LAGUNA PARK CLOSURE
SUNNYSIDE NURSERY
HAYWARD, CALIFORNIA
6/27/90
PROJECT 4454/4

FOR

THE PLYMOUTH GROUP
1616 NORTH SHORELINE BOULEVARD
MOUNTAIN VIEW, CALIFORNIA 94043

BY

TERRATECH, INC.
1365 VANDER WAY
SAN JOSE, CALIFORNIA 95112

JUNE 27, 1990

LAGUNA PARK CLOSURE
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INTRODUCTION

This report describes the field work performed and the findings gained from Terratech's recent observation and testing during the closure activities at the Laguna Park parcel of the Sunnyside Commons development in Hayward, California.

The objectives of our observation and testing were as follows: 1) to observe the off hauling of stockpiled potting soils and nursery debris with special attention being given to any containers which might be uncovered; 2) to observe the subexcavation of about 2500 cubic yards of native soil beneath stockpiles outside paved areas; 3) to test the native soils at the base of the subexcavation for pesticide content; and 4) to sample and test the proposed import soils for pesticide content.

BACKGROUND

During Terratech's initial environmental investigation of the Sunnyside Nursery properties (see Terratechs report titled "Phase I, Environmental/ Toxics Investigation, ...", dated February 8, 1990) laboratory analysis of a composite sample collected on the Laguna Park parcel indicated the presence of low levels of Endosulfan pesticides and DDE, a degradation product of DDT, in the native soil below the stockpiled materials. All levels detected were below the total threshold limit concentration (TTLC) as established by California's Title 22.

Terratech's recommendations (see "Laguna Park Closure Plan, ...", dated June 16, 1989) included the removal and off-site disposal of the organic potting soil for geotechnical concerns, an 18-inch subexcavation of native soil beneath the stockpiles and the future isolation of the latter soil under roadways of the Sunnyside Commons development. Also included in the Closure Plan recommendations was verification testing of both the native soils below the subexcavation and any imported soils.

WORK PERFORMED AND FINDINGS

Demolition, Offhaul and Subexcavation Observations

Demolition, offhaul and subexcavation activities were performed by Charles Campanella, Inc from April 6 to April 13, 1990. During demolition and offhaul Terratech provided full-time observation of on-site activities.

Approximately 3,400 cubic yards of potting soil and various other organic matter were removed from the site and transported to the Winton Avenue Landfill in Hayward. Transport was via tractor/trailer rigs with 30 cubic

yard trailers. Dust minimization consisted of spraying the soils with a water mist during loading.

Subexcavation of the area shown in Figure 1 began after removal of the stockpiled materials and the demolition and removal of the vacant on-site residences. To verify the 18-inch depth of excavation Terratech inspectors used a rod and level to establish existing grade with a City of Hayward manhole rim as the reference benchmark. The 18-inch depth of excavation was referenced to the grade existing after removal of the potting soil. Eight grade stakes were place around the boundary of the excavation area for grade checking purposes.

Approximately 2,500 cubic yards of soil were removed and stockpiled on a lot of the Sunnyside Nursery site.

Observation of demolition and excavation indicate that all activities were performed in accordance with the approved Closure Plan. Subexcavation depth and areal extent were also verified by Terratech inspectors to be in accordance. The only suspicious finding was a rubberized container of about 300-gallon volume. However, the container was upright, intact contained no residual liquid or odor.

Native Soil Verification

Verification sampling was performed by Terratech on April 16 and 17, 1990. One soil sample was collected from each of the six proposed residential lots which had yardspace coinciding with the subexcavation (VS-1 through VS-6). An additional soil sample, VS-7, was collected from the native soil in the location of the 300-gallon tank. The sampling locations are indicated on Figure 1.

All soil samples were collected in pre-cleaned two-inch diameter brass liners. Immediately upon collection the samples were sealed with foil and taped endcaps, labeled and iced. Samples were kept iced or refrigerated from the time of collection to the time of testing. Standard chain-of-custody procedures were followed to document sample collection, handling and analytical requests.

The seven samples were submitted to a state certified laboratory and analyzed for organochlorine pesticides by EPA Method 8080 and carbamate and urea pesticides by EPA Method 632. A summary of these verification soil samples analysis results is presented in Table 1. None of the samples contained Carbamate or Urea pesticides and five of the seven, VS-1 through VS-5, contained no detectable amounts of organochlorine pesticides. Samples VS-6 and VS-7 were found to contain trace levels (low parts per billion) of a DDT degradation product, DDE, and endosulfans. The concentrations are well below State hazardous thresholds (TTLCs) and the "safe soil levels" calculated by the project risk assessor. Laboratory reports and chain-of-custody records are presented in Appendix A.

Import Evaluation

On June 5, 1990 two soil samples were collected from the on-site import soil stockpile. These samples were submitted to a state certified laboratory for analysis of organochlorine pesticides by EPA Method 8080 and Priority Metals. The import was obtained during undercutting of the cul-de-sac pavement section for the adjacent Chabot Gardens development.

Soil sampling procedures were identical to those mentioned above in the "Native Soil Verification" section.

Import sample analysis results are summarized in Table 2. The laboratory found no detectable amounts of any compounds in the EPA 8080 scan. Metal concentrations were found to be well within naturally occuring ranges. Laboratory reports and chain-of-custody records are presented in Appendix A.

CONCLUSIONS

The adequacy of the subexcavation work was verified to be adequate. No noteworthy impact was found in the soil beneath the suspicious tank. The import material appears to be free of hazardous contamination. In summary, we feel that the subject parcel now presents no environmental or health risks to prevent proceeding with the development.

LIMITATIONS

This report and the associated work have been provided in accordance with the general principles and practices currently employed in the environmental consulting profession. This is in lieu of all warranties, express or implied. Our sampling and testing program is necessarily limited.

Report Prepared by:

TERRATECH, INC.

Thomas C. Morin

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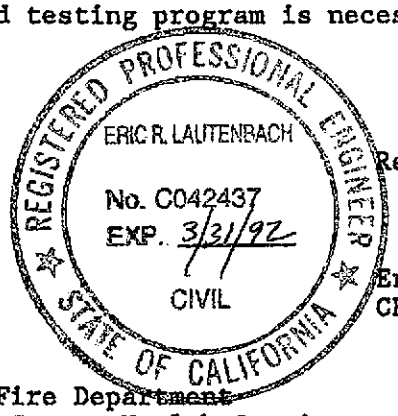
Environmental Geologist



Reviewed by:

E. R. Lautenbach

Eric R. Lautenbach
CE 42437, exp. 3/31/92

cc: Hugh Murphy, Hayward Fire Department
Pamela Evans, Alameda County Health Services
Lester Feldman, Regional Water Quality Control Board

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Lester Feldman, Regional Water Quality Control Board

TABLE 1

VERIFICATION SOIL SAMPLE ANALYSIS RESULTS

LAGUNA PARK
HAYWARD, CALIFORNIA

(samples collected on 4/16/90 and 4/17/90)
(concentrations presented in parts per million)

	LOT 16 VS-1	LOT 15 VS-2	LOT 14 VS-3	LOT 13 VS-4	LOT 4 VS-5	LOT 5 VS-6	LOT 12 VS-7
DEPTH*	20"-26"	20"-26"	20-26"	20"-26"	20"-26"	20"-26"	20"-26
ELEVATION**	29.8	30.2	30.4	30.4	30.6	30.7	31.8
CONTAMINANT							
CHLORINATED PESTICIDES							
Dieldrin	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
DDE	<0.005	<0.005	<0.005	<0.005	<0.005	0.008	0.011
DDT	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Endrin	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Endosulfan I	<0.01	<0.01	<0.01	<0.01	<0.01	0.033	<0.01
Endosulfan II	<0.005	<0.005	<0.005	<0.005	<0.005	0.058	<0.005
Endosulfan Sulfate	<0.05	<0.05	<0.05	<0.05	<0.05	<0.51	<0.05
Others (EPA 8080)	N.D	N.D	N.D	N.D	N.D	N.D	N.D
CARBAMATE AND UREA PESTICIDES (EPA 632)	N.D	N.D	N.D	N.D	N.D	N.D	N.D

N.D. - none detected, all compounds in analysis were below detectable limits of the method.

* - referenced to finished grade
** - referenced to manhole rim on Mohr Drive

TABLE 2

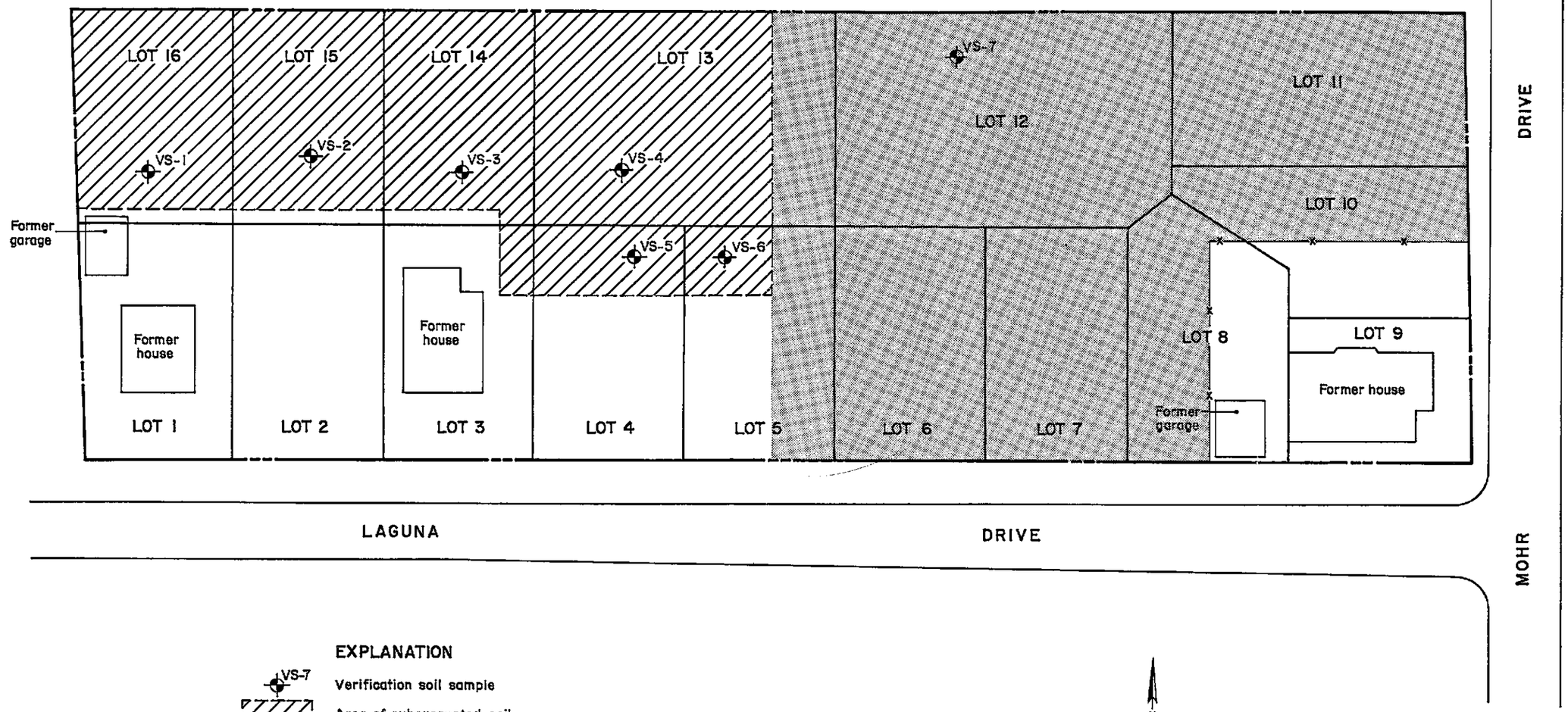
IMPORT SOIL SAMPLE ANALYSIS RESULTS

LAGUNA PARK
HAYWARD, CALIFORNIA

(samples collected on 6/5/90)
(concentrations presented in parts per million)

ANAYLSIS	Sample IS-1	Sample IS-2	NATURALLY OCCURRING *
EPA METHOD 8080			
Chlorinated Pesticides	N.D.	N.D.	--
Poly-Chlorinated Biphenyls	N.D.	N.D.	--
PRIORITY METALS			
Silver	N.D.	N.D.	0.01-5
Arsenic	13.8	14.1	1-50
Beryllium	0.6	0.6	0.1-40
Cadmium	N.D.	N.D.	0.01-0.7
Chromium	33.2	39.4	1-1,000
Copper	23.6	28.4	2-100
Mercury	0.03	N.D.	0.01-0.3
Nickel	48.4	53.6	5-500
Lead	7.3	7.6	2-200
Antimony	N.D.	N.D.	2-10
Selenium	N.D.	N.D.	0.1-2
Thallium	N.D.	N.D.	-- **
Zinc	45.1	53.7	10-300

N.D. - none detected.
* - EPA, SW-874, April 1983, page 273, Table 6.46
** - metal not included in cited reference.



TERRATECH

May 1990

LAGUNA CLOSURE
SUNNYSIDE NURSERY
HAYWARD, CALIFORNIA

VERIFICATION SAMPLE AND SUBEXCAVATION LOCATION

FIGURE
1

PROJECT
4454/4

SAN JOSE BLUEPRINT CO.
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APPENDIX A

CHAIN-OF-CUSTODY RECORDS
AND
ANALYTICAL LABORATORY RESULTS

TERRATECH

CHAIN OF CUSTODY RECORD

P.O. NO. 0467

TURNAROUND: 1 WEEK

PROJECT NUMBER: 4454/4

SAMPLERS (signature): T. Morin

Station Number	Date 1990	Time	Comp.	Grab	Station Location	Number of Containers	Analysis Required: EPA 8080	Analysis Required: (PESTICIDES ONLY) EPA 632	REMARKS: SAMPLE DEPTH
VS-1	4/17	0745			LOT 16	1 BRASS LINER			6"-12"
VS-2	4/17	0800			LOT 15	"			"
VS-3	4/17	0815			LOT 14	"			"
VS-4	4/16	1615			LOT 13	"			"
VS-5	4/16	1630			LOT 4	"			"
VS-6	4/17	0730			LOT 5	"			"
VS-7	4/17	0830			DISCOVERED TANK	"			"
BLANK	4/16	1420		X	MONTEREY SAND	"	X	X	"

Relinquished by(signature): / Company or Agency:	Date / Time	Received by (signature): / Company or Agency:	Relinquished by(signature): / Company or Agency:	Date / Time	Received by (signature): / Company or Agency:
Relinquished by(signature): / Company or Agency:	Date / Time	Received by (signature): / Company or Agency:	Relinquished by: / Company or Agency:	Date / Time	Received by (signature): / Company or Agency:
Relinquished by(signature): Thomas Morin / Company or Agency: TERRATECH, INC.	Date / Time 4/17/90 10:15	Received for Laboratory by: (signature) V.A. Herrera	Date / Time 4/17 10:15	Remarks/Shipping Information: Send reports to: Eric Lautenbach, 1365 VANDER WAY, SAN JOSE 95112	

SEQUOIA ANALYTICAL

680 Chesapeake Drive • Redwood City, CA 94063
(415) 364-9600 • FAX (415) 364-9233

Terratech, Inc.	Client Project ID:	#4454/4	Sampled:	Apr 17, 1990
1365 Vander Way	Sample Descript:	Soil, VS-1	Received:	Apr 17, 1990
San Jose, CA 95112	Analysis Method:	EPA 8080	Extracted:	Apr 20, 1990
Attention: Eric Lautenbach	Lab Number:	004-2452	Analyzed:	Apr 23, 1990
			Reported:	Apr 25, 1990

ORGANOCHLORINE PESTICIDES (EPA 8080)

Analyte	Detection Limit µg/kg	Sample Results µg/kg
Aldrin	5.0	N.D.
alpha-BHC	5.0	N.D.
beta-BHC	5.0	N.D.
delta-BHC	10	N.D.
gamma-BHC (Lindane)	5.0	N.D.
Chlordane	50	N.D.
4,4'-DDD	10	N.D.
4,4'-DDE	5.0	N.D.
4,4'-DDT	10	N.D.
Dieldrin	5.0	N.D.
Endosulfan I	10	N.D.
Endosulfan II	5.0	N.D.
Endosulfan sulfate	50	N.D.
Endrin	10	N.D.
Endrin aldehyde	15	N.D.
Heptachlor	5.0	N.D.
Heptachlor expoxide	5.0	N.D.
Methoxychlor	150	N.D.
Toxaphene	175	N.D.

Analytes reported as N.D. were not present above the stated limit of detection.

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Elizabeth W. Hackl
Project Manager

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Attention: Eric Lautenbach	Lab Number:	004-2452	Analyzed:	Apr 24, 1990
			Reported:	Apr 25, 1990

CARBAMATE AND UREA PESTICIDES (EPA 632)

Analyte	Detection Limit µg/kg	Sample Results µg/kg
Aminocarb	100	N.D.
Barban	100	N.D.
Carbaryl	100	N.D.
Carbofuran	500	N.D.
Chlorophopham	100	N.D.
Diuron	100	N.D.
Fenuron	100	N.D.
Fluometuron	1,000	N.D.
Linuron	100	N.D.
Methiocarb	100	N.D.
Methomyl	1,000	N.D.
Mexacarbate	100	N.D.
Monuron	100	N.D.
Neburon	100	N.D.
Oxyamyl	1,000	N.D.
Propham	100	N.D.
Propoxur	100	N.D.
Siduron	100	N.D.
Swep	100	N.D.

Analytes reported as N.D. were not present above the stated limit of detection. Because matrix effects and/or other factors required additional sample dilution, detection limits for this sample have been raised.

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Terratech, Inc.	Client Project ID:	#4454/4	Sampled:	Apr 17, 1990
1365 Vander Way	Sample Descript:	Soil, VS-2	Received:	Apr 17, 1990
San Jose, CA 95112	Analysis Method:	EPA 8080	Extracted:	Apr 20, 1990
Attention: Eric Lautenbach	Lab Number:	004-2453	Analyzed:	Apr 23, 1990
			Reported:	Apr 25, 1990

ORGANOCHLORINE PESTICIDES (EPA 8080)

Analyte	Detection Limit µg/kg	Sample Results µg/kg
Aldrin	5.0	N.D.
alpha-BHC	5.0	N.D.
beta-BHC	5.0	N.D.
delta-BHC	10	N.D.
gamma-BHC (Lindane)	5.0	N.D.
Chlordane	50	N.D.
4,4'-DDD	10	N.D.
4,4'-DDE	5.0	N.D.
4,4'-DDT	10	N.D.
Dieldrin	5.0	N.D.
Endosulfan I	10	N.D.
Endosulfan II	5.0	N.D.
Endosulfan sulfate	50	N.D.
Endrin	10	N.D.
Endrin aldehyde	15	N.D.
Heptachlor	5.0	N.D.
Heptachlor expoxide	5.0	N.D.
Methoxychlor	150	N.D.
Toxaphene	175	N.D.

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Attention: Eric Lautenbach	Lab Number:	004-2453	Analyzed:	Apr 24, 1990
			Reported:	Apr 25, 1990

CARBAMATE AND UREA PESTICIDES (EPA 632)

Analyte	Detection Limit µg/kg	Sample Results µg/kg
Aminocarb	100	N.D.
Barban	100	N.D.
Carbaryl	100	N.D.
Carbofuran	500	N.D.
Chlorophopham	100	N.D.
Diuron	100	N.D.
Fenuron	100	N.D.
Fluometuron	1,000	N.D.
Linuron	100	N.D.
Methiocarb	100	N.D.
Methomyl	1,000	N.D.
Mexacarbate	100	N.D.
Monuron	100	N.D.
Neburon	100	N.D.
Oxyamyl	1,000	N.D.
Propham	100	N.D.
Propoxur	100	N.D.
Siduron	100	N.D.
Swep	100	N.D.

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Terratech, Inc.	Client Project ID:	#4454/4	Sampled:	Apr 17, 1990
1365 Vander Way	Sample Descript:	Soil, VS-3	Received:	Apr 17, 1990
San Jose, CA 95112	Analysis Method:	EPA 8080	Extracted:	Apr 20, 1990
Attention: Eric Lautenbach	Lab Number:	004-2454	Analyzed:	Apr 23, 1990
			Reported:	Apr 25, 1990

ORGANOCHLORINE PESTICIDES (EPA 8080)

Analyte	Detection Limit µg/kg	Sample Results µg/kg
Aldrin	5.0	N.D.
alpha-BHC	5.0	N.D.
beta-BHC	5.0	N.D.
delta-BHC	10	N.D.
gamma-BHC (Lindane)	5.0	N.D.
Chlordane	50	N.D.
4,4'-DDD	10	N.D.
4,4'-DDE	5.0	N.D.
4,4'-DDT	10	N.D.
Dieldrin	5.0	N.D.
Endosulfan I	10	N.D.
Endosulfan II	5.0	N.D.
Endosulfan sulfate	50	N.D.
Endrin	10	N.D.
Endrin aldehyde	15	N.D.
Heptachlor	5.0	N.D.
Heptachlor expoxide	5.0	N.D.
Methoxychlor	150	N.D.
Toxaphene	175	N.D.

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1365 Vander Way	Sample Descript:	Soil, VS-3	Received:	Apr 17, 1990
San Jose, CA 95112	Analysis Method:	EPA 632	Extracted:	Apr 23, 1990
Attention: Eric Lautenbach	Lab Number:	004-2454	Analyzed:	Apr 24, 1990
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CARBAMATE AND UREA PESTICIDES (EPA 632)

Analyte	Detection Limit µg/kg	Sample Results µg/kg
Aminocarb	100	N.D.
Barban	100	N.D.
Carbaryl	100	N.D.
Carbofuran	500	N.D.
Chlorophopham	100	N.D.
Diuron	100	N.D.
Fenuron	100	N.D.
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Linuron	100	N.D.
Methiocarb	100	N.D.
Methomyl	1,000	N.D.
Mexacarbate	100	N.D.
Monuron	100	N.D.
Neburon	100	N.D.
Oxyamyl	1,000	N.D.
Propham	100	N.D.
Propoxur	100	N.D.
Siduron	100	N.D.
Swep	100	N.D.

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San Jose, CA 95112	Analysis Method:	EPA 8080	Extracted:	Apr 20, 1990
Attention: Eric Lautenbach	Lab Number:	004-2455	Analyzed:	Apr 23, 1990
			Reported:	Apr 25, 1990

ORGANOCHLORINE PESTICIDES (EPA 8080)

Analyte	Detection Limit µg/kg	Sample Results µg/kg
Aldrin	5.0	N.D.
alpha-BHC	5.0	N.D.
beta-BHC	5.0	N.D.
delta-BHC	10	N.D.
gamma-BHC (Lindane)	5.0	N.D.
Chlordane	50	N.D.
4,4'-DDD	10	N.D.
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Aminocarb	100	N.D.
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Carbaryl	100	N.D.
Carbofuran	500	N.D.
Chlorophopham	100	N.D.
Diuron	100	N.D.
Fenuron	100	N.D.
Fluometuron	1,000	N.D.
Linuron	100	N.D.
Methiocarb	100	N.D.
Methomyl	1,000	N.D.
Mexacarbate	100	N.D.
Monuron	100	N.D.
Neburon	100	N.D.
Oxyamyl	1,000	N.D.
Propham	100	N.D.
Propoxur	100	N.D.
Siduron	100	N.D.
Swep	100	N.D.

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Terratech, Inc.	Client Project ID:	#4454/4	Sampled:	Apr 17, 1990
1365 Vander Way	Sample Descript:	Soil, VS-5	Received:	Apr 17, 1990
San Jose, CA 95112	Analysis Method:	EPA 8080	Extracted:	Apr 20, 1990
Attention: Eric Lautenbach	Lab Number:	004-2456	Analyzed:	Apr 23, 1990
			Reported:	Apr 25, 1990

ORGANOCHLORINE PESTICIDES (EPA 8080)

Analyte	Detection Limit µg/kg	Sample Results µg/kg
Aldrin	5.0	N.D.
alpha-BHC	5.0	N.D.
beta-BHC	5.0	N.D.
delta-BHC	10	N.D.
gamma-BHC (Lindane)	5.0	N.D.
Chlordane	50	N.D.
4,4'-DDD	10	N.D.
4,4'-DDE	5.0	N.D.
4,4'-DDT	10	N.D.
Dieldrin	5.0	N.D.
Endosulfan I	10	N.D.
Endosulfan II	5.0	N.D.
Endosulfan sulfate	50	N.D.
Endrin	10	N.D.
Endrin aldehyde	15	N.D.
Heptachlor	5.0	N.D.
Heptachlor expoxide	5.0	N.D.
Methoxychlor	150	N.D.
Toxaphene	175	N.D.

Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL

Elizabeth W. Hackl
Project Manager

SEQUOIA ANALYTICAL

680 Chesapeake Drive • Redwood City, CA 94063
(415) 364-9600 • FAX (415) 364-9233

Terratech, Inc.	Client Project ID:	#4454/4	Sampled:	Apr 17, 1990
1365 Vander Way	Sample Descript:	Soil, VS-5	Received:	Apr 17, 1990
San Jose, CA 95112	Analysis Method:	EPA 632	Extracted:	Apr 23, 1990
Attention: Eric Lautenbach	Lab Number:	004-2456	Analyzed:	Apr 24, 1990
			Reported:	Apr 25, 1990

CARBAMATE AND UREA PESTICIDES (EPA 632)

Analyte	Detection Limit µg/kg	Sample Results µg/kg
Aminocarb	100	N.D.
Barban	100	N.D.
Carbaryl	100	N.D.
Carbofuran	500	N.D.
Chlorophopham	100	N.D.
Diuron	100	N.D.
Fenuron	100	N.D.
Fluometuron	1,000	N.D.
Linuron	100	N.D.
Methiocarb	100	N.D.
Methomyl	1,000	N.D.
Mexacarbate	100	N.D.
Monuron	100	N.D.
Neburon	100	N.D.
Oxyamyl	1,000	N.D.
Propham	100	N.D.
Propoxur	100	N.D.
Siduron	100	N.D.
Swep	100	N.D.

Analytes reported as N.D. were not present above the stated limit of detection. Because matrix effects and/or other factors required additional sample dilution, detection limits for this sample have been raised.

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Project Manager

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Terratech, Inc.	Client Project ID:	#4454/4	Sampled:	Apr 17, 1990
1365 Vander Way	Sample Descript:	Soil, VS-6	Received:	Apr 17, 1990
San Jose, CA 95112	Analysis Method:	EPA 8080	Extracted:	Apr 20, 1990
Attention: Eric Lautenbach	Lab Number:	004-2457	Analyzed:	Apr 23, 1990
			Reported:	Apr 25, 1990

ORGANOCHLORINE PESTICIDES (EPA 8080)

Analyte	Detection Limit µg/kg	Sample Results µg/kg
Aldrin	5.0	N.D.
alpha-BHC	5.0	N.D.
beta-BHC	5.0	N.D.
delta-BHC	10	N.D.
gamma-BHC (Lindane)	5.0	N.D.
Chlordane	50	N.D.
4,4'-DDD	10	N.D.
4,4'-DDE	5.0	7.5
4,4'-DDT	10	N.D.
Dieldrin	5.0	N.D.
Endosulfan I	10	33
Endosulfan II	5.0	58
Endosulfan sulfate	50	51
Endrin	10	N.D.
Endrin aldehyde	15	N.D.
Heptachlor	5.0	N.D.
Heptachlor expoxide	5.0	N.D.
Methoxychlor	150	N.D.
Toxaphene	175	N.D.

Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL

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Project Manager

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(415) 364-9600 • FAX (415) 364-9233

Terratech, Inc.	Client Project ID:	#4454/4	Sampled:	Apr 17, 1990
1365 Vander Way	Sample Descript:	Soil, VS-6	Received:	Apr 17, 1990
San Jose, CA 95112	Analysis Method:	EPA 632	Extracted:	Apr 23, 1990
Attention: Eric Lautenbach	Lab Number:	004-2457	Analyzed:	Apr 24, 1990
			Reported:	Apr 25, 1990

CARBAMATE AND UREA PESTICIDES (EPA 632)

Analyte	Detection Limit µg/kg	Sample Results µg/kg
Aminocarb	100	N.D.
Barban	100	N.D.
Carbaryl	100	N.D.
Carbofuran	500	N.D.
Chlorophopham	100	N.D.
Diuron	100	N.D.
Fenuron	100	N.D.
Fluometuron	1,000	N.D.
Linuron	100	N.D.
Methiocarb	100	N.D.
Methomyl	1,000	N.D.
Mexacarbate	100	N.D.
Monuron	100	N.D.
Neburon	100	N.D.
Oxyamyl	1,000	N.D.
Propham	100	N.D.
Propoxur	100	N.D.
Siduron	100	N.D.
Swep	100	N.D.

Analytes reported as N.D. were not present above the stated limit of detection. Because matrix effects and/or other factors required additional sample dilution, detection limits for this sample have been raised.

SEQUOIA ANALYTICAL

Elizabeth W. Hackl
Project Manager

SEQUOIA ANALYTICAL

680 Chesapeake Drive • Redwood City, CA 94063
(415) 364-9600 • FAX (415) 364-9233

Terratech, Inc.	Client Project ID:	#4454/4	Sampled:	Apr 17, 1990
1365 Vander Way	Sample Descript:	Soil, VS-7	Received:	Apr 17, 1990
San Jose, CA 95112	Analysis Method:	EPA 8080	Extracted:	Apr 20, 1990
Attention: Eric Lautenbach	Lab Number:	004-2458	Analyzed:	Apr 23, 1990
			Reported:	Apr 25, 1990

ORGANOCHLORINE PESTICIDES (EPA 8080)

Analyte	Detection Limit µg/kg	Sample Results µg/kg
Aldrin	5.0	N.D.
alpha-BHC	5.0	N.D.
beta-BHC	5.0	N.D.
delta-BHC	10	N.D.
gamma-BHC (Lindane)	5.0	N.D.
Chlordane	50	N.D.
4,4'-DDD	10	N.D.
4,4'-DDE	5.0	11
4,4'-DDT	10	N.D.
Dieldrin	5.0	N.D.
Endosulfan I	10	N.D.
Endosulfan II	5.0	N.D.
Endosulfan sulfate	50	N.D.
Endrin	10	N.D.
Endrin aldehyde	15	N.D.
Heptachlor	5.0	N.D.
Heptachlor expoxide	5.0	N.D.
Methoxychlor	150	N.D.
Toxaphene	175	N.D.

Analytes reported as N.D. were not present above the stated limit of detection.

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Elizabeth W. Hackl
Project Manager

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Terratech, Inc.	Client Project ID:	#4454/4	Sampled:	Apr 17, 1990
1365 Vander Way	Sample Descript:	Soil, VS-7	Received:	Apr 17, 1990
San Jose, CA 95112	Analysis Method:	EPA 632	Extracted:	Apr 23, 1990
Attention: Eric Lautenbach	Lab Number:	004-2458	Analyzed:	Apr 24, 1990
			Reported:	Apr 25, 1990

CARBAMATE AND UREA PESTICIDES (EPA 632)

Analyte	Detection Limit µg/kg	Sample Results µg/kg
Aminocarb	100	N.D.
Barban	100	N.D.
Carbaryl	100	N.D.
Carbofuran	500	N.D.
Chlorophopham	100	N.D.
Diuron	100	N.D.
Fenuron	100	N.D.
Fluometuron	1,000	N.D.
Linuron	100	N.D.
Methiocarb	100	N.D.
Methomyl	1,000	N.D.
Mexacarbate	100	N.D.
Monuron	100	N.D.
Neburon	100	N.D.
Oxyamyl	1,000	N.D.
Propham	100	N.D.
Propoxur	100	N.D.
Siduron	100	N.D.
Swep	100	N.D.

Analytes reported as N.D. were not present above the stated limit of detection. Because matrix effects and/or other factors required additional sample dilution, detection limits for this sample have been raised.

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Project Manager

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(415) 364-9600 • FAX (415) 364-9233

Terratech, Inc.	Client Project ID:	#4454/4	Sampled:	Apr 17, 1990
1365 Vander Way	Sample Descript:	Soil, Blank	Received:	Apr 17, 1990
San Jose, CA 95112	Analysis Method:	EPA 8080	Extracted:	Apr 20, 1990
Attention: Eric Lautenbach	Lab Number:	004-2459	Analyzed:	Apr 23, 1990
			Reported:	Apr 25, 1990

ORGANOCHLORINE PESTICIDES (EPA 8080)

Analyte	Detection Limit µg/kg	Sample Results µg/kg
Aldrin	5.0	N.D.
alpha-BHC	5.0	N.D.
beta-BHC	5.0	N.D.
delta-BHC	10	N.D.
gamma-BHC (Lindane)	5.0	N.D.
Chlordane	50	N.D.
4,4'-DDD	10	N.D.
4,4'-DDE	5.0	N.D.
4,4'-DDT	10	N.D.
Dieldrin	5.0	N.D.
Endosulfan I	10	N.D.
Endosulfan II	5.0	N.D.
Endosulfan sulfate	50	N.D.
Endrin	10	N.D.
Endrin aldehyde	15	N.D.
Heptachlor	5.0	N.D.
Heptachlor expoxide	5.0	N.D.
Methoxychlor	150	N.D.
Toxaphene	175	N.D.

Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL

Elizabeth W. Hackl
Project Manager

SEQUOIA ANALYTICAL

680 Chesapeake Drive • Redwood City, CA 94063
(415) 364-9600 • FAX (415) 364-9233

Terratech, Inc.	Client Project ID:	#4454/4	Sampled:	Apr 17, 1990
1365 Vander Way	Sample Descript:	Soil, Blank	Received:	Apr 17, 1990
San Jose, CA 95112	Analysis Method:	EPA 632	Extracted:	Apr 23, 1990
Attention: Eric Lautenbach	Lab Number:	004-2459	Analyzed:	Apr 24, 1990
			Reported:	Apr 25, 1990

CARBAMATE AND UREA PESTICIDES (EPA 632)

Analyte	Detection Limit µg/kg	Sample Results µg/kg
Aminocarb	100	N.D.
Barban	100	N.D.
Carbaryl	100	N.D.
Carbofuran	500	N.D.
Chlorophopham	100	N.D.
Diuron	100	N.D.
Fenuron	100	N.D.
Fluometuron	1,000	N.D.
Linuron	100	N.D.
Methiocarb	100	N.D.
Methomyl	1,000	N.D.
Mexacarbate	100	N.D.
Monuron	100	N.D.
Neburon	100	N.D.
Oxyamyl	1,000	N.D.
Propham	100	N.D.
Propoxur	100	N.D.
Siduron	100	N.D.
Swep	100	N.D.

Analytes reported as N.D. were not present above the stated limit of detection. Because matrix effects and/or other factors required additional sample dilution, detection limits for this sample have been raised.

SEQUOIA ANALYTICAL

Elizabeth W. Hackl
Project Manager

TERRATECH

CHAIN OF CUSTODY RECORD

P.O. NO. 8418

TURNAROUND: ONE WEEK

PROJECT NUMBER: 4454/4

SAMPLERS (signature): Thom Morin

Station Number	Date 1990	Time	Comp.	Grab	Station Location	Number of Containers	Analysis Required: EPA 8080		Priority Metals					REMARKS	SAMPLE DEPTH
IS-1	6/5	1630		X	IMPORT STOCKPILE	1 LINER	X		X						
IS-2	6/5	1630		X	IMPORT STOCKPILE	1 LINER	X		X						

Relinquished by(signature):	Date / Time	Received by (signature):	Relinquished by(signature):	Date / Time	Received by (signature):
Company or Agency:		Company or Agency:	Company or Agency:		Company or Agency:
Relinquished by(signature):	Date / Time	Received by (signature):	Relinquished by:	Date / Time	Received by (signature):
Company or Agency:		Company or Agency:	Company or Agency:		Company or Agency:
Relinquished by(signature): Thomas Morin	Date / Time 6/5/90 1715	Received for Laboratory by: (signature)	Date / Time 6/5/90 1715	Remarks/Shipping Information	
Company or Agency: TERRATECH, INC.				Send reports to: Eric Lautenbach	
				1365 VANDER WAY, SAN JOSE 95112	

ANAMETRIX INC
Environmental & Analytical Chemistry
1961 Concourse Drive, Suite E San Jose, CA 95131
(408) 432-8192 • Fax (408) 432-8198

REPORT

JUN 18 1990

RECEIVED

Eric Lautenbach
Terratech, Inc. - San Jose
1365 Vander Way
San Jose, CA 95112

June 15, 1990
Anametrix W.O.#: 9006049
Date Received : 06/05/90
Purchase Order#: 8418
Project Number : 4454/4

Dear Mr. Lautenbach:

Your samples have been received for analysis. The REPORT SUMMARY lists your sample identifications and the analytical methods you requested. The following sections are included in this report: RESULTS and QUALITY ASSURANCE.

NOTE: Amounts reported are net values, i.e. corrected for method blank contamination.

If there is any more that we can do, please give us a call. Thank you for using ANAMETRIX, INC.

Sincerely,

ANAMETRIX, INC.

Frank Fehon for

Burt Sutherland
Laboratory Director

BWS/dag

REPORT SUMMARY
ANAMETRIX, INC. (408) 432-8192

Client : Terratech, Inc. - San Jose
Address : 1365 Vander Way
City : San Jose, CA 95112
Attn. : Eric Lautenbach

Anametrix W.O.#: 9006049
Date Received : 06/05/90
Purchase Order#: 8418
Project No. : 4454/4
Date Released : 06/15/90

Anametrix I.D.	Sample I.D.	Matrix	Date Sampled	Method	Date Extract	Date Analyzed	Inst I.D.
RESULTS							
9006049-01	IS-1	SOIL	06/05/90	8080	06/11/90	06/12/90	HP5
9006049-02	IS-2	SOIL	06/05/90	8080	06/11/90	06/12/90	HP5
9006049-01	IS-1	SOIL	06/05/90	PP-MET		06/08/90	AA1/
9006049-02	IS-2	SOIL	06/05/90	PP-MET		06/08/90	AA1/
9006049-02	IS-2 DUPLICATE	SOIL	06/05/90	PP-MET		06/08/90	AA1/
QUALITY ASSURANCE (QA)							
PSBL061190	METHOD BLANK	SOIL	N/A	8080	06/11/90	06/12/90	HP5
MB060790S	METHOD BLANK	SOIL	N/A	PP-MET		06/08/90	AA1/
SAND0607A	METHOD SPIKE	SOIL	N/A	SPIKE		06/11/90	AA1/

ORGANIC ANALYSIS DATA SHEET -- EPA METHOD 608/8080
ANAMETRIX, INC. (408) 432-8192

Sample I.D. : 4454/4 IS-1
Matrix : SOIL
Date sampled : 06/05/90
Date ext. : 06/11/90
Date analyzed: 06/12/90
Dilution : NONE

Anametrix I.D. : 9006049-01
Analyst : ST
Supervisor : SD
Date released : 06/15/90
Weight ext. : 10g
Instrument ID : HP5

CAS #	Compound Name	Reporting Limit (ug/Kg)	Amount Found (ug/Kg)
319-84-6	alpha-BHC	8	ND
319-85-7	beta-BHC	8	ND
58-89-9	gamma-BHC (Lindane)	8	ND
319-86-8	delta-BHC	8	ND
76-44-8	Heptachlor	8	ND
309-00-2	Aldrin	8	ND
1024-57-3	Heptachlor epoxide	8	ND
959-98-8	Endosulfan I	8	ND
72-55-9	p,p'-DDE	16	ND
60-57-1	Dieldrin	16	ND
72-20-8	Endrin	16	ND
72-54-8	p,p'-DDD	16	ND
33212-65-9	Endosulfan II	16	ND
50-29-3	p,p'-DDT	16	ND
7421-93-4	Endrin aldehyde	16	ND
1031-07-8	Endosulfan sulfate	16	ND
72-43-5	p,p'-Methoxychlor	80	ND
53494-70-5	Endrin ketone	16	ND
12789-03-6	Technical chlordane	80	ND
8001-35-2	Toxaphene	160	ND
1104-28-2	Aroclor 1221	80	ND
11141-16-5	Aroclor 1232	80	ND
53469-21-9	Aroclor 1242	80	ND
12672-29-6	Aroclor 1248	80	ND
11097-69-1	Aroclor 1254	160	ND
11096-82-5	Aroclor 1260	160	ND
12674-11-2	Aroclor 1016	80	ND
	Dibutylchlorendate	20-150%	88%

ND : Not detected at or above the practical quantitation limit for the method.

ORGANIC ANALYSIS DATA SHEET -- EPA METHOD 608/8080
ANAMETRIX, INC. (408) 432-8192

Sample I.D. : 4454/4 IS-2
Matrix : SOIL
Date sampled : 06/05/90
Date ext. : 06/11/90
Date analyzed: 06/12/90
Dilution : NONE

Anametrix I.D. : 9006049-02
Analyst : ST
Supervisor : SD
Date released : 06/15/90
Weight ext. : 10g
Instrument ID : HP5

CAS #	Compound Name	Reporting Limit (ug/Kg)	Amount Found (ug/Kg)
319-84-6	alpha-BHC	8	ND
319-85-7	beta-BHC	8	ND
58-89-9	gamma-BHC (Lindane)	8	ND
319-86-8	delta-BHC	8	ND
76-44-8	Heptachlor	8	ND
309-00-2	Aldrin	8	ND
1024-57-3	Heptachlor epoxide	8	ND
959-98-8	Endosulfan I	8	ND
72-55-9	p,p'-DDE	16	ND
60-57-1	Dieldrin	16	ND
72-20-8	Endrin	16	ND
72-54-8	p,p'-DDD	16	ND
33212-65-9	Endosulfan II	16	ND
50-29-3	p,p'-DDT	16	ND
7421-93-4	Endrin aldehyde	16	ND
1031-07-8	Endosulfan sulfate	16	ND
72-43-5	p,p'-Methoxychlor	80	ND
53494-70-5	Endrin ketone	16	ND
12789-03-6	Technical chlordane	80	ND
8001-35-2	Toxaphene	160	ND
1104-28-2	Aroclor 1221	80	ND
11141-16-5	Aroclor 1232	80	ND
53469-21-9	Aroclor 1242	80	ND
12672-29-6	Aroclor 1248	80	ND
11097-69-1	Aroclor 1254	160	ND
11096-82-5	Aroclor 1260	160	ND
12674-11-2	Aroclor 1016	80	ND
	Dibutylchlorendate	20-150%	91%

ND : Not detected at or above the practical quantitation limit for the method.

ANALYSIS DATA SHEET - PRIORITY POLLUTANT METALS
ANAMETRIX, INC. - (408) 432-8192

Anametrix I.D.: 9006049
Matrix : SOIL
Date Sampled : 06/05/90
Project Number: 4454/4

Date Prepared : 06/07/90
Date Analyzed : 06/08/90
Date Released : 06/15/90
Instrument I.D.: AA1/ICP1

ELEMENTS	EPA Method#	Reporting Limit (mg/Kg)	Sample I.D.# IS-1 -01	Sample I.D.# IS-2 -02	Sample I.D.# IS-2 -02D	Sample I.D.# BLANK MB0607S
Silver (Ag)	6010	0.5	ND	ND	ND	ND
Arsenic (As)	7060	0.05	13.8	13.4	14.1	ND
Beryllium (Be)	6010	0.5	0.6	0.5	0.6	ND
Cadmium (Cd)	6010	0.5	ND	ND	ND	ND
Total Cr	6010	0.5	33.2	36.0	39.4	ND
Copper (Cu)	6010	0.5	23.6	25.1	28.4	ND
Mercury (Hg)	7471	0.025	0.030	ND	ND	ND
Nickel (Ni)	6010	1.0	48.4	53.6	51.0	ND
Lead (Pb)	6010	1.0	7.3	7.6	6.7	ND
Antimony (Sb)	6010	2.0	ND	ND	ND	ND
Selenium (Se)	7740	0.1	ND	ND	ND	ND
Thallium (Tl)	7841	0.4	ND	ND	ND	ND
Zinc (Zn)	6010	0.5	45.1	49.4	53.7	ND

ND : Not detected at or above the practical quantitation limit for the method.

All Metals by EPA Method 6010/7000, Test Methods for Evaluating Solid Waste, SW-846 3rd Edition November 1986.

Mona Kamel 6/15/90
Analyst Date

Refaat Monkarim 6-15-90
Supervisor Date

ORGANIC ANALYSIS DATA SHEET -- EPA METHOD 608/8080
ANAMETRIX, INC. (408) 432-8192

Sample I.D.	: METHOD BLANK	Anametrix I.D.	: PSBL061190
Matrix	: SOIL	Analyst	: SI
Date sampled	: N/A	Supervisor	: SD
Date ext.	: 06/11/90	Date released	: 06/15/90
Date analyzed	: 06/12/90	Weight ext.	: 10g
Dilution	: NONE	Instrument ID	: HP5

CAS #	Compound Name	Reporting Limit (ug/Kg)	Amount Found (ug/Kg)
319-84-6	alpha-BHC	8	ND
319-85-7	beta-BHC	8	ND
58-89-9	gamma-BHC (Lindane)	8	ND
319-86-8	delta-BHC	8	ND
76-44-8	Heptachlor	8	ND
309-00-2	Aldrin	8	ND
1024-57-3	Heptachlor epoxide	8	ND
959-98-8	Endosulfan I	8	ND
72-55-9	p,p'-DDE	16	ND
60-57-1	Dieldrin	16	ND
72-20-8	Endrin	16	ND
72-54-8	p,p'-DDD	16	ND
33212-65-9	Endosulfan II	16	ND
50-29-3	p,p'-DDT	16	ND
7421-93-4	Endrin aldehyde	16	ND
1031-07-8	Endosulfan sulfate	16	ND
72-43-5	p,p'-Methoxychlor	80	ND
53494-70-5	Endrin ketone	16	ND
12789-03-6	Technical chlordane	80	ND
8001-35-2	Toxaphene	160	ND
1104-28-2	Aroclor 1221	80	ND
11141-16-5	Aroclor 1232	80	ND
53469-21-9	Aroclor 1242	80	ND
12672-29-6	Aroclor 1248	80	ND
11097-69-1	Aroclor 1254	160	ND
11096-82-5	Aroclor 1260	160	ND
12674-11-2	Aroclor 1016	80	ND
	Dibutylchlorendate	20-150%	100%

ND : Not detected at or above the practical quantitation limit for the method.

SITE SAFETY PLAN FOR LAGUNA PARK

SITE DESCRIPTION

Location: North side of Laguna Avenue, between Mohr and Eden Drives
Hayward, California (see Figure 1)

Topography: Flat except for piles of nursery debris
(discarded plants, plant containers, soil amendments, etc.)

Ground Cover: Mostly unpaved, some asphalt paving for vehicle parking,
also, three homes and their associated outbuildings

Hazards: Near-surface soil found to contain low residues of the DDT and endosulfan groups of pesticides. Debris piles may contain old pesticide containers. A Site Risk Assessment is available for reference (ERS, Inc., June 22, 1989).

Surrounding Population: mostly residential, Chabot College located several hundred feet to the east

Prevailing Wind Direction: From the northwest

ENTRY OBJECTIVES

The objective of the entry to the contaminated area is to perform closure activitites prior to residential development. Included in the closure activities are the demolition of existing structures, removal of all debris, 18" excavation of surface soils assumed to contain pesticides, re-burial of subject soils under future pavement areas, and verification sampling and testing. A Site Closure Plan is available for reference (Terratech, Inc., June 16, 1989).

PROJECT ORGANIZATION AND CONTACTS

The following personnel are designated to carry out or oversee the site closure activities:

Developer: The Plymouth Group; Project Manager - Naoko Ward
Construction Foreman - ??
(415) 691-6956

Demolition Contractor: ; Foreman -
( ) ___-____

Earthwork Contractor: ; Foreman -
( ) ___-____

Environmental and Geotechnical Consultant: Terratech (408) 297-6969
Project Team Leader - Eric Lautenbach
Site Safety Officer - Geoff Blair

Lead Regulator: Alameda County Health Agency - Tom Peacock
(415) 271-4320

Local Regulator: Hayward Fire Department - Steve Faelz (or Hugh Murphy)
(415) 784-8693

ON-SITE CONTROL

The contractors shall be responsible for coordinating access control and security on site. A safe perimeter should be established and no unauthorized person should be within this area. Since subject chemicals have low vapor pressures, their only airborne transport will be associated with dust. The contractors shall therefore take conservative measures with regard to dust control.

HAZARD EVALUATION

A Health Risk Assessment dated June 22, 1989 was prepared for this project by Environmental Risk Sciences, Inc. (ERS).

Low levels of the pesticides DDE (0.13 ppm) and endosulfans (1.1 - 11 ppm) have been discovered in the near surface soil on the subject property. The major routes of entry for these compounds are skin and inhalation (dust).

ENVIRONMENTAL MONITORING

Based upon the concentrations of pesticides found to date on the subject property, we do not plan any formal environmental monitoring. NOTE: Further characterization testing is planned after demolition activities and monitoring may be needed based on new information. Keeping airborne dust to a minimum will be the primary objective.

PERSONAL PROTECTIVE EQUIPMENT

Based on evaluation of potential hazards the following levels of personal protection have been designated.

Location	Job Function	Level of Protection
All Locations	All functions	Level D

Level D includes as a minimum - work boots, long pants, long sleeve shirt, gloves and hard hat. Respirators should be available on site. Efforts should be made to limit skin contact with the pesticide contaminated soils.

Level C upgrade (if deemed necessary) includes as a minimum - tyvek suit, chemical resistant gloves, and half-face air-purifying respirators with pesticide cartridges.

DECIDING TO CHANGE THE SPECIFIED LEVEL OF PROTECTION SHOULD BE MADE BY THE SITE SAFETY OFFICER.

SAFETY TRAINING AND MEDICAL SURVEILLANCE

All Terratech onsite personnel for this project have completed 40 hours of OSHA/SARA 1910.120 training, have been fit tested for a respirator, and are enrolled in medical surveillance program.

ON-SITE WORK PLANS

Project personnel will perform the following tasks:

Position	Name	Function
Project Manager	Eric Lautenbach	Project Supervisor
Staff Engineer	Geoff Blair	Field inspector

COMMUNICATIONS PROCEDURES

Personnel in the Working Zone should remain within sight of the Site Safety Officer. The Working Zone is defined as the area within a safe radius around drill rig. A loud yell or car horn is the emergency signal to indicate that all personnel should stop work immediately and leave the Working Zone.

The following standard hand signals will be used in the event of problems.

Hand gripping throat ---------- Out of air, can't breathe
Grip co-worker's wrist or
both hands around waist ---------- Leave area immediately
Hands on top of head ---------- Need assistance
Thumbs up ---------- OK, I am all right, I understand
Thumbs down ---------- No, negative

SITE SAFETY & HEALTH PLAN

Geoff Blair (Terratech) is the Site Safety Officer and is directly responsible to the Project Team Leader, Eric Lautenbach, for safety on site. The nearest hospital, Kaiser Permanente Medical Center located at 27400 Hesperian Boulevard with telephone number (415) 784-4270. The hospital is 5 minutes from the project site. A map to the medical facility is attached.

Emergency medical information for most likely substances present:

Substance	Exposure Symptoms	First-Aid Instructions
DDE, Endosulfans	nausea, dizziness, fatigue	skin contact: wash thoroughly inhalation: don respirator & move upwind of work area

Emergency Phone Numbers:

Police or Fire: 911
Hospital: 911 or (415) 784-4270 (Kaiser Permanente Medical Center)
Other: (408) 297-6969 (Terratech office)

Emergency Procedures (should be modified as required for incident)

The following standard emergency procedures will be used by on-site personnel. The Site Safety Officer shall be notified of any on-site emergencies and be responsible for ensuring that the appropriate procedures are followed.

Personnel Injury: Upon notification of an injury, the designated emergency signal, a loud yell or car horn shall be sounded. All site personnel shall assemble upwind, outside the Working Zone. The Site Safety Officer (and Project Team Leader, if present) should evaluate the nature of the injury, and the affected person should be decontaminated to the extent possible prior to movement. Appropriate first aid shall be initiated, and contact should be made for an ambulance with the designated medical facility, if required. No persons shall re-enter the Working Zone until the cause of the injury or symptoms is determined.

The Site Safety Officer will assess the nature of the injury and determine the affect to the continued performance of site activities. Operations may continue, with appropriate first aid and necessary follow-up being administered outside the Working Zone. If the injury increases the risk to others, the designated emergency signal, a loud yell or car horn shall be sounded and all site personnel shall move outside the Working Zone for further instructions. Activities on site will stop until the added risk is removed or minimized.

Fire/Explosion: Upon notification of a fire or explosion on-site, the designated emergency signal,a loud yell or car horn shall be sounded. All site personnel should assemble at a safe distance from the involved area. If the fire can not be extinguished with available means, the fire department shall be alerted.

Personal Protective Equipment Failure: If any site worker experiences a failure or alteration of protective equipment that affects the protection factor, that person (and anyone assisting him) shall immediately leave the Working Zone. Re-entry shall not be permitted until the equipment has been repaired or replaced.

Other Equipment Failure: If any other equipment on site fails to operate properly, the Site Safety Officer shall be notified and then determine the effect of this failure on continuing operations on site. If the failure affects the safety of personnel or prevents completion of the Work Plan tasks, all personnel shall leave the Exclusion Zone until the situation is evaluated and appropriate actions taken.

In all situations, when an on-site emergency results in evacuation of the Working Zone, personnel shall not re-enter until:

1. The conditions resulting in the emergency have been corrected.
2. The hazards have been reassessed.
3. The Site Safety Plan has been reviewed (and revised, if needed).
4. Site personnel have been briefed on any changes in the Site Safety Plan.

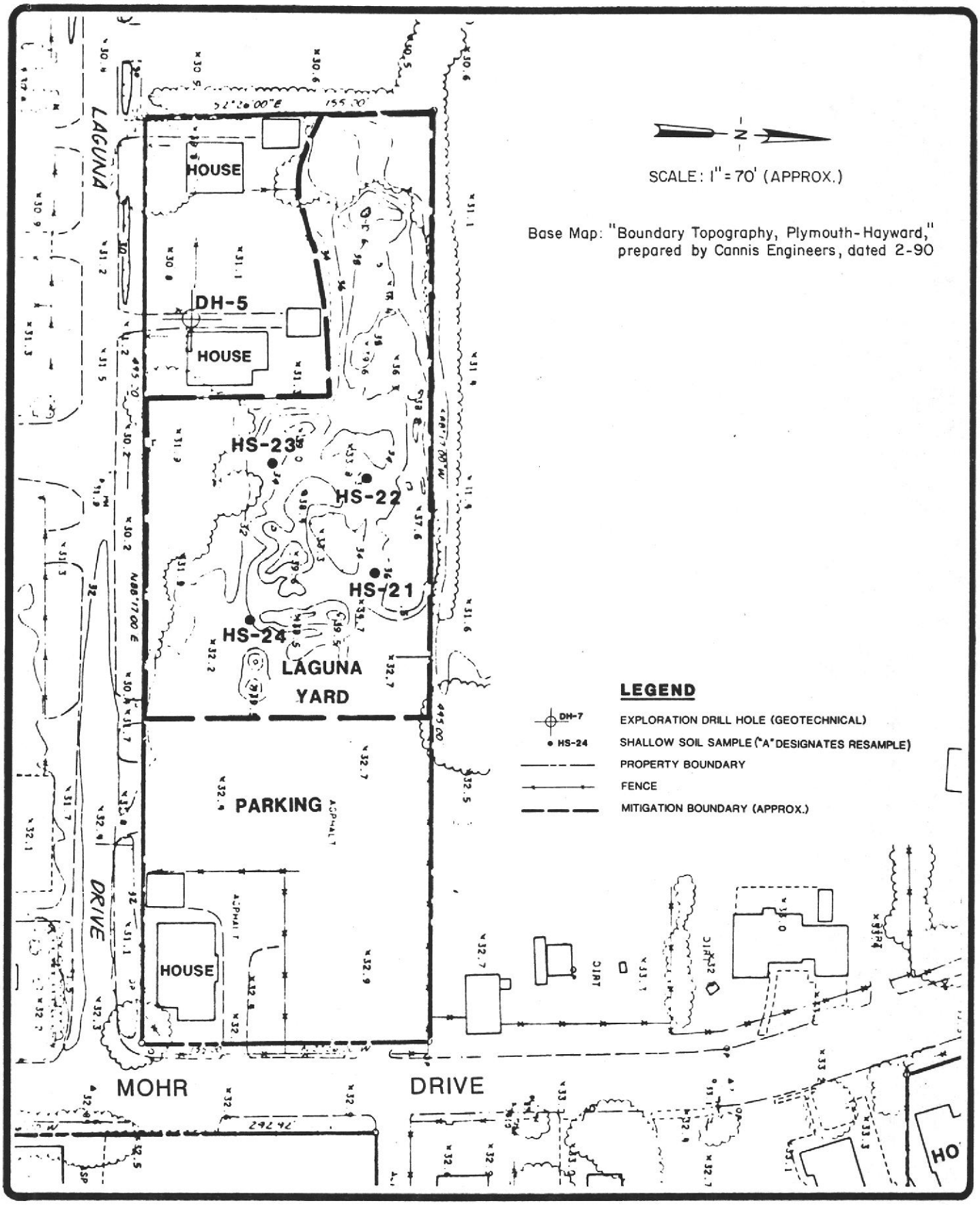
The undersigned site personnel have read the above plan and are familiar with its provisions.

Title	Name	Signature
Site Safety Officer	Geoff C. Blair	_____
Project Team Leader	Eric R. Lautenbach	_____
Other Site Personnel	_____	_____
	_____	_____
	_____	_____
	_____	_____

Project personnel were briefed on the contents of this plan at:

TIME:_____ PLACE:_____

SSP Prepared by Geoff Blair Date March 8, 1990
Reviewed by Eric Lautenbach



3-90
TERRATECH

LAGUNA PARK
HAYWARD, CALIFORNIA

SITE PLAN

FIGURE
1

PROJECT
4454/4

SAN JOSE BLUEPRINT CO.
PRINTED ON JR 330

HAYWARD
Mt. Eden
Baumberg
UNION CITY
W. JACKSON ST
W. TENNYSON
HESPERIAN BLVD
INDUSTRIAL BLVD
NIMITZ FRWY
SOUTHLAND SHOPPING CTR
CHABOT COLLEGE
MT EDEN CEM
MT EDEN PARK
RANCHO ARROYO PARK
SORENSEN PARK
FOR CONTINUATION SEE MAP 59
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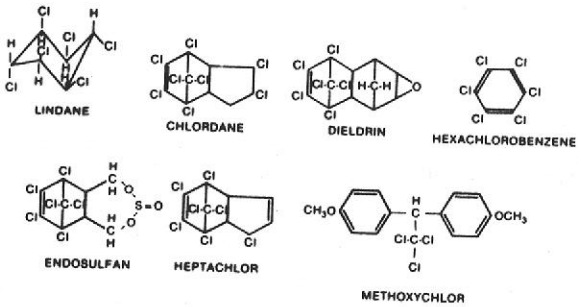
Chapter 3

SOLID ORGANOCHLORINE PESTICIDES

CHEMICAL STRUCTURES



COMMON COMMERCIAL PESTICIDE PRODUCTS*

Highly toxic: endrin (Hexadrin), a stereoisomer of dieldrin.

Moderately toxic: aldrin (Aldrite, Drinox), endosulfan (Thiodan), dieldrin (Dieldrite), toxaphene (Toxakil, Strobane-T), lindane (Gammexane), benzene hexachloride (BHC, HCH), DDT (chlorophenothane), heptachlor, kepone, terpene polychlorinates (Strobane), chlordane (Chlordan), dicofol (Kelthane), chlorobenzilate (Acaraben), mirex, methoxychlor (Marlate), dienochlor (Pentac), hexachlorobenzene (HCB), ethylan (Perthane). All except HCB are insecticides or acaricides; HCB is a fungicide.

The U.S. Environmental Protection Agency has sharply curtailed the availability of many organochlorines, particularly DDT, dieldrin, and chlordane. Others, however, are still the active ingredients of various home and garden products and some agricultural and structural pest control agents. Hexachlorobenzene is used as a seed protectant. Lindane may no longer be used in continuous vaporizers, but it is the active ingredient of many products for pest control in the home and on the farm. It is the active ingredient of the scabicide Kwell®.

TOXICOLOGY

Most organochlorines are efficiently absorbed from the gut and across the skin. In adequate dosage, they interfere with axonic transmission of nerve impulses and, therefore, disrupt the function of the nervous system, principally that of the brain. This results in behavioral changes, sensory and equilibrium disturbances, involuntary muscle activity, and depression of vital centers, particularly those controlling respiration. Adequate doses of some organochlorines increase myocardial irritability, and stimulate synthesis of hepatic drug-metabolizing enzymes.

* Listed approximately in order of decreasing toxicity.

Chlordane has apparently induced a few cases of self-limited megaloblastic anemia after protracted low-level exposures. The condition has resolved following termination of exposure.

Kepone has caused nervousness, tremor, incoordination, weakness and infertility in excessively exposed workers. Clinical improvement has occurred as the pesticide was excreted.

Endrin is more toxic to the liver and kidneys than the other organochlorines at comparable dosages.

Prolonged ingestion of HCB-treated grain produced porphyria cutanea tarda in several thousand Turkish citizens who mistakenly ate the seed grain. Disease was manifest as excretion of red urine, bullous dermatitis, hyperpigmentation, generalized hair growth, muscle wasting and liver enlargement. Slow improvement occurred when HCB ingestion was stopped.

A series of anecdotal reports of bone marrow injury has tended to indict lindane as a hematotoxic agent in certain predisposed individuals, but no relationship has been proved.

Lindane, methoxychlor, terpene polychlorinates, chlorobenzilate, dicofol, and the constituents of chlordane, except heptachlor and oxychlordane, are excreted rapidly by humans, usually within 3-4 days of ingestion. Dieldrin, aldrin, endrin, hexachlorobenzene, heptachlor, and oxychlordane are excreted within weeks to several months of absorption by humans. DDT, kepone, mirex, and the beta isomer of benzene hexachloride are excreted very slowly, requiring months or years for elimination. The excretion kinetics of perthane, kelthane, and dienochlor are not known. Because of their lipophilicity, all organochlorines are likely to be excreted in the milk of lactating women.

FREQUENT SYMPTOMS AND SIGNS OF POISONING

APPREHENSION, EXCITABILITY, DIZZINESS, HEADACHE, DISORIENTATION, WEAKNESS, PARESTHESIAE, muscle twitching, tremor, tonic and clonic **CONVULSIONS** (often epileptiform), and unconsciousness are the major manifestations. Soon after ingestion, nausea and vomiting commonly occur. When chemicals are absorbed dermally, apprehension, twitching, tremors, confusion, and convulsions may be the first symptoms. Respiratory depression is caused by the pesticide and by the petroleum solvents in which these pesticides are usually dissolved. Pallor occurs in moderate to severe poisoning. Cyanosis may result as convulsive activity interferes with respiration.

Even though convulsive activity may be severe, the prognosis in poisonings by these agents is far from hopeless. Although fatalities have occurred following absorption of large amounts of some organochlorines, there is a substantial likelihood of complete recovery if convulsions can be controlled, and vital functions sustained.

From EPA book "Recognition and Management of Pesticide Poisonings"

CONFIRMATION OF DIAGNOSIS

Pesticide and/or metabolites can usually be identified in blood or urine by gas-liquid chromatographic examination of samples taken within 72 hours of poisoning. These tests can be performed by some private laboratories, and by state health department and university laboratories supported by the U.S. Environmental Protection Agency. Such laboratories can be reached through poison control centers. Some chlorinated hydrocarbon pesticides (notably DDT) persist in the serum for weeks or months after absorption, but most are excreted in a few days. **DO NOT DELAY TREATMENT** of acute poisoning pending confirmatory blood analysis. Detection of chlorinated hydrocarbon residues in blood or tissues does not, of itself, indicate poisoning; actual concentrations are critical to a diagnosis of poisoning.

TREATMENT

1. Establish **CLEAR AIRWAY** and **TISSUE OXYGENATION** by aspiration of secretions, and, if necessary, by assisted pulmonary ventilation with oxygen.
2. **CONTROL CONVULSIONS. DIAZEPAM (VALIUM®)** is a valuable anticonvulsant.

   Adult dosage, including children over 6 years of age or 23 kg in weight: 5-10 mg (1-2 ml) slowly, intravenously (no faster than one ml per minute), or give total dose intramuscularly (deep). Repeat in 2-4 hours if needed.

   Dosage for children under 6 years or 23 kg in weight: 0.1 mg/kg (0.02 ml/kg) intravenously, no faster than half the total dose per minute, or give total dose intramuscularly (deep). Repeat in 2-4 hours if needed.

   CAUTION: Administer intravenous diazepam slowly to avoid irritation of the vein, hypotension, and respiratory depression.

   A. Persons suffering **SEVERE PROTRACTED CONVULSIONS** may require additional anticonvulsant medication. Agents that have been used successfully in the past are pentobarbital (Numbutal®), phenytoin (Dilantin®), thiopental (Pentothal®), and succinylcholine (Anectine®).

      CAUTION: Be prepared to maintain pulmonary ventilation mechanically if respiration is depressed during administration of anticonvulsants. Laryngospasm sometimes occurs during anticonvulsant therapy, and may necessitate tracheostomy.

      (a). **PENTOBARBITAL:** 5 mg/kg body weight, or 0.20 ml/kg body weight, using the usual 2.5% solution. If possible, inject solution intravenously, at a rate not exceeding 25 mg (one ml) per minute until convulsions are controlled. If intravenous administration is not possible, give total dose rectally, not exceeding 5 mg/kg body weight (0.20 ml/kg of 2.5% solution).

      (b). **PHENYTOIN:** loading dose 15-18 mg/kg. Maintenance dose 4-8 mg/kg q 4-24 hours as needed. Intramuscular administration is not recommended. Give IV slowly at no more than 20% total dose per minute.

      (c). **THIOPENTAL (PENTOTHAL):** a solution of one gm in 500 ml of 5% glucose in water is given by intravenous drip at a rate just sufficient to suppress convulsions.

      (d). **SUCCINYLCHOLINE:** occasionally, curarization may be required to stop seizures. Prior to curarization, the trachea must be intubated, and pulmonary ventilation maintained mechanically. Blood gases and pH must be monitored. A person experienced in general anesthesia should conduct these procedures.

3. **BATHE** and **SHAMPOO** the victim vigorously with soap and water if skin and hair have been contaminated.
4. **IF PESTICIDE HAS BEEN INGESTED** in quantity sufficient to cause poisoning, the stomach and intestine must be emptied.

   A. **IF** victim is **ALERT** and gag reflex is not depressed, give **SYRUP OF IPECAC** to induce vomiting (adults and children 12 years and older: 30 ml; children under 12: 15 ml), followed by 1-2 glasses of water.

      CAUTION: **OBSERVE** the **VICTIM** closely after administering **IPECAC.** If consciousness level declines, or if vomiting has not occurred in 15 minutes, proceed immediately to **INTUBATE** stomach.

   Following emesis, have victim drink a suspension of 30-50 gm **ACTIVATED CHARCOAL** in 3-4 ounces of water to limit absorption of toxicant remaining in the gut.

   B. If the victim is **NOT FULLY ALERT,** empty the stomach immediately by **INTUBATION, ASPIRATION,** and **LAVAGE,** using isotonic saline or 5% sodium bicarbonate. Because many pesticides are dissolved in petroleum distillates, emesis and intubation of the stomach involve a serious risk that solvent will be aspirated, leading to chemical pneumonitis. For this reason:

      (a). If victim is unconscious or obtunded and if facilities are at hand, insert an **ENDOTRACHEAL TUBE** (cuffed, if available) prior to gastric intubation.

      (b). Keep victim's **HEAD BELOW LEVEL OF STOMACH** and turned to left during intubation and lavage. (Trendelenburg, or left lateral decubitus, with head of table tipped downward).

      (c). **ASPIRATE PHARYNX** as regularly as possible to remove gagged or vomited stomach contents.

C. After aspiration of gastric contents and washing of stomach, instill 30-50 gm of **ACTIVATED CHARCOAL** in 3-4 ounces of water through stomach tube to limit absorption of remaining toxicant. **DO NOT** instill milk, cream, or other substances containing vegetable or animal fats, which enhance absorption of chlorinated hydrocarbons.

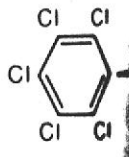
D. **SAVE A SAMPLE** of emesis or gastric washings for chemical analysis.

E. If bowel movement has not occurred in 4 hours and if patient is fully conscious, give **SODIUM SULFATE**, 0.25 gm/kg in 1-6 ounces of water, as a cathartic. Magnesium sulfate and citrate are as suitable as sodium sulfate if renal function is adequate. Retained magnesium may depress CNS function.

5. **DO NOT** give epinephrine or other adrenergic amines, because of the enhanced myocardial irritability induced by chlorinated hydrocarbons.
6. **CHOLESTYRAMINE** resin may accelerate the biliary-gastrointestinal excretion of the more slowly eliminated organochlorine compounds. This is usually administered in 3-8 gm doses, 4 times a day, before meals and at bedtime. Dose should be mixed with a pulpy fruit or liquid. Prolonged treatment (several weeks or months) may be necessary.
7. During convalescence, enhance **CARBOHYDRATE, PROTEIN,** and **VITAMIN** intake by diet or parenteral therapy to minimize injury to the liver.

PENTAC

CHEMICAL STRUCTUR



COMMON COMMERCIA

Pentachlorophenol or S
rophenol, Dowicide EC-7,
Wood Preserver, Wood T
mi Tox, Usol Cabin Oil,
track OS3, 4 or 5, Ortho
Weed and Vegetation K

Pentachlorophenol is
germicide, fungicide, and
mixtures sold for one or
Pentachlorophenol
treated interior surfaces

TOXICOLOGY

Pentachlorophenol
membranes. It is effic
intestinal lining. Like
idative metabolism by
phenols, it is toxic to
in the technical for
regularly exposed.

Most severe poisc
ments. However, a
hospital among new
Dehydration and
children.

Albuminuria, gly
enlargement has bee
occurred in some ch
monly found in acut

Chemical Name, Formula, CAS, RTECS, and DOT UN or NA and Guide Numbers	Synonyms	Exposure Limits	IDLH Level	Physical Description	Chemical and Physical Properties		Incompatibilities	Measurement Method (See Tables 1a and 1b)
2,4,-D $C_8H_6Cl_2O_3$ 94-75-7 AG6825000 2765 55	2,4-Dichlorophenoxy-acetic acid	10 mg/m³	500 mg/m³	Colorless, odorless solid	MW: 221 BP: Decomposes Sol: 0.07 ppm Fl.P: ? VP: ≅0 mm MP: 284°F UEL: ? LEL: ?		Strong oxidizers	Filter; CH_3OH; HPLC; III
DDT $C_{14}H_9Cl_5$ 50-29-3 KJ3325000 2761 55	p,p'-DDT; 2,2-bis(p-Chlorophenyl)-1,1,1-trichloroethane; Dichlorodiphenyl-trichloroethane	1 mg/m³ (NIOSH) lowest detectable limit (0.5 mg/m³ TWA by NIOSH-validated method) See Appendix A	Ca	Colorless solid with a weak, chemical odor	MW: 355 BP: Decomposes Sol: 0.00001 Not combustible VP: ≅ 0 mm MP: 228°F		Strong oxidizers	Filter; iso-octane; GC; S
Decaborane $B_{10}H_{14}$ 17702-41-9 HD1400000 1868 34	None	0.05 ppm (0.3 mg/m³)	20 ppm	Colorless solid with a pungent odor	MW: 122 BP: 416°F Sol: Insoluble Fl.P: 176°F IP: 10.8 eV VP(77°F): 0.05 mm MP: 212°F UEL: ? LEL: ?		Oxidizers, water, halogenated compounds	—
Demeton[e] $C_8H_{19}O_3PS_2$ $OC_2H_4SC_2H_5)_2$ 8065-48-3 TF3150000	Systox[e]; o,o-Diethyl o-(2-ethylthio)ethyl phosphoro-thioate mixture; demeton-o	0.1 mg/m³	20 mg/m³	Light brown liquid with an odor of sulfur compounds	MW: 258 BP(2 mm): 273°F Sol: 0.2% Fl.P: ? VP: ? MP: -13°F UEL: ? LEL: ?		Strong oxidizers	NIOSH 80-125

Physical es	Incompatibilities	Measurement Method (See Tables 1a and 1b)
VP: ≅0 mm MP: 284°F UEL: ? LEL: ?	Strong oxidizers	Filter; CH_3OH; HPLC; III
VP: ≅ 0 mm MP: 228°F	Strong oxidizers	Filter; iso-octane; GC; S
P(77°F): 0.05 mm P: 212°F EL: ? L: ?	Oxidizers, water, halogenated compounds	—
? -13°F L: ? : ?	Strong oxidizers	NIOSH 80-125

DOT

Personal Protection and Sanitation (See Table 2)	Respirator Selection Upper Limit Devices Recommended (See Table 3)	Health Hazards: Route	Symptoms (See Table 4)	First Aid (See Table 5)	Target Organs
Clothing: Repeat prolong Goggles: Reason prob Wash: Promptly upon contam Change: After work it may be contam Remove: Promptly contam non-imperv	NIOSH Ξ: SCBAF: PD,PP/SAF:PD,PP:ASCBA Escape: GMFHIEOV/SCBAE	Inh Abs Ing Con	Weak, stupor, hyporeflexia, musc twitch, convuls, derm	Eye: Irr immed Skin: Soap wash promptly Breath: Art resp Swallow: Medical attention immed	Skin, CNS
Clothing: Repeat prolong Goggles: Reason prob Wash: Promptly upon contam Change: After work it may be contam Remove: Promptly contam non-imperv	NIOSH Ξ: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFHIEOV/SCBAE	Inh Abs Ing Con	Pares tongue, lips, face; tremor; appre, dizz, conf, mal; head; convuls; paresis hands; vomit; irrit eyes, skin; [carc]	Eye: Irr immed Skin: Soap wash promptly Breath: Art resp Swallow: Medical attention immed	CNS, kidneys, liver, skin, PNS
Clothing: Reason prob Goggles: Reason prob Wash: Immed upon contam/daily Change: After work it may be contam Remove: Immed contam non-imperv Provide: Eyewash, quick drench	OSHA 0.5 ppm: SA/SCBA 1.25 ppm: SA:CF 2.5 ppm: SAF/SCBAF/SAT:CF 20 ppm: SAF:PD,PP Ω: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFHIEOV/SCBAE	Inh Abs Ing Con	Dizz, head, nau, li-head, drow, inco, local musc spas, tremor, convuls, ftg	Eye: Irr immed Skin: Soap wash immed Breath: Art resp Swallow: Medical attention immed	CNS
Clothing: Any poss Goggles: Any poss Wash: Immed upon contam Change: N.A. Remove: Immed contam non-imperv Provide: Eyewash, quick drench	OSHA 1 mg/m³: SA/SCBA 2.5 mg/m³: SA:CF 5 mg/m³: SCBAF/SAF/SAT:CF 20 mg/m³: SA:PD,PP Ω: SCBAF:PD,PP/SAF:PD,PP: ASCBA Escape: GMFHIEOV/SCBAE	Inh Abs Ing Con	Miosis, ache eyes; rhin; head; chest, wheez, lar spas; salv; cyan; anor; nau, vomit, abdom cramp, diarr; local sweat; musc fasc; para; dizz; atax; convul; low BP; card	Eye: Irr immed Skin: Soap wash immed Breath: Art resp Swallow: Medical attention immed	Resp sys, CVS, CNS, skin, eyes, blood cholinesterase

Demeton[e]

"From NIOSH Guide to chemical Hazards"

d

2,4-D. See 2,4-dichlorophenoxyacetic acid.

DACRON. See polyethylene terphthalate (film).

DACTIN. See 1,3-dichloro-5,5-dimethylhydantoin.

DALAPON-Na. See 2,2-dichloropropionic acid sodium.

DALF. See methyl parathion.

DALMATIAN INSECT POWDER. See pyrethrum flowers.

D & C RED 14. $C_{24}H_{20}ON_4$, mw: 380.5.
THR = An exper carc to rats via oral route. [*3*]

DANGER POINTS IN SOLID WASTE HANDLING. See Section 6.

DAP. See ammonium phosphate, dibasic.

DAPHNIN. See 7,8-dihydroxycoumarin-7-*β*-*d*-glucoside.

DASANIT. See *o*,*o*-diethyl-*o*-[*p*(methyl sulfinyl) phenyl] phosphorothioate.

DATURINE. See atropine.

DAUNOMYCIN. Thin red needles. $C_{27}H_{28}O_{10}N$, mw: 526.6, mp: 190° (decomp).
Acute tox data: Acute iv LD_{50} (rat) = 13 mg/kg. ip LD_{50} (mouse) = 2.5 mg/kg. [*3*]
THR = HIGH via iv and ip routes. An exper (+) carc. [*3*, *7*]

DAVY, SIR HUMPHREY. See Section 1.

DBH. See 1,2,3,4,5,6-hexachlorocyclohexane.

DBMC. See di-*tert*-butyl-*m*-cresol.

DBPC. See di-*tert*-butyl-*p*-cresol.

"DC 200 FLUID." Syn: *hexamethyldisiloxane*. Viscous liquid. $(CH_3)_3Si\text{-}O\text{-}Si(CH_3)_3$, mw: 162.4, vap. d: 5.5.
THR = MOD irr.

DCMX. See 2,4-dichloro-3,5-xylenol.

2,4-DDD. Syns: *2,2-bis-(p-chlorophenyl)-1,1-dichloroethane, dichloro diphenyl dichloroethylene, TDE.* Crystalline solid. $(ClC_6H_4)_2HCCHCl_2$, mw: 320.1, mp: 110°, vap. d: 11.
Acute tox data: Oral LD_{50} (rat) = 113 mg/kg. Dermal LD_{50} (rabbit) = 1200 mg/kg. [*3*]
THR = HIGH via oral, MOD via dermal routes. Used as a food additive permitted in the feed and drinking water of animals, and/or for the treatment of food-producing animals. [*109*] See also DDT.
Disaster Hazard: Dangerous; when heated to decomp, emits highly toxic fumes of chlorides. Similar DDT. An exper (+) carc and neo. [*3*, *12*]

DDE. See 1,1-dichloro-2,2-bis(*p*-chlorophenyl) ethylene.

4,4-DDM. See methylene dianiline.

DDT. Syns: *dichloro diphenyl trichloroethane, chlorophenothane, dicophane, 1,1,1-trichloro-2,2-bis-(p-chlorophenyl) ethane.* Colorless crystals or white to slightly off-white powder. Odorless or with slight aromatic odor. $(ClC_6H_4)_2CHCCl_3$, mw: 354.5, mp: 108.5°–109°.
Acute tox data: Oral LD_{Lo} (infant) = 150 mg/kg. Oral TD_{Lo} (humans) = 16 mg/kg ⟶ CNS damage; oral LD_{50} (rat) = 113 mg/kg. Dermal LD_{50} (rabbit) = 300 mg/kg. [*3*]
THR = HIGH via oral and dermal routes. Used as a food additive permitted in the food and drinking water of animals and/or for the treatment of food-producing animals. Also a food additive permitted in food for human consumption. [*109*] Note: DDT is a common air contaminant.

DDT is readily absorbed from the intestinal tract and, if it occurs in the air in the form of an aerosol or dust, it may be taken into the lung and readily absorbed. DDT is not, however, absorbed from the skin unless it is in solution. Solutions are absorbed from the skin and, by the same token, emulsions are absorbed to some extent. Likewise, fats and oils from whatever source increase the absorption of DDT from the intestine. DDT acts on the CNS, but the exact mechanism of this action either in man or in animals has not been elucidated. DDT is an exper (S) mutagen and carc. [*3*, *12*, *23*] See chlorinated hydrocarbons. Large doses of DDT also induce nausea and/or diarrhea in man; however, whether this is a central or local action is not yet clear. Chronically, DDT produces microscopic changes in the liver and kidneys in some exper animals. This has not been demonstrated in man. DDT is secreted in the milk and, as an acid derivative is excreted in the urine of rabbits, dogs and man. DDT and certain of its degradation products, particularly DDE, are stored in fat. Such storage results either from a single large dose or from repeated small doses. DDT stored in the fat is at least largely inactive since a greater total dose may be

From book "Dangerous Properties of Industrial Materials" by Sax

stored in an exper animal than is sufficient as a lethal dose for that same animal if given at one time. A study based on 75 human cases reported an average of 5.3 ppm of DDT stored in the fat. A higher content of DDT and its derivatives (up to 434 ppm of DDE and 648 ppm of DDT) was found in workers who had very extensive exposure. Without exception, the samples were taken from persons who were either asymptomatic or suffering from some disease completely unrelated to DDT. Careful hospital examination of workers, who had been very extensively exposed and who had volunteered for examination revealed no abnormality which could be attributed to DDT. Much higher levels than have been found in man have been observed in the fat of exper animals which were apparently asymptomatic. DDT stored in the fat is eliminated only very gradually when further dosage is discontinued. After a single dose, the secretion of DDT in the milk and its excretion in the urine reach their height within a day or two and continue at a lower level thereafter.

Dangerous Acute Dose in Man: A dose of 20 g has proved highly dangerous though not fatal to man. This dose was taken by 5 persons who vomited an unknown portion of the material and even so recovered only incompletely after 5 weeks. Smaller doses produced less important symptoms with relatively rapid recovery. Exper ingestion of 1.5 g resulted in great discomfort and moderate neurological changes including paraesthesia, tremor, moderate ataxia, exaggeration of part of the reflexes, headache, and fatigue. Vomiting followed only after 11 hours. Recovery was complete on the following day. The fatal dose of DDT for man is not known. Judging from the literature, no one has ever been killed by DDT in the absence of other insecticides and/or a variety of toxic solvents. However, these common solvent formulations are highly fatal when taken in small doses, partly because of the toxicity of the solvent, and perhaps because of the increased absorbability of the DDT; several fatal cases in man have been reported. Acute oral toxicity for man = 250 mg/kg. Acute oral LD_{50} (rat) = 113 mg/kg (tech grade). Federal fruit and vegetable tolerance = 7 ppm.

Dangerous Chronic Dose in Man: Even less is known of the hazard of chronic DDT poisoning. It is known that certain exper animals fed diets containing one part of DDT per million store the compound in their fat. The storage of DDT in man has been mentioned above. The exact significance of these findings is not known and their further investigation is of the greatest importance. Human volunteers have ingested up to 35 mg/day for 21 months with no ill effects.

Signs and Symptoms of Poisoning in Man: In patients who ate substantial doses of DDT in flour, the symptoms observed were vomiting, numbness and partial paralysis of the extremities, mild convulsions, loss of proprioception and vibratory sensation of the extremities, and hyperactive knee jerk reflexes. Symptoms appeared in 30 to 60 min after eating the DDT. The paralysis and numbness were most evident in the most distal portions of the extremities, and their intensity was directly proportional to the amount of DDT ingested. All the patients were apprehensive and excited; respiration was moderately rapid; pulse remained slow to normal. The immediate protective mechanism in man, following substantial doses, is vomiting. With smaller doses, nausea and vomiting are less prominent, but diarrhea has been observed. Signs and symptoms of chronic poisoning in man are unknown, although, judging from the observed microscopic changes in exper animals, liver and kidney dysfunctions should be looked for. The primary irr of DDT is practically nil, and it has little or no tendency to produce allergy. Dermatitis induced by DDT has occasionally been reported, but these reports are unconfirmed; nevertheless the phenomenon should be expected to occur in rare instances.

Laboratory Findings: Laboratory findings are essentially negative except for the presence of DDT which may be quantitatively measured in stomach contents, urine, or tissues.

Treatment of Poisoning: Depending on the condition of the patient, attention should first be given to the sedation or to the removal of poison which may have been taken internally. Stomach lavage and saline laxatives may be used. Oil laxatives should be avoided; they promote absorption of DDT and of many organic solvents. The five drugs of choice, arranged roughly in order of their effectiveness, are phenobarbital, pentobarbital, paraldehyde, urethane, and calcium gluconate. Phenobarbital, which has been used in doses up to 0.7 g per day in epilepsy, and pentobarbital (0.25 to 0.5 g) are the barbiturates known to control convulsions of central origin. Paraldehyde (average dosage 15 cc orally, 1 cc undiluted intravenously, 35 cc rectally in normal saline) controls the convulsions of DDT-poisoned animals. Urethane (human dosage 1 to 4 g) has proved very effective in rats, but it should be remembered that the hypnotic and narcotic effects of urethane are not correspondingly high in man. Urethane has an added advantage, however,

of being tolerated in the young and the aged. The object of sedation is not to induce sleep but to restore a relative calm; however, the proper dosage in the presence of poisoning may be so large that it would induce anesthesia if poisoning were not present.

Calcium gluconate has been used less than the other antidotes, but it is reported to control DDT-induced convulsions in several animals. Since its mechanism of action is entirely different, it may be used in addition to sedatives. Epinephrine is contraindicated.

DDVP. See dimethyldichlorovinyl phosphate.

DEAC. See diethyl aluminum chloride.

DEADLY NIGHTSHADE.
Source of the alkaloids, atropine and belladonine.

DEAPASIL. See *p*-aminosalicylic acid.

DECARBORANE. Syns: *boron hydride, decaboron tetradecahydride*. Colorless needles. $B_{10}H_{14}$, mw: 122.3, mp: 99.7°, d: 0.94. (solid), d: 0.78 (liquid @ 100°), vap. press: 19 mm @ 100°.
Acute tox data: Oral LD_{50} (rat) = 64 mg/kg. Inhal LD_{50} (rat) = 46 ppm for 4 hrs. Dermal LD_{50} (rat) = 740 mg/kg. [*3*]
THR = HIGH via oral, inhal; MOD via dermal routes. Self-ignites in O_2. [*19*]

DECABORON TETRADECAHYDRIDE. See decaborane.

DECACHLOROOCTAHYDO-1,3,4-METHENO-2H-CYCLOBUTA(cd) PENTALEN-2-ONE. See kepone.

DECAHYDRONAPHTHALENE. See Decalin.

DECAHYDRONAPHTHALENE, trans. flash p: 129°F; autoign. temp.: 491°F, lel = 0.7%, uel = 5.4%, d: 0.87, vap. d: 4.77, bp: 195°.
THR = See Decalin.
Fire Hazard: Mod, via heat, flame and oxidizers.
To Fight Fire: Water spray, mist, alcohol foam, dry chemical.

DECALIN. Syn: *decahydronaphthalene*. Water white liquid. $C_{10}H_{18}$, mw: 138.3, mp (*cis*): −43.3°, mp (*trans.*): −30.7°, bp: (*cis*): 194.6°, flash p: 136°F, (CC), autoign. temp.: 482°F, vap. press: (*cis*) 1 mm@ 22.5°, (*trans*) 10 mm @ 47.2°, d: 0.8963, vap. d: 4.76, lel = 0.7% @ 212°F, uel = 4.9% @ 212°F.
Acute tox data: Oral LD_{50} (rat) = 4170 mg/kg. Inhal LD_{50} (rat) = 500 ppm for 2 hrs. [*3*]
THR = MOD via oral and inhal routes. Irr to skin, eyes and mu mem. Has caused kidney damage in exper animals.
Fire Hazard: Mod, when exposed to heat or flame; can react with oxidizing materials.
Spont Heating: No.
To Fight Fire: Foam, CO_2, dry chemical.

1-DECANAL. Syns: *caprylaldehyde, capric aldehyde, n-decylaldehyde, aldehyde-C-10*. Colorless to light yellow liquid, floral fatty odor, sol in 80% alcohol, fixed oils, volatile oils and mineral oils, insol in water and glycerol. $CH_3(CH_2)_8CHO$, mw: 156, d: 0.831-0.838 @ 15°.
Acute tox data: Oral LD_{50} (rat) = 3730 mg/kg. [*3*]
THR = MOD via oral route. Used as a synthetic flavoring substance and adjuvant. [*109*]

DECANE. Syn: *decyl hydride*. Liquid. $CH_3(CH_2)_8CH_3$, mw: 142.3, mp: −29.7°, bp: 174.1°, lel = 0.8%, uel = 5.4%, flash p: 115°F (CC), d: 0.730 @ 20°/4°, autoign. temp.: 410°F, vap. press: 1 mm @ 16.5°, vap. d: 4.90.
THR = A simple asphyxiant. Narcotic in high conc. See argon.
Fire Hazard: Mod, when exposed to heat or flame; can react with oxidizing materials.
Spont Heating: No.
Explosion Hazard: Mod, in its vapor form.
To Fight Fire: Foam, CO_2, dry chemical.

DECANOIC ACID. Syns: *decoic acid, decylic acid*. White crystals, unpleasant odor, sol in most organic solvents and in dilute nitric acid, insol in water. $CH_3(CH_2)_8COOH$, mw: 172.3, d: 0.8858, bp: 270°, mp: 31.4°.
Acute tox data: iv LD_{50} (mouse) = 129 mg/kg. [*3*]
THR = HIGH via iv route.

1-DECANOL. See *n*-decyl alcohol.

1-DECENE. Syn: *n-decylene*. Colorless liquid. $H_2CCH(CH_2)_7CH_3$, mw: 140.26, mp: −66.3°, bp: 172°, d: 0.7396 @ 20°/4°, vap. press: 1 mm @ 95.7°, vap. d: 4.83, flash p: < 131°F, autoign. temp.: 455°F.
THR = U. Compounds in this group generally have irr and narcotic action. See also hexene-1.
Fire Hazard: Mod, when exposed to heat or flame; can react with oxidizing materials.
To Fight Fire: Foam, CO_2, dry chemical.

DECYL ACRYLATE. Very slightly sol in water. $C_{13}H_{24}O_2$, mw: 212.4, flash p: 441°F (OC), d: 0.9, bp: 157° @ 50 mm.
Acute tox data: Oral LD_{LO} (rat) = 4930 mg/kg; dermal LD_{LO} (rabbit) = 4660 mg/kg. [*3*] See also esters.
THR = MOD via oral and dermal routes.
Fire Hazard: Slight, when exposed to heat or flame.
To Fight Fire: Dry chemical, CO_2, mist, spray.

***n*-DECYL ALCOHOL.** Syn: *1-decanol, nonyl carbinol*. Viscous, refractive liquid. $CH_3(CH_2)_8CH_2OH$, mw: 158.3, mp: 7°, bp: 232.9°, flash p: 180°F (OC), d:

when administering it in this manner. The symptoms of intoxication are gastrointestinal irr and salivation, as well as general edema, which follows renal insufficiency, hemoptysis, flaccid paralysis, peripheral neuritis, aphonia, difficulties in swallowing, delirium, coma and failure of the heart. The fatal dose is considered to be approximately 2 g, whether administered over a short or relatively long period. The drug seems to have a cumulative effect.

Disaster Hazard: Dangerous; when heated to decomp, emits highly toxic fumes of NO_x.

Treatment and Antidotes: Since poisoning occurs generally only after repeated dosage, discontinuing use of the drug usually stops symptoms and recovery follows. When acute intoxication occurs, the remedial measures are purely symptomatic. Heart depression is the most serious symptom and is to be most guarded against.

EMILENE. $C_7H_{10}O_2N_2S \cdot HCl$, mw: 222.7.
Acute tox data: iv LD_{50} (rat) = 1170 mg/kg. [*3*]
THR = MOD via iv route.

EMILINE. $C_{10}H_{16}O_3$, mw: 184.3.
THR = An exper carc. [*23*]

EMMATOS. See *o,o-dimethyldithiophosphate of diethyl mercapto succinate.*

EMPTY CARTRIDGE BAGS, BLACK POWDER IGNITERS. See explosives, low.

EMPTY CARTRIDGE CASES, PRIMED. See explosives, high.

EMULSIFYING FOOD ADDITIVES. [*109*]

ENAVID.
THR = An exper (±) carc and neo. [*3, 15*]

ENCLOSURES FOR SOUND CONTROL. See Section 3.

ENDO-*cis*-BICYCLO(2,2,1)-5-HEPTENE-2,3-DICARBOXYLIC ANHYDRIDE. White crystals. $C_9H_8O_3$, mw: 164.2, mp: 165°.
THR = U.
Fire Hazard: Slight; will react with water or steam to produce heat.

ENDO-DICYCLOPENTADIENE DIOXIDE. White crystalline powder, slightly sol in water, sol in acetone and benzene. $C_{10}H_{12}O$, mw: 164, mp: 180°–184°, d: 1.331 @ 25°.
THR = Probably HIGH via oral route, and MOD via inhal and dermal routes.

2,5-ENDOMETHYLENE CYCLOHEXENE CARBOXYLIC ACID, ETHYL ESTER.
Acute tox data: Oral LD_{LO} (rat) = 4290 mg/kg. [*3*]
THR = MOD via oral route.

(2,5-ENDOMETHYLENE CYCLOHEXYL METHYL)AMINE.
Acute tox data: Oral LD_{LO} (rat) = 1410 mg/kg; dermal LD_{50} (rabbit) = 520 mg/kg. [*3*]
THR = MOD irr via oral and dermal routc.

ENDOSULFAN. Syn: *thiodan.* A mixture of 2 isomers, brown crystals, nearly insol in water, sol in most organic solvents. $C_9H_6Cl_6O_3S$, mw: 407.0, mp(α): 106°, mp(β): 212°, d: 1.745 @ 20°/20°.
Acute tox data: Oral LD_{50} (rat) = 18 mg/kg; dermal LD_{50} (rabbit) = 74 mg/kg; oral LD_{50} (wild birds) = 35 mg/kg. [*3*] oral LD_{50} (rat) = 100 mg/kg. [*2*]
THR = VERY, VERY HIGH via oral; VERY HIGH via dermal routes. An exper neo. [*3*] A CNS stimulant producing convulsions. A highly toxic organochlorine pesticide which does not accumulate significantly in human tissue. Absorption is normally slow but is increased by alcohols, oil, emulsifiers.
Disaster Hazard: Dangerous; see chlorides and S compounds.

ENDOTHAL. Syn: *3,6-endoxo hexanhydrophthalic acid, disodium salt.* A water-sol solid. $C_8H_8O_5Na_2$, mw: 230.1, mp: 144°.
Acute tox data: Oral LD_{50} (rat) = 51 mg/kg; dermal LD_{50} (rat) = 750 mg/kg; dermal LD_{50} (rabbit) = 100 mg/kg. [*3*] oral LD_{50} (rat) = ca 35 mg/kg. [*2*]
THR = HIGH via oral and dermal routes. Very irr to eyes, skin and mu mem. A defoliant and an herbicide.

ENDOXAN. Syn: *cyclophosphamide.* Crystals. Water-sol, slightly sol in organic solvents. $C_7H_{15}Cl_2N_2O_2P$, mw: 261.1, mp: 41°–45°.
Acute tox data: 45 mg/kg → glandular symptoms in women. Oral LD_{50} (rat) = 94 mg/kg; dermal LD_{50} (rat) = 60 mg/kg; ip LD_{50} (rat) = 40 mg/kg; iv LD_{50} (rat) = 160 mg/kg. [*3*]
THR = HIGH via oral, dermal, iv routes. An exper (S) mutagen, teratogen, neo and carc. [*23, 3, 8*] Can cause GI disturbances and leukopenia, nausea, alopecia and hepatic dysfunction.
Disaster Hazard: When heated to decomp, emits highly toxic fumes of PO_x and NO_x.

3,6-ENDOXO HEXAHYDROPHTHALIC ACID DISODIUM SALT. See endothal.

ENDRIN. Syn: *1,2,3,4,10,10-hexachloro-6,7-epoxy-1,4,4a,5,6,7,8,8a-octahydro-1,4,5,8-endo-endo-dimethanonaphthalene.* White crystals. $C_{12}H_8Cl_6O$, mw: 380.9, mp: decomp @ 200°.
Acute tox data: Oral LD_{50} (rat) = 3 mg/kg; dermal LD_{50} (rat) = 15 mg/kg; oral LD_{50} (mouse) = 1.37 mg/kg; oral LD_{50} (wild birds) = 2 mg/kg; iv LD_{50} (mouse) = 2 mg/kg. [*3*]