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NCBC GULFPORT
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LETTER FROM U S AIR FORCE REGARDING SOIL SAMPLING IN SUPPORT OF
HERBICIDE ORANGE MONITORING STUDY NCBC GULFPORT MS
12/29/1978
U S AIR FORCE

DEPARTMENT OF THE AIR FORCE
USAF OCCUPATIONAL AND ENVIRONMENTAL HEALTH LABORATORY (AFSC)
BROOKS AIR FORCE BASE, TEXAS 78235



29 DEC 1978

REPLY TO
ATTN OFF

EC

SUBJECT

Trip Report, NCBC, Gulfport MS and Eglin AFB FL, 6-9 Nov 78

TO

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IN TURN

2ND SOIL SAMPLES

1. Place: Naval Construction Battalion Center (NCBC), Gulfport MS, and Test Area C-52A, Eglin AFB FL.
2. Inclusive Date of Travel: 6-9 Nov 78.
3. Persons Making Trip: Lt Col Charles E. Talken and Capt Alvin L. Young
4. Primary Modes of Travel: Commercial Air and Commercial Automobile.
5. Purpose of Trip: To collect soil samples at NCBC in support of Herbicide Orange Site Monitoring Study and to conduct field investigations on plant uptake of TCDD on Test Area C-52A, Eglin AFB FL.
6. Persons Contacted:
Captain Robert McHugh, USN, Commander, NCBC, Gulfport MS
Mr Dennis Boxx, OI, NCBC
Mr C. Breland, CE, NCBC
Mr Don Harrison, AFATL/DLV, Eglin AFB FL

7. Observations and Comments:

a. On 6 Nov 78, the second complete set of soil samples were collected from the Naval Construction Battalion Center (NCBC) in support of the Herbicide Orange Site Monitoring Project (USAF OEHL Special Project 78-8). Soil from 42 sites on the storage area were collected to a depth of 8 cm, thoroughly mixed, dried, screened so as to pass through a number 14 sieve, subsampled and placed into glass bottles. All samples were appropriately labelled (Atch 1) and shipped as sets to either the Flammability Research Center, University of Utah, Salt Lake City UT or The Department of Chemistry and Biological Sciences, USAF Academy CO. The sampling objectives and protocol are described in Attachment 2.

b. A meeting on the Site Monitoring Project was held on 7 Nov with the NCBC Commander (Captain McHugh), Base Civil Engineer (Mr Breland) and a representative from the Office of Information (Mr Boxx). Captain McHugh, had previously been briefed on Project PACER HO and on our site

3RD SAMPLES TO BE
TAKEN IN SEPT 1979.
12.1/llb

studies. We emphasized the importance of continuing our studies and requested his continued assistance in maintaining the 12-acre area as a "minimum" access area. We informed him that 2 Markers had been destroyed by cross-site vehicular travel since our last trip (Jan 1978), and that Mr Breland's staff had had to re-locate those sites the previous day. The Commander was pleased with the meeting and pledged his continued support for the project. He directed Mr Breland to place portable roadblock signs at all accesses to the site.

c. Prior to leaving NCBC, photographs of the site were taken and are provided as Attachment 3, Figures 1-6. Figures 1 and 2 are photographs taken of the sites where drums were previously stored. Figure 1 also includes a new facility under construction North West of the Quonset Building. Figures 3 and 4 show close-ups of sampling locations. The normal procedure is to collect an 8 cm X 8 cm X 8 cm section of soil. Figures 5 and 6 show how vegetation, primary broomsedge (Agropogon virginicus) has become established in the oyster chips used to cover areas heavily contaminated with herbicide.

d. On 8 Nov 78, soil samples were collected from the Herbicide Orange Biodegradation Plots on Test Area C-52A, Eglin AFB Reservation. These plots were treated with 4,000 pounds/acre herbicide in April 1972 and have been periodically sampled for residue. A list of soil samples with treatment descriptions is provided as Attachment 4. While on Test Area C-52A, a special study was initiated on the plant uptake potential of TCDD. A site on Grid I, an area heavily contaminated with TCDD, was selected for study. All vegetation and representative soil samples were removed from a 0.5 m² area (Atch 5). Plant tissue and soil will be analyzed for TCDD under a contract with the University of Nebraska.

e. The studies on Test Area C-52A will provide supporting environmental fate data for Herbicide Orange and TCDD which will be invaluable in understanding the eventual fate of residue on the Herbicide Orange Storage Sites at Gulfport MS and Johnston Island.

f. Funds for this TDY were provided by AFLC Obligation Authority T-79-32 in support of the Herbicide Orange Site Monitoring Project (USAF OEHL Special Project 78-8). The total expenditure was \$717.00.



ALVIN L. YOUNG, Captain, USAF, Ph.D.
Environmental Sciences Consultant

- 5 Atch
1. NCBC Soil Samples
 2. Protocol
 3. Figures 1-6
 4. Eglin Soil Samples
 5. TCDD Plant Uptake Samples

SOIL SAMPLES
 NCBC, GULFPORT MS
 HERBICIDE ORANGE SITE MONITORING PROJECT
 6 NOVEMBER 1978

<u>SAMPLE NO.</u>	<u>CODE</u>	<u>SOIL DESCRIPTION</u>	<u>OEHL ODOR VALUE</u>
1	H/H *	dark brown, oyster chips	23
2	O/O **	dark brown loam	0
3	L/L ***	light brown loam, oyster chips	1
4	O/O	dark brown, oyster chips	2
5	H/H	light sandy loam	10
6	O/O	light brown loam	0
7	L/L	light brown, oyster chips	0
8	L/L	light sandy loam	0
9	L/L	dark brown loam	0
10	H/H	dark brown	17
11	L/L	light brown	1
12	O/O	light brown	2
13	L/L	light brown, oyster chips	1
14	L/L	light brown, oyster chips	7
15	O/O	dark sandy loam	1
16	H/H	dark brown, oyster chips	18
17	H/H	gray, oyster chips	18
18	O/O	light red, oyster chips	1
19	H/H	dark gray, oysters chips	6
20	H/H	light brown loam	8
21	O/O	light brown loam	0
22	H/H	dark brown, oyster chips	16
23	O/O	light brown loam	3
24	H/H	dark brown, oyster chips	22
25	O/O	dark brown loam	1
26	H/H	dark brown loam	16
27	H/H	red sandy loam	9
28	O/O	light brown loam	0
29	L/L	light brown, oyster chips	1

30	H/H	red sandy clay	17
31	L/L	red sandy clay	18
32	L/L	gray, oyster chips	0
33	O/O	gray, oyster chips	0
34	L/L	light brown, oyster chips	0
35	L/L	gray, oyster chips	6
36	O/O	light brown loam	1
37	H/H	dark brown loam	9
38	L/L	light brown, oyster chips	12
39	L/L	gray, oyster chips	1
40	O/O	red sandy clay	2
41	H/H	red sandy clay, oyster chips	22
42	O/O	dark brown	0
43	Depth 8-16 cm, #37	dark brown loam	14
44	Depth 16-24 cm, #37	dark brown loam	14

* Dark herbicide stain, strong odor (See Site Monitoring Protocol)

** No herbicide stain, no odor (See Site Monitoring Protocol)

*** Light herbicide stain, mild odor (See Site Monitoring Protocol)

**** Odor Value determined by eight individuals independently smell each sample and rating on the basis of 0=no herbicide odor, 1=trace odor, 2=mild odor, and 3=strong odor. Maximum value is 24.

PROTOCOL DEVELOPMENT FOR ENVIRONMENTAL MONITORING OF STORAGE SITES
PREVIOUSLY CONTAMINATED WITH ORANGE HERBICIDE

Following the at-sea incineration of surplus Herbicide Orange in the fall of 1977, an environmental monitoring study was developed for the former storage sites. Approximately 0.85 million gallons of this phenoxy herbicide had been stored for eight years on the Naval Construction Battalion Center (NCBC), Gulfport MS, with the remaining 1.37 million gallons stored for five years on Johnston Island, South Pacific. Although soils of both 12-acre storage sites were relatively homogenous, contamination due to drum leakage was heterogenous since neither the dates of spills nor the amount of herbicides or areas involved were recorded. The expected variability in the concentrations of herbicides, degradation products or other contaminants through-out the storage site dictated that a monitoring program: (a) provide inferences as to the range of residue levels in the soil for any area on the site, (b) be sufficiently replicated to be statistically valid, (c) be continued over a sufficiently long period of time for trends in residue degradation to be evidenced, and (d) be accomplished within budgetary limitations. In addition, the "ideal" monitoring program should have some method of determining a minimum level of residue that could be considered biologically and ecologically acceptable, i.e. a "no significant effect" residue level.

A preliminary study of soil penetration indicated that 95 percent of residues were within the top 8 cm of soil profile. Forty-two sampling sites were selected within each storage area on the basis of history, and discernible herbicide stain and odor. Three sets of soil samples, extending over a 20-month period have been collected and have been (or are being) analyzed for the esters and acids of 2,4-D and 2,4,5-T, di- and trichlorophenol and TCDD. The same samples have also been qualitatively and quantitatively analyzed for actino-myctes, fungi and bacteria.

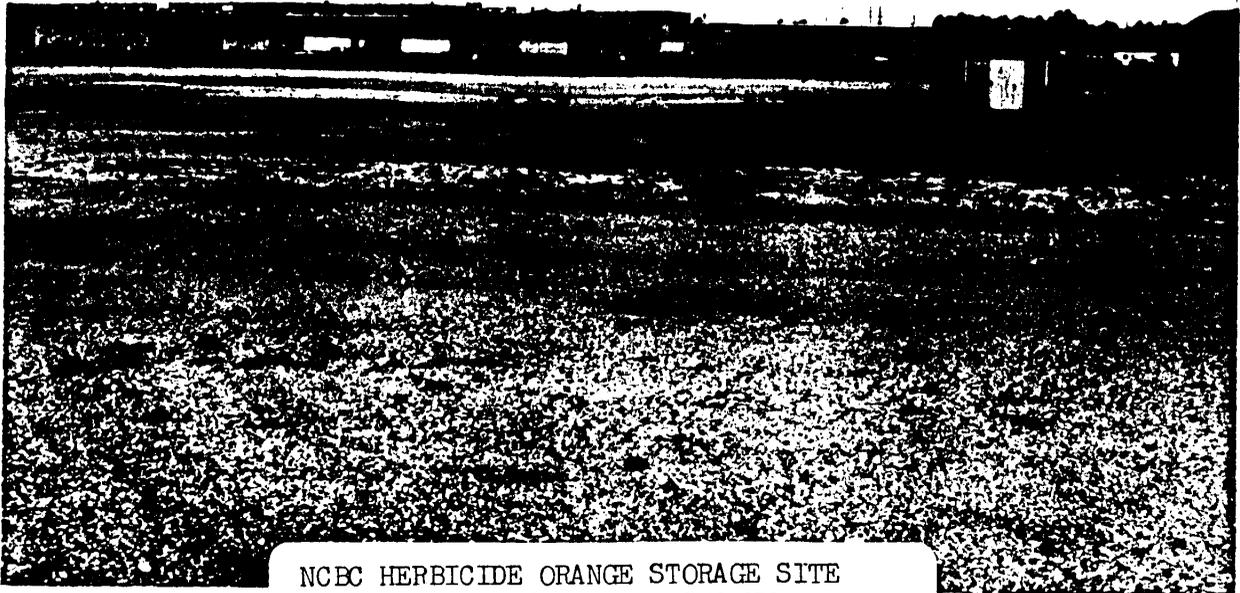


Figure 1.

NCBC HERBICIDE ORANGE STORAGE SITE
7 NOVEMBER 1978 LOCKING NW



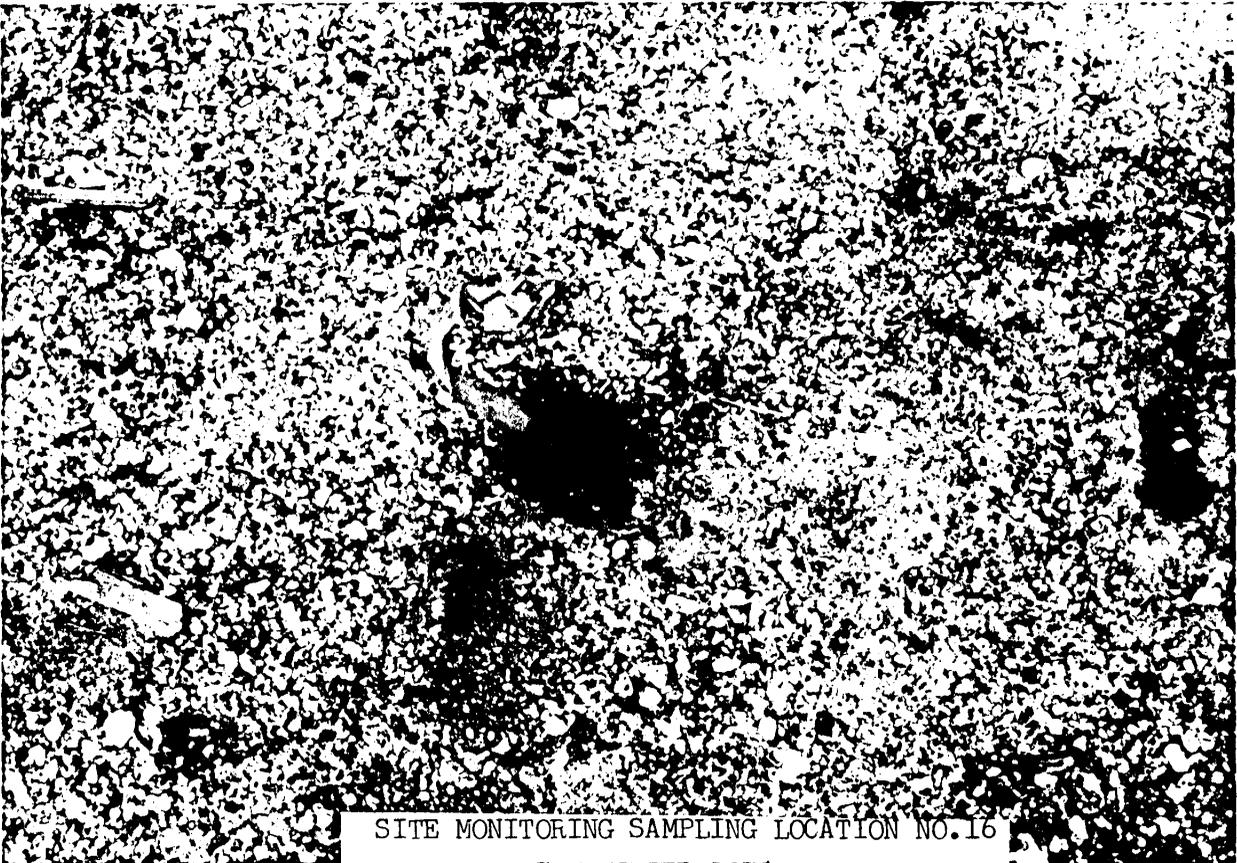
Figure 2.

NCBC HERBICIDE ORANGE STORAGE SITE
7 NOVEMBER 1978 LOOKING SW



SITE MONITORING SAMPLING LOCATION NO.17
NCBC 7 NOVEMBER 1978

FIGURE 3.



SITE MONITORING SAMPLING LOCATION NO.16
NCBC 7 NOVEMBER 1978

FIGURE 4.



Figure 5.

VEGETATIVE ESTABLISHMENT IN SPILL AREA
NCBC LOCATION NO. 28 7 NOVEMBER 78



Figure 6.

VEGETATIVE ESTABLISHMENT IN SPILL AREA
NCBC LOCATION NO. 24 7 NOVEMBER 78

SOIL SAMPLES
EGLIN AFB FL HERBICIDE BIODEGRADATION PLOTS
8 NOV 1978

<u>SAMPLE NUMBER</u>	<u>PLOT DESCRIPTION</u>	<u>DEPTH (INCHES)</u>
E-1	Plot 5, Herbicide	0-6
E-2	Plot 5, Herbicide	6-12
E-3	Plot 6, Herbicide	0-6
E-4	Plot 6, Herbicide	6-12
E-5	Plot 7, Herbicide and Amendments	0-6
E-6	Plot 7, Herbicide and Amendments	6-12
E-7	Plot 8, Herbicide and Amendments	0-6
E-8	Plot 8, Herbicide and Amendments	6-12
E-9	Plot 9, Herbicide, Amendments, Charcoal	0-6
E-10	Plot 9, Herbicide, Amendments, Charcoal	6-12
E-11	Plot 10, Herbicide, Amendments, Charcoal	0-6
E-12	Plot 10, Herbicide, Amendments, Charcoal	6-12

TCDD PLANT UPTAKE STUDY
GRID I, TA C-52A
EGLIN AFB FL
8 NOV 1978

<u>SAMPLE NUMBER</u>	<u>DESCRIPTION</u>
T-1	Soil, 0-5 cm
T-2	Soil, 5-10 cm
T-3	Soil, 10-15 cm
T-4	Soil, Composite, 0-15 cm
T-5	Plant Tissue, leaves, <u>Chrysoma pauciflosculosa</u>
T-6	Plant Tissue, stems
T-7	Plant Tissue, flower heads
T-8	Plant Tissue, roots
T-9	Plant Tissue, whole plant, <u>Panicum lanuginosum</u>
T-10	Plant Tissue, leaves, <u>Andropogon virginicus</u>
T-11	Plant Tissue, crown tissue
T-12	Plant Tissue, roots

Location of plot- 60 meters south of post 0-4, Grid I, Test Area C-52A, Eglin AFB Reservation, Florida. All soil was dried at 94°F for 18 hr and sieved so as to pass through a No. 14 sieve (1.41 mm opening). All plant parts were separated, washed, dried and grounded in a wiley mill prior to submission for analysis.



6 NOV 78



6 NOV 78