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Report/Article Title Memorandum and attached report: From Thomas R. Doane, Captain, USAF, Aquatic Biology Consultant regarding Aquatic Environmental Sampling Program at the Herbicide Orange Storage Site on NCBC, Gulfport, Mississippi

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Color ☐

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Descripton Notes

8 FEB 1979

Memo For the Record

SUBJ: Aquatic Sampling at NCBC, Gulfport MS

TO: EC
CV

1. At Maj. Tremblay's request I have collected the data that I have on biological and aquatic sampling at NCBC, Gulfport MS.

a. The Consultative Report was prepared by me at the request of Col. Taylor in late 1976. I believe it was for presentation to Capt Taylor, Commander of NCBC, in January 1977. It is as complete summary of the available data to that date as I can accomplish.

b. The following table is a statistical view of the samples taken during the dredging operation at NCBC, Gulfport during May-Jun 1977. Following that table is the listing of all water samples taken during that period. The sampling sites are as follows:

W1 - Drainage ditch immediately adjacent to the ~~dedrumming~~ operation at NCBC

W2 - Drainage ditch on NCBC just prior to off base exit.

W3 + - Immediately above and
W4 below the railroad bridge that spanned a small creek as the RR went to the harbor at NCBC

W5 - Sample taken under the pier where the Vulcanus was berthed

W6 - Taken at the Keesler AFB laundry during the washing of the coveralls used in the dedrumming operation.

W7 - Taken at the WWTP at Keesler AFB. (I believe this was prior to treatment.)

c. The only positive analysis for TCDD during the summer of 1977 operation was in a sample taken at the laundry. The value for this analysis was 2.4 ppb (ppb). It should be noted that this value is above the expected saturation value of 0.2 ppb. It is considered by myself and Maj Tremblay to be an anomaly, probably an analytical error.

2. I do not have any personal knowledge of the status of biological samples. There were samples taken prior to the dechlorinating operation, on at least two occasions. There were also biological samples taken before and after the dechlorinating operation.

THOMAS R. DOANE, Capt, USAF, BSC
Consultant, Aquatic Biology

Consultative Report: Summary of the Environmental Sampling Program at the Herbicide Orange Storage Site on NCBC, Gulfport MS

1. BACKGROUND: Representatives of the Operating Location AA, USAF Occupational and Environmental Health Laboratory (OL AA USAF OEHL), Kelly AFB TX have made 12 major trips to the Naval Construction Battalion Center (NCBC), Gulfport MS since Aug 1974. Reasons for these trips included monitoring of pilot plant activities, drum rinse studies, and monitoring of the Herbicide Orange (HO) storage area. A variety of environmental samples has been collected during these trips, however, all of them have not been analyzed to date. The sampling locations used have not always remained constant but varied as different areas of the HO storage area and storm drainage system have come under scrutiny. The samples that were initially collected were analyzed solely for the primary components of the herbicide, 2,4-D and 2,4,5-T. It was not until some concern was generated that the contaminant, TCDD, might be differentially distributed in the environment in different proportions to its content in the herbicide that increased numbers of TCDD analyses were accomplished. The analyses for 2,4-D and 2,4,5-T were done primarily at OL AA and those for TCDD were accomplished by Wright State University (WSU) under a USAF contract.

2. ENVIRONMENTAL SAMPLING PROGRAM AND RESULTS:

a. Ambient Air/Industrial Hygiene - The ambient air/industrial hygiene sampling has been accomplished predominately in support of pilot plant reprocessing activities at NCBC. To date there have been over 150 samples collected and approximately 95% of these have been analyzed. The range of values of HO and TCDD in the ambient air samples are found in Table I.

TABLE I. SUMMARY OF AMBIENT AIR/INDUSTRIAL HYGIENE SAMPLE RESULTS FROM NCBC, GULFPORT MS

	2,4-D*	2,4,5-T*	TCDD
Lowest Value	ND**	ND**	ND**
Highest Value	186 $\mu g/m^3$	168 $\mu g/m^3$	9.1 ng/m^3
TLV Value	10 mg/m^3	10 mg/m^3	No Value

* Includes acid and ester forms ** Non-detectable

b. Water Samples - The drainage ditch system which drains the HO storage area has been extensively sampled during the past two years, both during periods of pilot plant activities and periods of non-activity. As mentioned above, the sample collection sites have varied from survey to survey, see Fig 1 for sites. A breakdown of the sites and analyses can be found in Table II. The only positive analysis for TCDD was from a sample collected at location IIA (drainage ditch before bauxite pile). The TCDD concentration was

46 pico grams per ml (pg/ml) with a detection limit of 10 pg/ml. The WSU laboratory reran this sample to verify the result using high resolution mass spectrophotometry. It should be noted that on Table II, the results for 2,4-D and 2,4,5-T include both the acid and ester forms of the herbicide, the individual analysis can be found in Appendix A. The water samples were primarily grab samples although some were weekly composites of samples that were taken on a daily basis.

c. Sediment Samples - The bottom sediments in the stream beds were sampled at the same time the water samples were taken. The sediment samples were composited from several locations in the stream bed. Table III is a summary of the analytical results.

d. Soil Samples - There have been many soil samples taken from the HO storage area over the last two years. Unfortunately, a great number of these have not been analyzed to date because of problems encountered with interference from large quantities of hydrocarbon compounds similar to those found in motor oil. During the June 1975 TDY to Gulfport there were samples taken from an old HO spill area as well as a new HO spill area. These samples have been analyzed and the results can be found on page 4 of Appendix A. The results of the sampling in the old spill indicate that there was minimal HO residue except for the immediate center of the spill. The results of the sampling in the new spill areas show high results out to the edge of the stain.

3. SUMMARY AND CONCLUSIONS: Based on the results available at this time, the following conclusions can be made.

a. Ambient Air - The TLV for 2,4-D and 2,4,5-T of 10 mg/m^3 each was never exceeded in any of the samples collected in the HO storage area. There were some relatively high levels of TCDD analyzed in the ambient samples; however, in their third Quarterly Report, WSU states "The research-nature of the analytical method employed in these determinations suggests that the ambient air results should be considered as upper limits until corrobative studies are performed." The most recent WSU Quarterly Report stated that the early levels of TCDD detected could have been due in part (if not totally) to the presence of polychorinated biphenyls (PCBs) which only recently have been identified as interferring with the analyses for TCDD.

b. Water Samples - Of the 26 water samples analyzed, 13 were reported as containing more than 10 ppb herbicide. However, at the base discharge sample point, EPA 2, there were no sample analyses that exceeded this level. Also out of 23 water samples that were analyzed for TCDD, there was one that had a positive reading. These results indicate that although some HO is getting into the drainage system, it is not leaving the base but is most likely being absorbed in the bottom sediments of the drainage ditch system. Visual observations of the drainage ditch system indicate that there are no deleterious effects being exerted on the biotic community and that fish, frogs, snakes, and other normal inhabitants seem to flourish.

c. Sediment Samples - Only 2 of the 12 sediment samples analyzed to date have exceeded 1 ppm herbicide (the values were 2.04 ppm and 1.07 ppm). Again, as was the case above with the water samples, the sediment samples collected at EPA 2, the base exit site, never exceeded the 1 ppm level. There were only two samples analyzable for TCDD and both had no TCDD detected.

d. Soil Samples - The data available on the soil samples collected to date do not allow much interpretation. More data are necessary before any judgment can be made as to how wide spread or severe the contamination of the soil is in the HO storage area.

4. RECOMMENDATIONS:

a. The levels of HO in the ambient air are not high enough to create any concern about any on or off base exposure. This has also been borne out by the biomonitoring that has been performed during the Agent Chemical Inc (ACI) operations at NCBC. If the TCDD analytical results are viewed as upper limits as suggested by WSU, then there is no need for concern.

b. There is no indication of any off-base discharge of TCDD in the water or sediment samples.

c. Quarterly environmental monitoring surveys should be continued.

d. There is need for a comprehensive sampling program of the soil in the HO storage area to permit a better evaluation of the degree and extent of contamination by both HO and TCDD.

Table II Results of Water Samples from HO Storage Area NCBC GUlfport - May 1974, Oct 1976

Sample Site		2,4-D µg/l *				2,4,5-T µg/l *				TCDD Pg/ml		
Number	Description	Number of Samples	Min	Max	Avg	Min	Max	Avg	Number of Samples	Min	Max	Avg
EPA 1	Drainage ditch - North End PAD #64	5	ND**	240.5	53.5	ND	493.7	133.4	-	0	0	0
EPA 2	Base perimeter - exit of drainage ditch	6	ND	0.57	0.15	ND	0.3	0.1	3	0	0	0
EPA 3	Drainage ditch - North End PAD #59	5	ND	1928.4	409.4	ND	390	0	8	0	0	0
IIA	Drainage ditch - before bauxite pile	2	55.9	326	190.9	83.7	955.2	519.4	6	0	46	7.7
IIB	Drainage ditch - after bauxite pile	5	ND	178.3	46.1	ND	302.5	128.1	4	0	0	0
IIC	Further down stream of IIB	1	ND	ND	-	ND	ND	-	0	-	-	-
IIIA	Drainage from Industrual area	2	ND	ND	-	ND	ND	-	0	-	-	-
-	Back bay of Biloxi	0	-	-	-	-	-	-	2	0	0	0

* Includes both acid and ester forms of the herbicide
** Non-detectable

Table III Analytical Results of Sediment Samples from HO Storage Area Gulfport - Aug 1974, Oct 1976

Sample Site		/	2,4-D mg/kg*			2,4,5-T mg/kg			/	TCDD pg/g		
Number	Description	Number of Samples	Min	Max	Avg	Min	Max	Avg	Number of Samples	Min	Max	Avg
EPA 1	Drainage ditch - North End PAD #64	3	0.054	0.30	0.19	0.028	0.64	0.34	2	0	0	-
EPA 2	Base Perimeter - exit of drainage ditch	3	ND**	0.11	0.04	ND	0.11	0.04	-	-	-	-
EPA 3	Drainage ditch - North End PAD #59	5	ND	0.86	0.24	ND	1.28	0.42	-	-	-	-
IIIA	Drainage from Industrial area	1	0.05	0.05	0.05	0.10	0.10	0.10				

* Includes both acid and ester forms of the herbicide
** Non-detectable

APPENDIX A

Completed Analyses on Environmental Samples Collected at NCBC, Gulfport as of 20 September 1976

WATER

EHL #	GP #	DATE	ESTER D	ESTER T	ACID D	ACID T	TCDD
9621	EPA 1	24 Jun 75	ND	ND	ND	ND	-
11409	EPA 1	2 Aug 75	12.7μg/l	43.3μg/l	4.1μg/l	4.3μg/l	-
12085	EPA 1	8 Aug 75	0.88μg/l	2.3μg/l	239.6μg/l	491.4μg/l	-
12086	EPA 1	12 Aug 75	0.03μg/l	0.05μg/l	10.2μg/l	56.0μg/l	-
12637	EPA 1	21 Aug 75	ND	ND	ND	69.9μg/l	-
9623	EPA 3	24 Jun 75	ND	ND	6.1μg/l	4.4μg/l	-
11411	EPA 3	2 Aug 75	T	T	4.5μg/l	4.6μg/l	-
12083	EPA 3	8 Aug 75	ND	ND	ND	ND	-
12084	EPA 3	12 Aug 75	ND	ND	107.8μg/l	126.5μg/l	-
12638	EPA 3	23 Aug 75	ND	ND	1928.4μg/l	1814.7μg/l	-
12087	IIA	12 Aug 75	ND	ND	55.9μg/l	83.7μg/l	-
12639	IIA	23 Aug 75	ND	ND	326.0μg/l	955.2μg/l	-
12088	IIB	12 Aug 75	ND	ND	22.2μg/l	28.6μg/l	-
12634	IIB	15 Aug 75	T	T	ND	302.5μg/l	-
12635	IIB	18 Aug 75	ND	ND	ND	ND	-
12636	IIB	21 Aug 75	ND	ND	178.3μg/l	237.8μg/l	-
12640	IIB	23 Aug 75	ND	ND	30.1μg/l	71.4μg/l	-
12641	IIC	23 Aug 75	ND	ND	ND	ND	-
12089	IIIA	12 Aug 75	ND	ND	ND	ND	-
12642	IIIA	23 Aug 75	ND	ND	ND	ND	-
9622	EPA 2	24 Jun 75	ND	ND	0.6μg/l	0.3μg/l	-
11410	EPA 2	2 Aug 75	T	T	0.3μg/l	0.3μg/l	-
12090	EPA 2	12 Aug 75	ND	ND	ND	ND	-
12091	EPA 2	12 Aug 75	ND	ND	ND	ND	-
12633	EPA 2	14 Aug 75	ND	ND	ND	ND	-
12643	EPA 2	23 Aug 75	ND	ND	ND	ND	-
-	H_2O blank	2 Aug 75	0.5μg/l	3.3μg/l	1.1μg/l	1.2μg/l	-

ater (continued)

HL #	WSU #	DATE	EHL CODE	LOCATION	TCDD
	1-101	15 Oct 75	-	Ditch near HO storage	0
	1-102	15 Oct 75	-	Before bauxite pile	46 pg/ml
	1-103	15 Oct 75	-	After bauxite pile	0
	1-104	15 Oct 75	-	Before base exit	0
28	1-414	27 Jan 76	EW27J11K	After bauxite pile	0
27	1-412	4 Feb 76	EW04F11K	After bauxite pile	0
31	1-413	11 Feb 76	EW11F11K	After bauxite pile	0
	1-425	21 Apr 76	-	At base exit	0
	1-426	21 Apr 76	-	At base exit	0
	1-427	21 Apr 76	-	Ditch near HO storage (old EPA 3)	0
	1-428	21 Apr 76	-	Ditch near HO storage (old EPA 3)	0
	1-429	21 Apr 76	-	Back Bay of Biloxi	0
	1-430	21 Apr 76	-	Back Bay of Biloxi	0

SEDIMENT

EHL #	GP #	DATE	ESTER D	ESTER T	ACID D	ACID T	TCDD
9618	EPA 1	24 Jun 75	T	T	54µg/kg	28µg/kg	-
11412	EPA 1	2 Aug 75	0.07mg/kg	0.08mg/kg	0.23mg/kg	0.26mg/kg	-
12094	EPA 1	8 Aug 75	0.06mg/kg	0.10mg/kg	0.17mg/kg	0.54mg/kg	-
9620	EPA 3	24 Jun 75	ND	ND	ND	ND	-
11414	EPA 3	2 Aug 75	0.17mg/kg	0.63mg/kg	0.59mg/kg	0.65mg/kg	-
12092	EPA 3	8 Aug 75	0.01mg/kg	0.02mg/kg	0.09mg/kg	0.36mg/kg	-
12093	EPA 3	8 Aug 75	0.05mg/kg	0.10mg/kg	0.01mg/kg	0.02mg/kg	-
12649	EPA 3	22 Aug 75	0.03mg/kg	0.07mg/kg	0.27mg/kg	0.70mg/kg	-
12095	IIIA	23 Aug 75	0.04mg/kg	0.08mg/kg	0.01mg/kg	0.02mg/kg	-
9618	EPA 2	24 Aug 75	ND	ND	ND	ND	-
11413	EPA 2	2 Aug 75	T	T	T	T	-
12096	EPA 2	8 Aug 75	0.09mg/kg	0.09mg/kg	0.02mg/kg	0.02mg/kg	-
-	H_2O blank	Jun 75	ND	ND	ND	ND	-

Analyses of Soil from an Area of an Old Herbicide Spill in the Orange Storage Area, June 1975

EHL #	LOCATION	ESTER (mg/kg) D	ESTER (mg/kg) T	ACID (mg/kg) D	ACID (mg/kg) T	TCDD
9796	Center of spill, 0-3 in.	24	21	88	14	-
9797	Center of spill 3-12 in.	10	11	112	19	-
9798	Out fron center 2 ft, 0-3 in.	0.008	0.008	0.09	0.17	-
9799	Out from center 2 ft, 3-12 in.	0.012	0.008	0.02	0.014	-
9802	Edge of stain, 0-3 in.	0.56	1.10	51	31	-
9803	Edge of stain, 3-12 in.	T	T	0.05	0.05	-
	Area of new Herbicide Spill					
9804	Center of spill, 0-3 in.	110	52	166	64	-
9805	Center of spill, 3-12 in.	2.9	2.2	124	40	-
9806	Out from center 2 ft, 0-3 in.	T	T	0.09	0.24	-
9807	Out from center 2 ft, 3-12 in.	970	570	71	19	-
9810	Edge of stain, 0-3 in.	819	326	72	26	-
9811	Edge of stain, 3-12 in.	299	165	78	24	-

Environmental samples which have not
been analyzed as of 20 Sept 76

WATER

EHL #	GP #	EHL CODE	DATE
9793	EHL 4	-	Jun 75
9795	EHL 24	-	Jun 75
-	IIA	-	5 Aug 75
-	EPA 2	-	12 Aug 75
-	IIB	-	18 Aug 75
-	IIB	-	23 Aug 75
273	-	EW10E11W	Jun 76
272	-	EW13E10W	Jun 76
316	-	EW11J11K	Jun 76
315	-	EW11J16K	Jun 76
317	-	EW11J16K	Jun 76
318	-	EW11J16K	Jun 76
311	-	EW14E09W	Jun 76
312	-	EW15E08W	Jun 76
313	-	EW16E09W	Jun 76
384	-	EW17E09W	Jun 76
385	-	EW18E10W	Jun 76
386	-	EW19E9W	Jun 76
387	-	EW20E10W	Jun 76
426	-	EW21E9W	Jun 76
425	-	EW22E10W	Jun 76
-	-	EW23E10W	Jun 76
-	-	EW24E10W	Jun 76
-	-	EW25E10W	Jun 76
-	-	EW26E9W	Jun 76
-	-	EW27E9W	Jun 76
-	-	EW28E9W	Jun 76
-	-	EW29E8W	Jun 76
-	-	EW30E8W	Jun 76

SEDIMENT

EHL #	GP # OR LOCATION	EHL CODE	DATE
9792	EHL 4	-	Jun 75
9794	EHL 24	-	Jun 75
-	IIA	-	8 Aug 75
-	IIB	-	8 Aug 75
-	IIIA	-	12 Aug 75
227	-	EB27J11K	27 Jan 76
133	-	EB04F11K	4 Feb 76
132	-	EB11F11K	11 Feb 76
274	-	EB10E11W	Jun 76
314	-	EB16E09W	Jun 76
-	-	EB23E10W	Jun 76
-	-	EB30E8W	Jun 76

SOIL

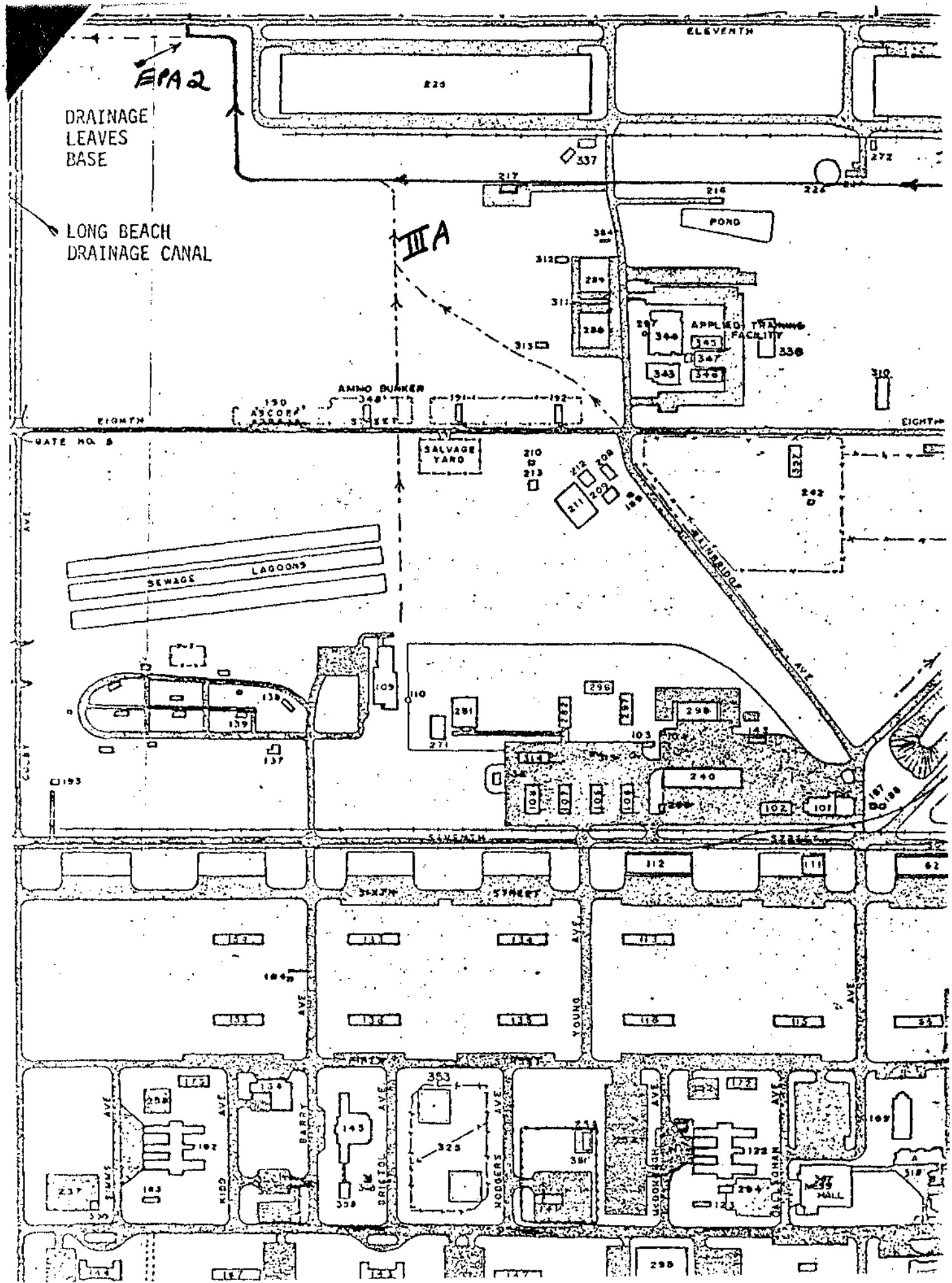
9800	Old spill, 4 ft out, 0-3 in.	-	Jun 75
9801	Old spill, 4 ft out, 3-12 in.	-	Jun 75
9808	New spill, 4 ft out, 0-3 in.	-	Jun 75
9809	New spill, 4 ft out, 3-12 in.	-	Jun 75
9812	EHL 18	-	Jun 75
9813	EHL 19	-	Jun 75
9814	EHL 20	-	Jun 75
9815	EHL 21	-	Jun 75
9816	EHL 22	-	Jun 75
9817	EHL 23	-	Jun 75
9818	EHL 14	-	Jun 75
9819	EHL 15	-	Jun 75
9820	EHL 16	-	Jun 75
9821	EHL 17	-	Jun 75
9822	EHL 11	-	Jun 75
9823	EHL 12	-	Jun 75
9824	EHL 13	-	Jun 75
9825	EHL 5	-	Jun 75
9826	EHL 6	-	Jun 75
9827	EHL 7	-	Jun 75
9828	EHL 8	-	Jun 75
9829	EHL 9	-	Jun 75
9830	EHL 10	-	Jun 75
	20	-	22 Aug 75

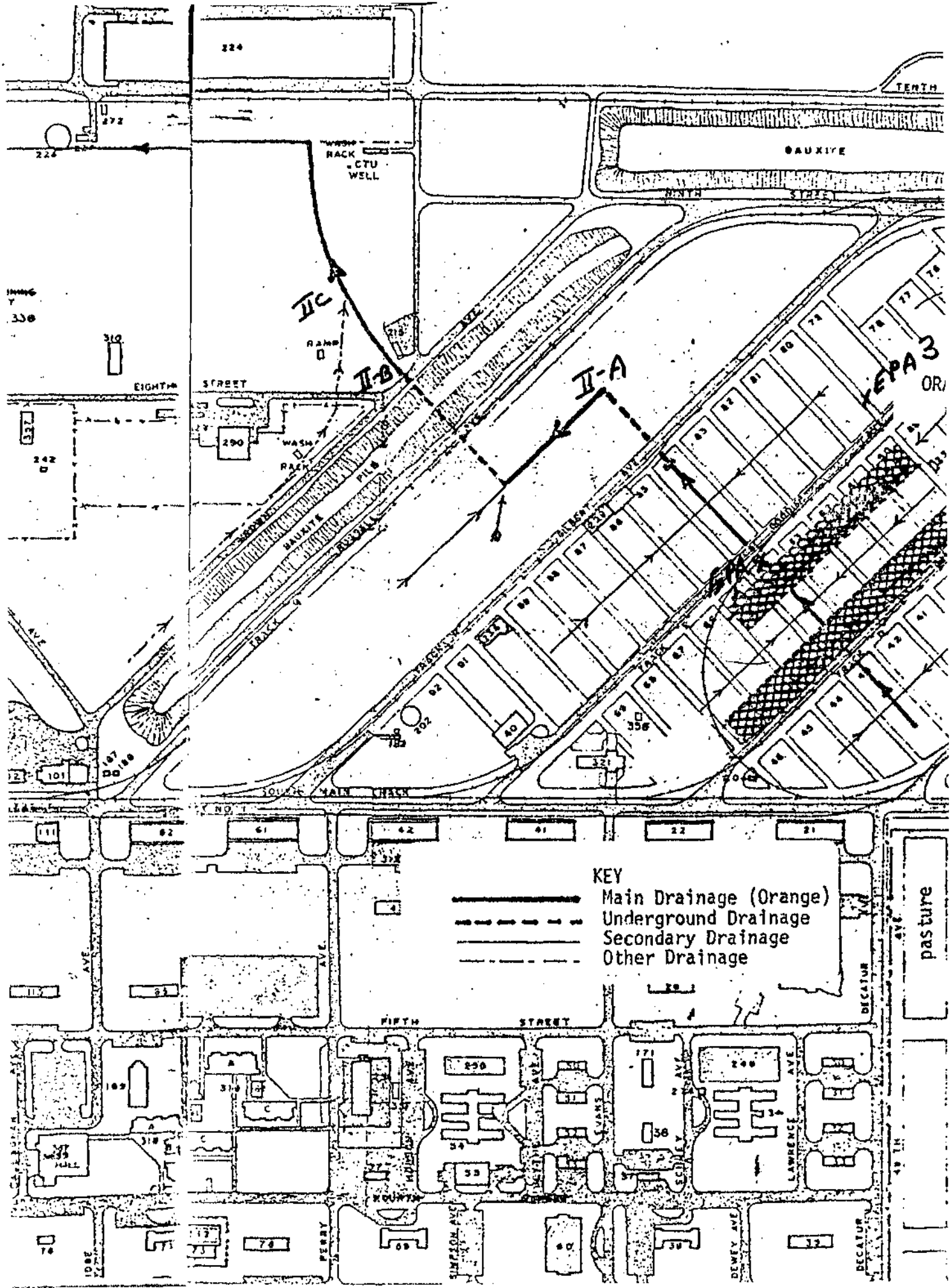
SOIL (continued)

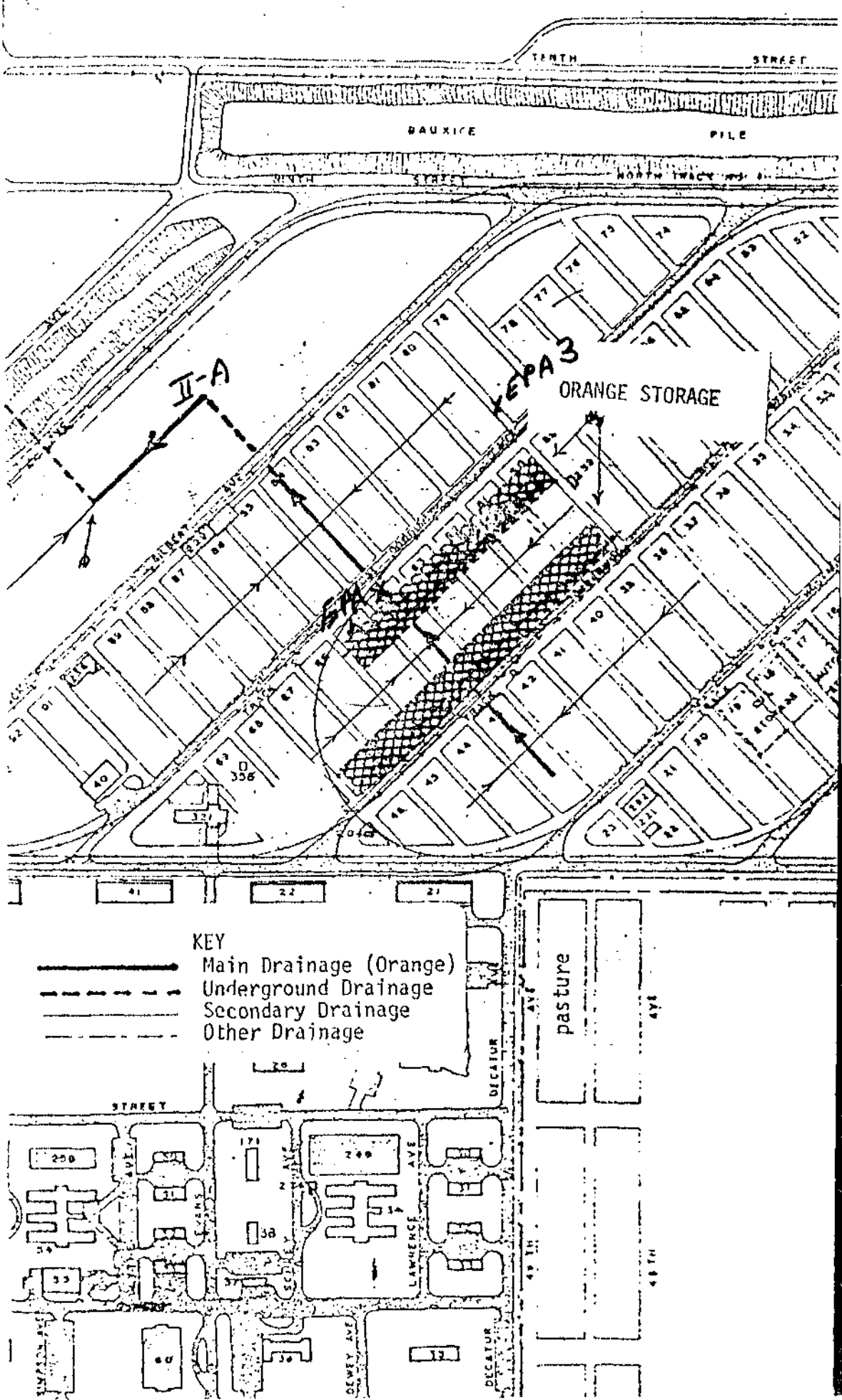
EHL #	GP # OR LOCATION	EHL CODE	DATE
-	27	-	22 Aug 75
-	28	-	22 Aug 75
-	29	-	22 Aug 75

BIOLOGICAL

DATE	LOCATION	TYPE MATERIAL
21 Apr 76	Ditch near HO storage (old EPA 3)	Fish, tadpoles, frogs, crayfish
21 Apr 76	Drainage ditch at base perimeter	Fish


EPA 2
DRAINAGE LEAVES BASE
LONG BEACH DRAINAGE CANAL
III A
ELEVENTH
POND
APPLIED TRAINING FACILITY
AMMO BUNKER
EIGHTH
GATE NO. 5
SALVAGE YARD
SEWAGE LAGOONS
SEVENTH
SIXTH STREET
FIFTH
FOURTH
YOUNG AVE
BARRY AVE
BRISTOL AVE
HODGERS AVE
KIDD AVE
SIMMS AVE
COSBY AVE
HALL


KEY
Main Drainage (Orange)
Underground Drainage
Secondary Drainage
Other Drainage
II-A
II-B
II-C
EPA 3
TENTH
BAUXITE
NINTH STREET
EIGHTH
STREET
WASH RACK
CTU WELL
RAMP
BAUXITE PILE
TRACK
SOUTH MAIN TRACK
FIFTH STREET
KOUNTZE
PERRY
SIMPSON AVE
EVANS
SCHLEY
LAWRENCE
DEWEY AVE
DECATUR
pasture


TENTH STREET
BAUXITE PILE
NINTH STREET
NORTH TRACK
II-A
EPA 3
ORANGE STORAGE
EPA 1
KEY
Main Drainage (Orange)
Underground Drainage
Secondary Drainage
Other Drainage
pasture
DECATUR
STREET
LAWRENCE
DEWEY AVE
49TH

PAGE 10 – GULFPORT

3.3.2.X 1 mm to Plant Bioassays

SITE NO		1	2	3	4	5	6	7
MAXIMUM LEVEL	2,4-D ug/l	1,020	1160	9.82	2.46	5.23	1.43×10^5	185
	2,4,5-T ug/l	~~3,855~~ 3,450	3060	8.46	4.57	6.62	9.54×10^5	286
MINIMUM LEVEL	2,4-D ug/l	0.046	0.138	0.029	ND	ND	2090	0.375
	2,4,5-T ug/l	0.912	0.412	N.D*	ND	ND	947	1.34
AVERAGE LEVEL	2,4-D ug/l	97.6	111	1.42	0.56	1.12	2.20×10^5	74.6
	2,4,5-T ug/l	273	288	1.37	0.73	1.39	1.55×10^5	88.6

* Non detected

TABLE ___. Maximum, minimum and average levels of 2,4-D and 2,4,5-T found at the seven water sampling sites at NEC, Gulfport MS.

WATER (NON-POTABLE) MAY - JUNE '77 (µg/l)

USDA

2, 4-D MAY JUN							2, 4, 5-T MAY JUN						
W1	W2	W3	W4	W5	W6	W7	W1	W2	W3	W4	W5	W6	W7
.78	.13	neg	neg	N/S	N/S	N/S	.95	.145	neg	neg	N/S	N/S	N/S
neg	.18	N/S	N/S	neg	N/S	N/S	.065	.235	N/S	N/S	neg	N/S	N/S
neg	neg	neg	neg	neg	N/S	N/S	.085	.09	neg	neg	neg	N/S	N/S
N/S	N/S	neg	neg	neg	2.297	N/S	N/S	N/S	neg	neg	neg	1.78	N/S
1.96	.185	0.70	neg	.475	N/S	.375	1.01	.425	.045	.045	.850	N/S	1.34
4.93	.421	.923	.729	.901	[illegible]	22.89	3.73	.51	.882	.680 0.204	.771	14,938.00 11,368.42	20.29
1.89	0.138	0.011	0.173	neg	15,000	11.94	.912	0.359	neg	[illegible]	neg	[illegible]	11.40
1.[illegible]	0.325	0.31[illegible]	0.417	2.28	[illegible]	32.13	2.10	0.566	1.35	.528	1.85	25,540	17.82
1.[illegible]	.09	0.251	1.10	.738	N/S	N/S	1.44	1.34	0.374	0.929	.869	N/S	N/S
2.[illegible]	1.610	9.92	neg	1.62		N/S	1.55	1.23	1.46	neg	1.65	N/S	N/S
[illegible]	1.64	.357	1.25	5.23	N/S	N/S	31.499	3.69	.888	1.64	6.62	N/S	N/S
	8.34	1.48	.828	.75	23,906.1	173.58		9.73	1.93	1.32	1.19	947.22	123.98
1023.03	1165.47	4.66	2.46	1.09	1,[illegible]	158.27	3,451.27	306.17	4.56	4.57	2.04	959.49	285.97
61.43	305.08	0.191	0.183	0.90	N/S	86.52	185.77	536.4	0.060	0.132	1.15	N/S	82.72
17.94	135.72	0.79	0.151	1.44	N/S	N/S	97.57	407.12	0.254	0.176	2.21	N/S	N/S
1.40	98.55	0.64	0.097	0.206	N/S	N/S	8.29	464.92	0.701	0.10	0.238	N/S	N/S
1.12	1.30	0.97	0.033	0.657	20,010.20 40,955	90.61	4.91	7.26	0.23	ND	0.713	20,106.00 59,172	8.10
1.04	5.94	0.45	0.932	0.374		2.06	3.14	10.44	1.09	0.824	0.911		67.27
0.076	1.20	0.545	0.700	1.154	N/S	155.251	2.35	0.87	0.311	0.431	1.125	N/S	197.472
1.55	49.50	0.13	N.D	0.13		7.08	9.66	96.75	0.12	N.D	0.12		3.74
1.950	ND	0.09	0.314	0.45	2.4		7.315	270	0.06	0.037	0.32	3.78	
N.D	N.D	0.045	0.105	0.724			0.037	14.51	0.037	0.093	0.735		
2.09	1.79						10.77	336					

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2 Boxes of biological samples from G.P. Faccetto project taken to Brooks VS + stored ~~[illegible]~~ in -0 freezer. About 20 samples. The samples are OEHL bioassay minnows, and native aquatic life.

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