppm. The 2,4,5-T used in these formulations must have contained < 0.04 to 30 ppm TCDD.

c. The concentration of TCDD varied between and within the Lots of Herbicide Orange procured from the various chemical companies contracted to produce it.

d. The mean weighted concentration of TCDD in 2.3 million gallons of Herbicide Orange was approximately 2 ppm TCDD. These data were based upon the analyses of 488 drums, selected for analyses so as to permit inferences about the entire inventory.

IMPLICATIONS: • 2,4,5-T formulations produced prior to 1968-69, quality control was poor.

• Herbicides used in the early equipment test program at Eglin were apparently very contaminated with TCDD. These products were also commercially used in the US at the same time. (In the period from 1961 thru 1969, 78 million pounds went into domestic channels and 51 million pounds into military channels.)

• The chemical industry has taken significant steps to minimize levels of TCDD in 2,4,5-T. The level of TCDD in current production lots of 2,4,5-trichlorophenol is less than 0.1 ppm.

QUESTION 2. DOES TCDD PERSIST IN THE FIELD ENVIRONMENT WHEN SPRAYED AS A CONTAMINANT OF 2,4,5-T HERBICIDE?

a. When massive quantities of 2,4,5-T were aerially applied to a spray-equipment testing grid at Eglin AFB, Florida, detectable levels of TCDD could be found in some soils 14 years after the last application of herbicide.

b. Field studies on the half-life of TCDD in sandy soils with low organic matter in Northwest Florida and in the absence of detectable levels of phenoxy herbicides was approximately three (3) years.

IMPLICATIONS:

· TCDD is apparently very persistent once it enters the soil environment. This does not address the fate of TCDD in air or on vegetation or other surfaces. The Eglin Test Site represents a unique situation. Heavy, repetitive applications of TCDD-contaminated herbicides were applied to rather bare areas (lacking vegetation). These applications also occurred in close sequence to each other (almost daily). The roles of volatility and photodegradation in reducing levels of residues were thus limited.

· The half-life of TCDD in soil is extremely difficult to determine unless numerous samples are collected. Sampling of the soil is in itself very variable. Since the TCDD was not uniformly dispersed, extreme heterogeneity of TCDD exists within the soil profiles of the test area. Thus the half-life data may not be accurate.

· The role of 2,4,5-T herbicide (and other similar chemicals) in influencing the persistence of TCDD in soil has not been adequately addressed. The concept of metabolism needs to be discussed as it may relate to the influence of microorganisms on residue levels in sites where spills or heavy applications may have occurred. Thus,

the persistence of TCDD may be strongly influenced by the other substrates found with it or at the time of soil contamination (e.g., acid vs base considerations).

QUESTION 3. DOES TCDD MOVE IN THE ABIOTIC (NON-LIVING) PORTION OF THE ENVIRONMENT?

a. In areas where the vegetative density is low and the soil is comprised of light sand, the wind may play a significant role in moving TCDD-contaminated particles into adjacent areas away from where spraying occurred. Data from the Eglin studies suggest that this mechanism may also result in deposition of soil into a depth profile that may reduce degradation.

b. The erosion of soil by water has been shown to be a mechanism of removing TCDD-contaminated soil particles to locations away from where spraying occurred. Dilution of these contaminated particles results in rapid dispersal of the residue unless the particles are washed into a silt accumulating site, where build-up of residue may occur.

QUESTION 4. DOES TCDD IN THE FIELD ENVIRONMENT BIOACCUMULATE IN BIOLOGICAL ORGANISMS AND/OR BIOMAGNIFY WITHIN FOOD CHAINS?

a. Organisms that come into direct and intimate contact with TCDD-contaminated soil generally become contaminated themselves.

b. From limited studies of a few animal species, animals may accumulate in selected organs from 4 to 10 times the level of TCDD that occurs in the soil. In these cases, it appears that soil is directly ingested so that accumulation occurred in the absence of food chains.

c. From studies of organisms that ingested TCDD-contaminated organisms, the data suggest a simple concentration mechanism consisting of a single stage, e.g., birds eat insects contaminated with TCDD-contaminated soil particles. Biomagnification, i.e., orders-of-magnitude increases of residue through trophic levels, does not occur.

QUESTION 5. DO THE LEVELS OF TCDD FOUND IN THE FIELD ENVIRONMENT HAVE ADVERSE EFFECTS UPON THE ORGANISMS WITHIN THAT ENVIRONMENT?

a. The ecological studies conducted on Test Area C-52A, Eglin AFB, Florida have found no significant adverse acute toxic effects of TCDD in animal populations exposed to concentrations of TCDD in the range of 0.1 to 1.5 parts per billion.

b. The ecological studies conducted on Test Area C-52A, Eglin AFB, Florida suggest that long-term, low level exposure to TCDD under field conditions has had minimal effect upon the health and reproduction of the beachmouse.

Maj Young

DEPARTMENT OF THE AIR FORCE
USAF SCHOOL OF AEROSPACE MEDICINE (AFSC)
BROOKS AIR FORCE BASE, TEXAS 78235



REPLY TO
ATTN OF: EK

30 June 1980

SUBJECT: Testimony - EPA Administrative Cancellation Hearings on 2,4,5-T and
Silvex Herbicides

TO: SAF/GC (Mr. Grant Reynolds)
Rm 4C 921
The Pentagon
Washington DC 20330

1. Reference USDA/GC Ltr, 6 Dec 79; SAF/MI Ltr, 12 Dec 79; HQ USAF/SG
Ltr, 15 Jan 80; HQ AMD/SG Ltr, 29 Jan 80, and USAFSAM/EK Ltr, 1 Feb 80.

2. The attached testimony has been prepared for presentation to the
EPA Administrative Cancellation Hearings on 2,4,5-T and Silvex Herbi-
cides. The testimony is scheduled for presentation on 22 Jul 80. Your
review and comments will be appreciated.

SIGNED

ALVIN L. YOUNG, Major, USAF, PhD
Consultant, Environmental Sciences

1 Atch
Testimony

Cy to: SAF/MIQ (Lt Col Laney)
HQ USAF/SG (Maj Brown)
HQ AFSC/SG (Lt Col Burnett)
HQ AMD/SG (Col Watson)
HQ AMD/PA (Capt Giammo)

1 JUDGE FINCH: Well, that throws all my exhibit
2 numbers off here that I was prepared to discuss.

3 MISS PATTON: I believe the exhibit numbers on
4 the list are correct.

5 JUDGE FINCH: On the document that you filed,
6 the 668-1?

7 MISS PATTON: Yes.

8 JUDGE FINCH: I'm going to deny the motion to
9 exclude. The reasons are as follows: the foundation laid
10 by Mr. Schroeter yesterday in his voir dire of the witness
11 with regard to certain of the exhibits to which there is
12 no objection really pre-empted some questions that I was
13 going to ask the witness in the same area.

14 And I think that that basis is sufficient enough
15 to admit the exhibits. However, I have additional reasons
16 which I think it would be appropriate that are entered
17 in the record, and I will only take a few minutes to
18 discuss them.

19 The testimony of this witness, including the
20 exhibits, are so integrated in every way that I think it
21 would be devastating to this important testimony to try
22 to segregate one line from an exhibit, or another line, or
23 a page. And the reasons for which I will give in a moment.

24 In his testimony where the motion to exclude
25 includes page 45-46 and page 49, there was a lot of

1 examination on those questions, on those pages by Counsel,
2 who made the motion. And then they refer to Table 19 in
3 Exhibit 672, which is mentioned on page 45. And the
4 extent of the questions were such that the witness had no
5 hesitation whatsoever in answering the questions in every
6 bit of detail, enough to satisfy Counsel.

7 So, that's the reason that I would refuse to
8 exclude those pages.

9 With regard to 675, that would be the one exhibit
10 that I feel might fall within this area, where we could
11 strike it. But since I'm going to rule to deny the motion,
12 based on the fact that the witness and these reports, and
13 his results, were submitted to him, pursuant to his
14 function as Director of the project at Eglin, or pursuant
15 to direction from his superiors, over whom he had control,
16 675 will not be excluded.

17 670, there was considerable cross-examination on
18 Chapter 2; in Chapter 3, where pages 50 through 76 are
19 requested to be excluded, there was considerable cross-
20 examination on page 53.

21 Again, without any hesitation to answer fully
22 the questions. There were other sections with regard to
23 rodents, page 84, which I will admit, based on the fact
24 that these are reports submitted to him. On page 87 of
25 that same exhibit, 670, there was considerable cross-

1 examination on animal by magnification, which the witness
2 answered without hesitation.

3 Exhibit 150 is in the record, therefore, that
4 requires no ruling. Exhibit 673, pages 2 to 4, involves
5 accidental accidents, SEVESO and the horse arena, which is
6 already in the record to a great extent, and that same
7 exhibit, pages 32 to 34 deal with vegetation. There was
8 considerable cross-examination on that to which the
9 witness testified, I believe, to the satisfaction of every-
10 one.

11 669, is another one that could be excluded based
12 on that, however, I'm taking the position that these are
13 reports submitted to the witness and, in fact, in the --
14 on pages 1 and 2 of that report, it says it is reported --
15 in fact, reported to the witness. And, therefore, he is
16 merely reporting what was reported to him by one of his
17 subordinates in this project.

18 Exhibit 672, there was cross-examination regard-
19 ing plants and so forth on pages 11 to 27. On pages 45
20 to 65, where we really have an area where the witness
21 admits that if he were involved in necropsy he could not
22 identify dilated renal pelvis, he could not identify
23 chloracne from a medical standpoint, toxicological stand-
24 point.

25 But, nevertheless, on pages 45 to 65 he discussed

1 examination of these mice for thymus problems, and in a
2 great deal of detail, which seemed to satisfy the questions
3 that were asked.

4 So, in those areas, I think that, based on the
5 fact that, as I said, these reports were submitted to the
6 witness, pursuant to his direction as project director,
7 they will be admitted.

8 As I said, in Mr. Schroeter's voir dire of the
9 witness, on his qualifications, I find it very difficult
10 to tell, except upon the admission of the witness, where
11 his knowledge really stops. That's my impression as the
12 judge.

13 He admitted that if he is involved in a necropsy,
14 that probably he could not look at a thymus and say that
15 is a bad tissue, or dilated renal pelvis and say that is,
16 or diagnose chloracne -- he admits that.

17 But the reports that are in here were made to him,
18 were made to him by members of his staff, who are members
19 of the armed services and appointed to his staff by his
20 superiors.

21 Now, if there is testimony in here where -- and
22 there is in some of these exhibits, where the witness
23 reports what has been reported to him as to carcinogenicity
24 teratogenicity, that kind of thing -- where he admits that
25 he's not fully an expert to testify, to be cross-examined,

NEAL R. GROSS

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1 they will be given the weight that report will be given.

2 If there is contrary evidence in the record by
3 somebody who is more knowledgeable in that area, then that
4 will probably, and could, depending upon the testimony,
5 out-weigh the report of this witness in his exhibits.

6 But those would be the only exceptions I think,
7 to not giving full credence to every one of these exhibits
8 and every bit of the testimony that the witness has given
9 us in the last two and a half days.

10 So, admissibility of all of this evidence is
11 not in question; the weight effects just some of it. But
12 the motion to exclude the testimony is denied in its
13 entirety, based on those conclusions.

14 If there is nothing further, Doctor, you are
15 finally excused. Thank you for coming up, it's been very
16 interesting.

17 (Whereupon, the witness was excused.)

18 MISS BREINHOLT: Your Honor, we have one other
19 bookkeeping matter on the slides which Dr. Young showed.
20 I have talked with both counsel for the Respondent and
21 counsel for Dow, and they have no objection to those being
22 printed and entered in the record as an exhibit.

23 Would it be possible to assign them -- the last
24 number we have used as an exhibit is 690 -- would it be
25 possible to assign them 691 as an exhibit number and we

BRIEF DESCRIPTION OF TESTIMONY*
31 October 1979

Alvin L. Young, PH.D.
5226 Prince Valiant Drive
San Antonio, TX 78218

Dr. Young, A United States Air Force scientist who has extensively studied 2,4,5-T, will testify on the persistence, environmental fate and toxicology of 2,4,5-T and TCDD. Dr. Young will present results of his seven-year study, at Eglin Air Force Base, Florida, on an area where plant and animal populations were continuously and heavily exposed to massive amounts of phenoxy herbicides applied in the course of developing aerial spray equipment for military use.

EXHIBITS

- Sturrock, T. T., and A. L. Young. 1970. A histological study of Yucca filamentosa L. from Test Area C-52A, Eglin Reservation, Florida. Technical Report AFATL-TR-70-125, Air Force Armament Laboratory, Eglin AFB, Florida. 9 p.
- Hunter, J.H. and A. L. Young. 1972. Vegetative succession studies on a defoliant - equipment Test Area, Eglin AFB Reservation, Florida. Technical Report AFATL-TR-72-31, Air Force Armament Laboratory, Eglin AFB, Florida. 23 p.
- Young, A. L. 1974. Ecological studies on a herbicide - equipment test area (TS C-52A), Eglin AFB Reservation, Florida. Technical Report AFATL-TR-74-12, Air Force Armament Laboratory, Eglin AFB, Florida. 146 p.
- Young, A.L., C. E. Thalken, and W. E. Ward. 1975. Studies of the ecological impact of repetitive aerial applications of herbicides on the ecosystem of Test Area C-52A, Eglin AFB, Florida. Technical Report AFATL-TR-75-142, Air Force Armament Laboratory, Eglin AFB, Florida. 127 p.

* Testimony for the 2,4,5-T Administrative Hearings before EPA, January 1980.

- Young, A. L., C. E. Thalken, E. L. Arnold, J. M. Cupello, and L. G. Cockerham. 1976. Fate of 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) in the environment: summary and decontamination recommendations. Technical Report USAFA-TR-76-18, United States Air Force Academy, Colorado. 41 p.
- Arnold, E. L., and A. L. Young. 1976. A rapid gas chromatographic method for the determination of several phenoxyalkanoic acid herbicides in soil samples. Technical Memorandum FJSRL(NC)TM-76-5, Frank J. Seiler Research Laboratory, United States Air Force Academy, Colorado. 16 p.
- Young, A. L., J. A. Calcagni, C. E. Thalken, and J. W. Tremblay. 1978. The toxicology, environmental fate, and human risk of Herbicide Orange and its associated dioxin. Technical Report OEHL-TR-78-92. USAF Occupational and Environmental Health Laboratory, Brooks AFB, Texas. 247 p.
- Cockerham, L. G., A. L. Young, and C. E. Thalken. 1979. Histopathological and ultrastructural studies of liver tissue from TCDD-exposed beach mice (Peromyscus polionotus). Technical Report, Frank J. Seiler Research Laboratory (AFSC), United States Air Force Academy, Colorado. 46 p.