100 Pine Street, 10th Floor
San Francisco, CA 94111
(415) 434-9400 • FAX (415) 434-1365

GEOMATRIX

Transmittal

Date 11 MAY 93

To DR. DAVID ARULANANTHAM
ALAMEDA COUNTY HEALTH CARE SERVICES AG.
80 SWAN WAY,
OAKLAND, CA

Project Number 1666.02

Project Name SUNNYSIDE NURSERY

Transmitted via
- ☐ Messenger
- ☐ U.S. Mail
- ☒ Federal Express
- ☐ Fax

Total pages 1 Report.

Item Description

1 LETTER REPORT

Remarks Hi Dave:
Please receive one copy of the report describing soil sampling activities and soil removal performed at the 2 parcels that the Plymouth Group wants to develop.

I'll Call you tomorrow (THURS) to make sure you've received the report.

Thanks & Best Regards— Jeff Wehr

Signed

cc:

Geomatrix Consultants, Inc.
Engineers, Geologists, and Environmental Scientists

100 Pine Street, 10th Floor
San Francisco, CA 94111
(415) 434-9400 • FAX (415) 434-1365

GEOMATRIX

12 May 1993
Project 1886.02

Ravi Arulanantham, Ph.D., CHMM
Alameda County Health Agency
Division of Hazardous Materials
Department of Environmental Health
80 Swan Way, Room 200
Oakland, California 94621

Subject: Results of Supplemental Soil Sampling and Removal of Soil Containing PCBs
Phase II Development Area
Sunnyside Nursery
Hayward, California

Dear Dr. Arulanantham:

This letter reports the analytical results of supplemental soil sampling activities and soil removal conducted at your request at the subject site (Figure 1). This work was performed on behalf of The Plymouth Group (Plymouth), of Mountain View, California, by Geomatrix Consultants, Inc. (Geomatrix). The objective of the soil sampling activities was to further evaluate the presence of pesticides in shallow soil in two areas, Lots 1-9 of Tract 6260 (formerly Sunnyside Commons II area) and Lots 1-5 of Tract 6391, of the Sunnyside Nursery parcel (Figure 2). As you requested, the sampling plan included the collection of authoritative soil samples from four locations along the perimeter of the Tract 6260 area, and soil samples from thirteen locations in the area of Lots 1-5 of Tract 6391. In addition, soil was excavated and removed from the area in Tract 6260 where a soil sample collected by Geomatrix was found to contain polychlorinated biphenyls (PCBs). Plymouth intends to develop these two areas as their Phase II Development program.

Lots 1-9, Tract 6260 (former Sunnyside Commons II Area)
These lots are within the former Sunnyside Commons II Area that borders Mohr Drive and cover approximately 45,000 square feet. This residential area borders the former Sunnyside Nursery. Terratech, Inc. (Terratech), of San Jose, California, collected four near-surface soil samples from this area in January 1990; sample locations and concentrations of detected compounds are shown on Figure 2. An elevated concentration of aroclor 1254 (1.4 part per million) was detected in sample HS-3; Plymouth removed soil in the vicinity of this sample location and Terratech conducted confirmation soil sampling. At your request, Geomatrix performed supplemental soil sampling to further evaluate the possible presence of organochlorine pesticides, PCBs, and organophoshorous pesticides in this area. Four

near-surface (6 to 12 inches below grade) authoritative soil samples, NS-1, NS-2, NS-3, and NS-4, were collected by Geomatrix on 7 January 1993 from the Tract 6260 area (Figure 2). The soil samples were collected according to Geomatrix protocols and were delivered to Anametrix, Inc. (Anametrix), of San Jose, California, a state-certified analytical laboratory, according to Geomatrix chain-of-custody procedures. Chain-of-custody records are included in Appendix A.

The near-surface soil samples were analyzed for organochlorine pesticides and PCBs using Environmental Protection Agency (EPA) Method 8080 and organophosphorus pesticides using EPA Method 8140. Relatively low levels of organochlorine compounds were detected in near-surface soil samples NS-1 (endrin at 0.110 milligrams per kilogram [mg/kg]), NS-2 (Aroclor 1254 at 1.60 mg/kg), NS-3 (4,4'-DDT at 0.017 mg/kg), and NS-4 (4,4'-DDE at 0.086 mg/kg and 4-4'-DDT at 0.062 mg/kg). The source of the elevated concentration of Aroclor 1254 is not known. No EPA Method 8140 compounds were detected in any of the soil samples collected from the subject area. Analytical results are summarized in Table 1; analytical laboratory reports are included in Appendix A.

To remove soil potentially containing elevated concentrations of PCBs near soil sample NS-2, approximately 17 cubic yards of soil was removed from this area on 30 April 1993 (Figure 2). The excavation was approximately 15 feet by 18 feet and was approximately 18 inches deep. The soil was transported under Non-Hazardous Waste Manifest to Forward, Inc., a state-licensed Class III disposal facility with a state-licensed Class II soil treatment facility located in Manteca, California. Three confirmation soil samples, C-1W, C-2C, C-3E, were collected from the west side, center, and east side of the bottom of the soil excavation. The soil samples were collected according to Geomatrix protocols and delivered to Anametrix under Geomatrix chain-of-custody procedures. The soil samples were analyzed for organochlorine pesticides and PCBs according to EPA Method 8080. No EPA Method 8080 compounds were detected in the three soil samples. Analytical results are summarized in Table 1; analytical laboratory reports are included in Appendix A.

Lots 1 through 5, Tract 6391

These lots border Mohr Drive and cover approximately 23,000 square feet. Terratech collected five near surface soil samples within this area (Figure 2). Elevated concentrations of endosulfan were detected in two of the five samples collected by Terratech. These samples, RS-41 and HS-15, contained concentrations of endosulfan at 26.7 and 11.4 mg/kg, and were collected in February 1991 and January 1989, respectively.

On 16 February 1993, Geomatrix collected eight sets of soil samples at locations within the Tract 6391 area (Figure 2). Each sample set consisted of a surface soil sample (0-6 inches below grade), a near-surface soil sample (6-12 inches below grade), and a subsurface soil sample (12-18 inches below grade). Two sets of authoritative soil samples, B2 and B6, were collected from the vicinity of Terratech soil samples HS-15 and RS-41, respectively, to confirm the presence of endosulfan compounds. The locations of the six other soil samples were selected to provide additional coverage of the area. The samples were collected according to Geomatrix protocols and delivered to Anametrix following Geomatrix chain-of-custody procedures; chain-of-custody records are included in Appendix A.

The eight sets of surface soil samples (0 - 6 inches below ground surface) were analyzed for organochlorine pesticides and PCBs using EPA Method 8080. No EPA Method 8080 compounds were detected in near-surface soil samples B1, B3, B6, B7, or B8. Relatively low concentrations of pesticides were detected in near surface samples B2 (dieldrin at 0.020 mg/kg, endrin at 0.017 mg/kg), B4 (endosulfan II at 0.024 mg/kg), and B5 (endosulfan I at 0.022 mg/kg, endosulfan II at 0.072 mg/kg). Analytical results are summarized in Table 2; analytical laboratory reports and chain-of-custody forms are included in Appendix A. Endosulfan compounds were not detected in authoritative soil samples B2 and B6; consequently, the presence of elevated concentrations of endosulfan compounds in the vicinity of Terratech soil sampling locations HS-15 and RS-41 were not confirmed. Because the detected concentrations of EPA Method 8080 compounds were relatively low, the deeper soil samples were not analyzed.

Organophosphorus pesticides (EPA Method 8140) were not detected in the three previous sampling programs conducted by Geomatrix; therefore, this analysis was not conducted as discussed in our 28 January 1993 letter to you.

At your request, five additional authoritative soil samples, B9 through B13, were collected by Geomatrix on 7 April 1993 from the Tract 6391 area (Figure 2). Soil samples B9 and B10 were collected near the location of Terratech soil sample HS-15, and were collected from a depth of 3 to 6 inches and 12 inches below ground surface, respectively. Soil samples B11, B12, and B13 were collected near the location of Terratech sample RS-41, and were collected from depths of 3 to 6 inches, 12 inches, and 3 to 6 inches below ground surface, respectively. The samples were collected according to Geomatrix protocols and delivered to Anametrix following Geomatrix chain-of-custody procedures; chain-of-custody records are included in Appendix A. Relatively low concentrations of organochlorine pesticides were detected in samples B9 (endosulfan II at 0.054 m/kg), B10 (endrin at 0.022 mg/kg, 4,4'-DDT at 0.041 mg/kg), B11 (endosulfan I at 0.025 mg/kg, 4,4'-DDE at 0.019

mg/kg, endosulfan II at 0.083 mg/kg, endosulfan sulfate at 0.068 mg/kg), and B13 (endosulfan I at 0.018 mg/kg, endosulfan II at 0.053 mg/kg, endosulfan sulfate at 0.059 mg/kg). No analyte compounds were detected in sample B12. Analytical results are summarized in Table 2; analytical laboratory reports are included in Appendix A.

Summary and Recommendations

Four near-surface soil samples were collected from within the Tract 6260 area. Relatively low concentrations (less than 0.012 mg/kg) of endrin, 4,4'-DDE, and 4,4'-DDT were detected in three of the soil samples. Risk assessment based cleanup concentrations[1] for endrin and DDT compounds are 0.2 mg/kg and 1.0 mg/kg respectively. In addition, the PCB Aroclor 1254 was detected in soil sample NS-2. No information regarding the possible source of the Aroclor 1254 is available. Geomatrix excavated approximately 17 cubic yards of soil from the vicinity of soil sample NS-2; this soil was disposed of at the Forward, Inc. Class III landfill in Manteca, California. Confirmation soil sampling and analysis indicate that the PCB-containing soil has been removed from this area.

At Tract 6391, endosulfan compounds were detected at relatively high concentrations of 26.7 and 11.4 mg/kg in soil samples RS-41 and HS-15 collected by Terratech in February 1991 and January 1989, respectively. Geomatrix collected four soil samples in the vicinity of Terratech soil sample RS-41, and three soil samples in the vicinity of Terratech soil sample HS-15 (Figure 2) and was unable to confirm the presence of elevated concentrations of endosulfan compounds in these areas. The highest concentration of endosulfan compounds detected in samples collected by Geomatrix was 0.176 mg/kg in sample B11. Safe-soil[1] concentrations[1] for endosulfan was determined to be 3.5 mg/kg. Research indicates that endosulfan compounds break down in natural settings either biotically or abiotically; while the degradation is pH dependent, most studies report half-lives of endosulfan either on soil or in water of several days to a few months (See Appendix B). We believe this likely explains the absence of endosulfan compounds within the Phase II development area. In addition, six soil samples (Figure 2), were collected in other portions of Tract 6391 to provide additional sampling coverage. Again, elevated concentrations of EPA Method 8080 compounds were not detected.

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[1] From "Health Risk Assessment, Sunnyside Commons Project, Hayward, California"; 22 June 1989, prepared by Environmental Risk Sciences, Inc., for The Plymouth Group

Based on the above analytical results, Geomatrix recommends approval for residential development of the Phase II Development Area, Tract 6260 Lots 1-9 and Tract 6391, Lots 1-5, be granted.

Please contact either of the undersigned if you have any questions or require further information.

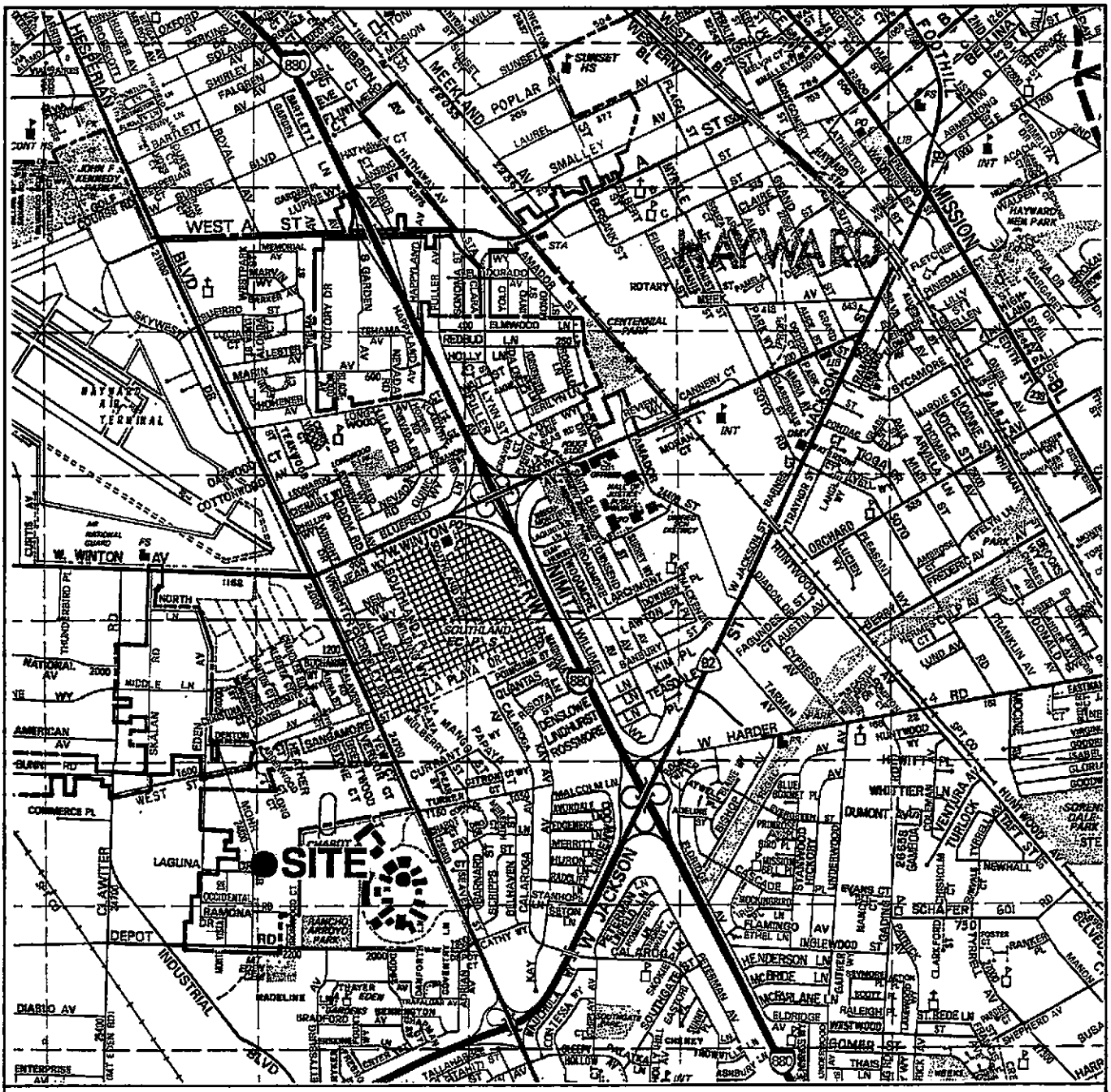
Sincerely yours,

GEOMATRIX CONSULTANTS

Jeff Nelson
Project Manager

Tom Graf, P.E.
Principal Engineer

JCN/TEG/lsm
CONTR\18862RSS.LTR

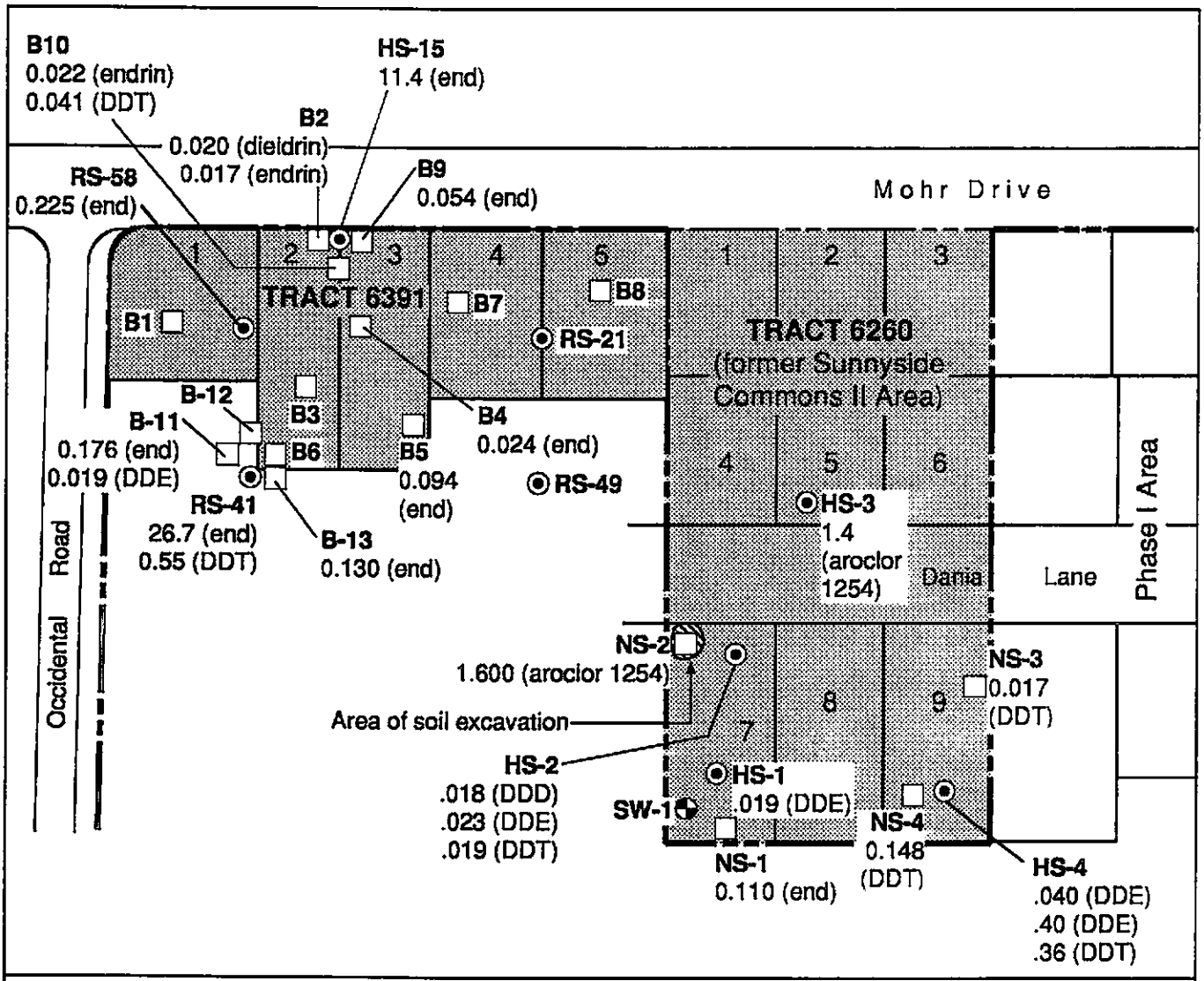


GEOMATRIX

SITE LOCATION MAP
Phase II Development Area
Sunnyside Nursery
Hayward, California

Figure
1

Project No.
1886.01



EXPLANATION

- Previously collected groundwater sample location (Terratech)
- Previously collected surface (0 - 6") soil sample location (Terratech)
- Soil sample location (Geomatrix)
- 26.7 (end) Concentration in mg/kg; end = endosulfan; pesticides not detected at sample locations with no concentrations indicated
- Sunnyside Nursery property boundary
- Phase II developement area

0 80 Feet

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SUPPLEMENTAL SOIL SAMPLING LOCATIONS
PHASE II DEVELOPMENT AREA, TRACT 6391
Sunnyside Nursery
Hayward, California

Figure 2

Project No. 1886.02

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TABLE 1

EPA METHOD 8080 ANALYTICAL RESULTS
TRACT 6360 - PHASE II DEVELOPMENT AREA
Sunnyside Nursery - Hayward, California

(Concentrations is milligrams/kilogram)

Sample	Endrin	4,4'DDE	4,4'DDT	Aroclor 1254
Authoritative[1]				
NS-1	0.110	ND[2]	ND	ND
NS-2	ND	ND	ND	1.600
NS-3	ND	ND	0.017	ND
NS-4	ND	0.086	0.062	ND
Confirmation[3]				
C-1W	ND	ND	ND	ND
C-2C	ND	ND	ND	ND
C-3E	ND	ND	ND	ND
Detection Limit	0.016	0.016	0.016	0.160

1 No EPA Method 8140 or other EPA Method 8080 compounds were detected; EPA Method 8140 analyses performed at Clayton Environmental Consultants of Pleasanton, California; EPA Method 8080 analyses performed at Anametrix, Inc., of San Jose, California.

2 ND = Not detected.

3 No other EPA Method 8080 compounds detected; analyses performed at Anametrix, Inc. of San Jose, California.

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TABLE 2

EPA METHOD 8080 ANALYTICAL RESULTS
TRACT 6391 - PHASE II DEVELOPMENT AREA
Sunnyside Nursery - Hayward, California

(Concentrations is milligrams/kilogram)

Sample	Dieldrin	Endrin	Endosulfan I	Endosulfan II	Endosulfan Sulfate	4,4'DDE	4,4'DDT	Aroclor 1254
B1	ND	ND	ND	ND	ND	ND	ND	ND
B2	0.020	0.017	ND	ND	ND	ND	ND	ND
B3	ND	ND	ND	ND	ND	ND	ND	ND
B4	ND	ND	ND	0.024	ND	ND	ND	ND
B5	ND	ND	0.022	0.072	ND	ND	ND	ND
B6	ND	ND	ND	ND	ND	ND	ND	ND
B7	ND	ND	ND	ND	ND	ND	ND	ND
B8	ND	ND	ND	ND	ND	ND	ND	ND
B9	ND	ND	ND	0.054	ND	ND	ND	ND
B10	ND	0.022	ND	ND	ND	ND	0.041	ND
B11	ND	ND	0.025	0.083	0.068	0.019	ND	ND
B12	ND	ND	ND	ND	ND	ND	ND	ND
B13	ND	ND	0.018	0.053	0.059	ND	ND	ND

ND = Not detected.

FORWARD INC.

NON-HAZARDOUS WASTE MANIFEST
WASTE TREATMENT AND DISPOSAL FACILITY

JOB ACCEPTANCE NO. —

TO BE COMPLETED BY THE GENERATOR

GENERATOR
The Plymouth Group
MAILING ADDRESS
1616 N. Shoreline Blvd.
CITY, STATE, ZIP
Mt. View, CA 94043-1316
PHONE
(415) 960-8570
CONTACT PERSON
Mr. Curt Peterson
SIGNATURE OF AUTHORIZED AGENT / TITLE
* Curt A Pet
DATE
4/2493

REQUIRED PERSONAL PROTECTIVE EQUIPMENT
☒ GLOVES ☐ GOGGLES ☐ RESPIRATOR ☒ HARD HAT
☐ TY-VEK ☐ OTHER

SPECIAL HANDLING PROCEDURES:

WASTE TYPE
☐ TREATMENT SOIL
☒ DISPOSAL SOIL
☐ CONSTRUCTION SOIL
☐ SLUDGE
☐ NON-FRIABLE ASBESTOS
☐ WOOD
☐ ASH
☐ OTHER

GENERATING FACILITY
Former Sunnyside Nursery
Mohr Drive at Laguna Drive
Hayward, CA

RECEIVING FACILITY

FORWARD INC. LANDFILL
9999 SOUTH AUSTIN ROAD
MANTECA, CALIFORNIA 95336
(209) 982-4298 PHONE
(209) 982-1009 FAX

TRANSPORTER HAULER MUST COMPLETE

NAME
Trumpp Bros., Inc.
ADDRESS
1540 Industrial Avenue
CITY, STATE, ZIP
San Jose, CA 95112
PHONE
SIGNATURE OF AUTHORIZED AGENT OR DRIVER
*
DATE

NOTES:

TRUCK NUMBER

END DUMP ☐ BOTTOM DUMP ☐ TRANSFER ☐
ROLL-OFF(S) ☐ FLAT-BED ☐ VAN ☐ DRUMS ☐

FACILITY REQUIREMENTS

FORWARD INC. LANDFILL

Forward shall have no obligation to accept the waste if weather or other conditions impair the safe and effective disposal of the waste or if the waste impairs the safe and effective operation of the Landfill. Forward shall use reasonable efforts to promptly notify Disposer of its inability to accept the waste for any reason. If Forward's refusal to accept the waste is based on weather or other site conditions, Forward shall notify the Disposer when site conditions are expected to change such that Forward will be able to accept the waste.

REMARKS

FACILITY TICKET NUMBER

SIGNATURE OF AUTHORIZED AGENT
*
DATE

CUBIC YARDS
Approximately 18 cubic yards

DISPOSAL METHOD: (TO BE COMPLETED BY FORWARD)

	DISPOSE	BIO	AERATE	STOCKPILE	OTHER
☐ SOIL					
☐ SLUDGE					
☐ NON-FRIABLE ASBESTOS					
☐ WOOD					
☐ ASH					
☐ OTHER					

SCHEDULING MUST BE MADE PRIOR TO 4:00 P.M. THE DAY PRIOR TO EXPECTED ARRIVAL • ANY UNSCHEDULED LOADS ARE SUBJECT TO REFUSAL UPON ARRIVAL. ONGOING DAILY DELIVERIES MUST BE SCHEDULED WITH THE LANDFILL THE DAY BEFORE.
TO SCHEDULE CALL (209) 982-4298

MANIFEST # 5136

ANAMETRIX INC
Environmental & Analytical Chemistry

Part of INCHCAPE ENVIRONMENTAL

REPORT

MR. JEFF NELSON
GEOMATRIX CONSULTANTS INC.
100 PINE STREET, SUITE 1000
SAN FRANCISCO, CA 94111

Workorder # : 9301057
Date Received : 01/07/93
Project ID : 1886.02
Purchase Order: N/A

The following samples were received at Anametrix, Inc. for analysis :

ANAMETRIX ID	CLIENT SAMPLE ID
9301057- 1	NS-1
9301057- 2	NS-2
9301057- 3	NS-3
9301057- 4	NS-4

This report consists of 9 pages not including the cover letter, and is organized in sections according to the specific Anametrix laboratory group or section which performed the analysis(es) and generated the data. The Report Summary that precedes each section will help you determine which Anametrix group is responsible for those test results, and will bear the signatures of the department supervisor and the chemist who have reviewed the analytical data. Please refer all questions to the department supervisor who signed the form.

Anametrix is certified by the California Department of Health Services (DHS) to perform environmental testing under Certificate Number 1234. A detailed list of the approved fields of testing can be obtained by calling our office, or the DHS Environmental Laboratory Accreditation Program at (415)540-2800.

If you have any further questions or comments on this report, please give us a call as soon as possible. Thank you for using Anametrix.

Larry Kent for

Sarah Schoen, Ph.D.
Laboratory Director

1-25-93
Date

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

MR. JEFF NELSON
GEOMATRIX CONSULTANTS INC.
100 PINE STREET, SUITE 1000
SAN FRANCISCO, CA 94111

Workorder # : 9301057
Date Received : 01/07/93
Project ID : 1886.02
Purchase Order: N/A
Department : GC
Sub-Department: PEST

SAMPLE INFORMATION:

ANAMETRIX SAMPLE ID	CLIENT SAMPLE ID	MATRIX	DATE SAMPLED	METHOD
9301057- 1	NS-1	SOIL	01/07/93	8080
9301057- 2	NS-2	SOIL	01/07/93	8080
9301057- 3	NS-3	SOIL	01/07/93	8080
9301057- 4	NS-4	SOIL	01/07/93	8080
9301057- 1	NS-1	SOIL	01/07/93	8140
9301057- 2	NS-2	SOIL	01/07/93	8140
9301057- 3	NS-3	SOIL	01/07/93	8140
9301057- 4	NS-4	SOIL	01/07/93	8140

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

MR. JEFF NELSON
GEOMATRIX CONSULTANTS INC.
100 PINE STREET, SUITE 1000
SAN FRANCISCO, CA 94111

Workorder # : 9301057
Date Received : 01/07/93
Project ID : 1886.02
Purchase Order: N/A
Department : GC
Sub-Department: PEST

QA/QC SUMMARY :

- Due to the large amount of PCB's in the sample that was used in the matrix spike and duplicate, recoveries for gamma-BHC, Dieldrin and Endrin are outside of Anametrix control limits.

Paul Gowan 1-24-93
Department Supervisor Date

Chemist 1/24/93
Chemist Date

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

Project ID	: 1886.02	Anametrix I.D.	: 9301057-1
Sample ID	: NS-1	Elec. File I.D.	: EPJ05701
Matrix	: SOIL	Analyst	: SPK
Date Sampled	: 01/07/93	Supervisor	: PG
Date Extracted	: 01/11/93	Weight ext. (g)	: 30
Date Analyzed	: 01/22/93	% Moisture	: N/A
Instrument ID	: HP22	Final Vol. (ml)	: 10
Dilution	: NONE	Inj. Vol. (ul)	: 1

CAS #	Compound Name	Reporting Limit (ug/Kg)	Amount Found (ug/Kg)
319-84-6	alpha-BHC	8	ND
58-89-9	gamma-BHC	8	ND
76-44-8	Heptachlor	8	ND
309-00-2	Aldrin	8	ND
319-85-7	beta-BHC	8	ND
319-86-8	delta-BHC	8	ND
1024-57-3	Heptachlor Epoxide	8	ND
959-98-8	Endosulfan I	8	ND
72-55-9	4,4'-DDE	16	ND
60-57-1	Dieldrin	16	ND
72-20-8	Endrin	16	110
33212-65-9	Endosulfan II	16	ND
72-54-8	4,4'-DDD	16	ND
50-29-3	4,4'-DDT	16	ND
7421-93-4	Endrin Aldehyde	16	ND
1031-07-8	Endosulfan Sulfate	16	ND
72-43-5	Methoxychlor	80	ND
53494-70-5	Endrin Ketone	16	ND
12789-03-6	Tech. Chlordane	80	ND
8001-35-2	Toxaphene	160	ND
12674-11-2	Aroclor 1016	80	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
	SURROGATE	% Recovery	Rec Limits *
2051-24-3	Decachlorobiphenyl	120%	60-150%

ND : Not detected at or above the practical quantitation limit for the method.
* Anametrix advisory limits, based on the OLM01.8 (CLP) contract.

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

Project ID	: 1886.02	Anametrix I.D.	: 9301057-2
Sample ID	: NS-2	Elec. File I.D.	: EPJ05702
Matrix	: SOIL	Analyst	: SR
Date Sampled	: 01/07/93	Supervisor	: PG
Date Extracted	: 01/11/93	Weight ext. (g)	: 30
Date Analyzed	: 01/22/93	% Moisture	: N/A
Instrument ID	: HP22	Final Vol. (ml)	: 10
Dilution	: NONE	Inj. Vol. (ul)	: 1

CAS #	Compound Name	Reporting Limit (ug/Kg)	Amount Found (ug/Kg)
319-84-6	alpha-BHC	8	ND
58-89-9	gamma-BHC	8	ND
76-44-8	Heptachlor	8	ND
309-00-2	Aldrin	8	ND
319-85-7	beta-BHC	8	ND
319-86-8	delta-BHC	8	ND
1024-57-3	Heptachlor Epoxide	8	ND
959-98-8	Endosulfan I	8	ND
72-55-9	4,4'-DDE	16	ND
60-57-1	Dieldrin	16	ND
72-20-8	Endrin	16	ND
33212-65-9	Endosulfan II	16	ND
72-54-8	4,4'-DDD	16	ND
50-29-3	4,4'-DDT	16	ND
7421-93-4	Endrin Aldehyde	16	ND
1031-07-8	Endosulfan Sulfate	16	ND
72-43-5	Methoxychlor	80	ND
53494-70-5	Endrin Ketone	16	ND
12789-03-6	Tech. Chlordane	80	ND
8001-35-2	Toxaphene	160	ND
12674-11-2	Aroclor 1016	80	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	1600
11096-82-5	Aroclor 1260	160	ND
	SURROGATE	% Recovery	Rec Limits *
2051-24-3	Decachlorobiphenyl	99%	60-150%

ND : Not detected at or above the practical quantitation limit for the method.
* Anametrix advisory limits, based on the OLM01.8 (CLP) contract.

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

Project ID	: 1886.02	Anametrix I.D.	: 9301057-3
Sample ID	: NS-3	Elec. File I.D.	: EPJ05703
Matrix	: SOIL	Analyst	: JR
Date Sampled	: 01/07/93	Supervisor	: PG
Date Extracted	: 01/11/93	Weight ext. (g)	: 30
Date Analyzed	: 01/22/93	% Moisture	: N/A
Instrument ID	: HP22	Final Vol. (ml)	: 10
Dilution	: NONE	Inj. Vol. (ul)	: 1

CAS #	Compound Name	Reporting Limit (ug/Kg)	Amount Found (ug/Kg)
319-84-6	alpha-BHC	8	ND
58-89-9	gamma-BHC	8	ND
76-44-8	Heptachlor	8	ND
309-00-2	Aldrin	8	ND
319-85-7	beta-BHC	8	ND
319-86-8	delta-BHC	8	ND
1024-57-3	Heptachlor Epoxide	8	ND
959-98-8	Endosulfan I	8	ND
72-55-9	4,4'-DDE	16	ND
60-57-1	Dieldrin	16	ND
72-20-8	Endrin	16	ND
33212-65-9	Endosulfan II	16	ND
72-54-8	4,4'-DDD	16	ND
50-29-3	4,4'-DDT	16	17
7421-93-4	Endrin Aldehyde	16	ND
1031-07-8	Endosulfan Sulfate	16	ND
72-43-5	Methoxychlor	80	ND
53494-70-5	Endrin Ketone	16	ND
12789-03-6	Tech. Chlordane	80	ND
8001-35-2	Toxaphene	160	ND
12674-11-2	Aroclor 1016	80	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
	SURROGATE	% Recovery	Rec Limits *
2051-24-3	Decachlorobiphenyl	118%	60-150%

ND : Not detected at or above the practical quantitation limit for the method.
* Anametrix advisory limits, based on the OLM01.8 (CLP) contract.

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

Project ID	: 1886.02	Anametrix I.D.	: 9301057-4
Sample ID	: NS-4	Elec. File I.D.	: EPJ05704
Matrix	: SOIL	Analyst	: STR
Date Sampled	: 01/07/93	Supervisor	: PG
Date Extracted	: 01/11/93	Weight ext. (g)	: 30
Date Analyzed	: 01/22/93	% Moisture	: N/A
Instrument ID	: HP22	Final Vol. (ml)	: 10
Dilution	: NONE	Inj. Vol. (ul)	: 1

CAS #	Compound Name	Reporting Limit (ug/Kg)	Amount Found (ug/Kg)
319-84-6	alpha-BHC	8	ND
58-89-9	gamma-BHC	8	ND
76-44-8	Heptachlor	8	ND
309-00-2	Aldrin	8	ND
319-85-7	beta-BHC	8	ND
319-86-8	delta-BHC	8	ND
1024-57-3	Heptachlor Epoxide	8	ND
959-98-8	Endosulfan I	8	ND
72-55-9	4,4'-DDE	16	86
60-57-1	Dieldrin	16	ND
72-20-8	Endrin	16	ND
33212-65-9	Endosulfan II	16	ND
72-54-8	4,4'-DDD	16	ND
50-29-3	4,4'-DDT	16	62
7421-93-4	Endrin Aldehyde	16	ND
1031-07-8	Endosulfan Sulfate	16	ND
72-43-5	Methoxychlor	80	ND
53494-70-5	Endrin Ketone	16	ND
12789-03-6	Tech. Chlordane	80	ND
8001-35-2	Toxaphene	160	ND
12674-11-2	Aroclor 1016	80	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
	SURROGATE	% Recovery	Rec Limits *
2051-24-3	Decachlorobiphenyl	119%	60-150%

ND : Not detected at or above the practical quantitation limit for the method.
* Anametrix advisory limits, based on the OLM01.8 (CLP) contract.

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

Project ID	: 1886.02	Anametrix I.D.	: PSBLK011193A
Sample ID	: BLANK	Elec. File I.D.	: BJ2101P1
Matrix	: SOIL	Analyst	: SR PG
Date Sampled	: N/A	Supervisor	:
Date Extracted	: 01/11/93	Weight ext. (g)	: 30
Date Analyzed	: 01/22/93	% Moisture	: N/A
Instrument ID	: HP22	Final Vol. (ml)	: 10
Dilution	: NONE	Inj. Vol. (ul)	: 1

CAS #	Compound Name	Reporting Limit (ug/Kg)	Amount Found (ug/Kg)
319-84-6	alpha-BHC	8	ND
58-89-9	gamma-BHC	8	ND
76-44-8	Heptachlor	8	ND
309-00-2	Aldrin	8	ND
319-85-7	beta-BHC	8	ND
319-86-8	delta-BHC	8	ND
1024-57-3	Heptachlor Epoxide	8	ND
959-98-8	Endosulfan I	8	ND
72-55-9	4,4'-DDE	16	ND
60-57-1	Dieldrin	16	ND
72-20-8	Endrin	16	ND
33212-65-9	Endosulfan II	16	ND
72-54-8	4,4'-DDD	16	ND
50-29-3	4,4'-DDT	16	ND
7421-93-4	Endrin Aldehyde	16	ND
1031-07-8	Endosulfan Sulfate	16	ND
72-43-5	Methoxychlor	80	ND
53494-70-5	Endrin Ketone	16	ND
12789-03-6	Tech. Chlordane	80	ND
8001-35-2	Toxaphene	160	ND
12674-11-2	Aroclor 1016	80	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
	SURROGATE	% Recovery	Rec Limits *
2051-24-3	Decachlorobiphenyl	140%	60-150%

ND : Not detected at or above the practical quantitation limit for the method.
* Anametrix advisory limits, based on the OLM01.8 (CLP) contract.

MATRIX SPIKE RECOVERY FORM --- EPA METHOD 8080
ANAMETRIX, INC. (408)432-8192

Project ID	: 1886.02	Anametrix I.D.	: 9301057-2
Sample ID	: NS-2	Elec. File I.D.	: EMJ05702
Matrix	: SOIL	Analyst	: LK
Date Sampled	: 01/07/93	Supervisor	: PG
Date Extracted	: 01/11/93	Weight ext. (g)	: 30
Date Analyzed	: 01/22/93	% Moisture	: N/A
Instrument ID	: HP22	Final Vol. (ml)	: 10
Dilution	: NONE	Inj. Vol. (ul)	: 1

COMPOUND	SPIKE ADDED (ug/Kg)	MS CONCENTRATION (ug/Kg)	MSD CONCENTRATION (ug/Kg)
gamma-BHC	17	22	24
Heptachlor	17	14	15
Aldrin	17	12	13
Dieldrin	33	152	186
Endrin	33	41	46
4,4'-DDT	33	25	30

COMPOUND	MS % RECOVERY	MSD % RECOVERY	% REC LIMITS
gamma-BHC	129	141	41-123
Heptachlor	82	88	41-124
Aldrin	71	76	37-123
Dieldrin	461	564	44-112
Endrin	124	139	41-117
4,4'-DDT	76	91	35-134

COMPOUND	% RPD	% RPD LIMITS
gamma-BHC	9	25
Heptachlor	7	25
Aldrin	8	25
Dieldrin	20	25
Endrin	11	25
4,4'-DDT	18	25

Surrogate	MS REC	MSD REC	REC LIMITS**
DCB	105%	126%	60-150%

* Value is outside of Anametrix QC limits
** Anametrix advisory limits, based on the OLM01.8 (CLP) contract.

LABORATORY CONTROL SPIKE RECOVERY FORM --- EPA METHOD 8080
ANAMETRIX, INC. (408)432-8192

Project ID	: 1886.02	Anametrix I.D.	: PSLCS011193A
Sample ID	: LCS	Elec. File I.D.	: MJ2101P1
Matrix	: SOIL	Analyst	: SNR
Date Sampled	: N/A	Supervisor	: PG
Date Extracted	: 01/11/93	Weight ext. (g)	: 30
Date Analyzed	: 01/22/93	% Moisture	: N/A
Instrument ID	: HP22	Final Vol. (ml)	: 10
Dilution	: NONE	Inj. Vol. (ul)	: 1

COMPOUND	SPIKE ADDED (ug/Kg)	LCS CONCENTRATION (ug/Kg)	% REC
gamma-BHC	17	15	88%
Heptachlor	17	16	94%
Aldrin	17	15	88%
Dieldrin	33	32	97%
Endrin	33	32	97%
4,4'-DDT	33	30	91%

COMPOUND	% REC LIMITS
gamma-BHC	41-123
Heptachlor	41-124
Aldrin	37-123
Dieldrin	44-112
Endrin	41-117
4,4'-DDT	35-134

Surrogate	LCS REC	REC LIMITS**
DCB	140%	60-150%

* Value is outside of Anametrix QC limits
** Anametrix advisory limits, based on the OLM01.8 (CLP) contract.

ANAMETRIX INC
environmental analytical chemistry

1961 Concourse Drive Suite E
San Jose, CA 95131
(408)432-8192 • Fax (408)432-8198

January 22, 1993

Mr. Jeff Nelson
GEOMATRIX CONSULTANTS, INC.
100 Pine Street
Suite 1000
San Francisco, CA 94111

Dear Mr. Nelson:

Enclosed are the analytical results from your project number 1886.02, received by Anametrix, Inc. on January 7, 1993. The enclosed work was performed by a laboratory subcontracted by Anametrix, Inc.

Anametrix I.D.#	Client I.D. #
9301057-1	NS-1
9301057-2	NS-2
9301057-3	NS-3
9301057-4	NS-4

If you have any questions concerning this workorder, please call our Client Services Department at (408)432-8192.

Sincerely,

ANAMETRIX, INC.

Cristina Velasquez

Cristina Velasquez
Client Services Representative

CV/mnh/9551

Western Operations

1252 Quarry Lane
P.O. Box 9019
Pleasanton, CA 94566
(510) 426-2600
Fax (510) 426-0106

Clayton
ENVIRONMENTAL
CONSULTANTS

January 21, 1993

Ms. Cristina Velasquez
ANAMETRIX INC.
1961 Concourse Drive, Ste. E
San Jose, CA 95131

Client Ref. 9301057
Clayton Project No. 93010.53

Dear Ms. Velasquez:

Attached is our analytical laboratory report for the samples received on January 8, 1993. A copy of the Chain-of-Custody form acknowledging receipt of these samples is attached.

Please note that any unused portion of the samples will be disposed of 30 days after the date of this report, unless you have requested otherwise.

We appreciate the opportunity to be of assistance to you. If you have any questions, please contact Suzanne Silvera, Client Services Supervisor, at (510) 426-2657.

Sincerely,

Ronald H. Peters, CIH
Director, Laboratory Services
Western Operations

RHP/tb
Attachments

Results of Analysis
for
Anametrix Inc.

Client Reference: 9301057
Clayton Project No. 93010.53

Sample Identification:	1	Date Sampled:	01/07/93
Lab Number:	9301053-01A	Date Received:	01/08/93
Sample Matrix/Media:	SOIL	Date Extracted:	01/11/93
Extraction Method:	EPA 3550	Date Analyzed:	01/15/93
Analytical Method:	EPA 8140		

Analyte	CAS #	Concentration (mg/kg)	Limit of Detection (mg/kg)
Organophosphorus Pesticides			
Azinphos methyl	86-50-0	ND	0.2
Bolstar (Sulprofos)	35400-43-2	ND	0.2
Chlorpyrifos	2921-88-2	ND	0.2
Coumaphos	56-72-4	ND	0.2
Demeton, O and S	8065-48-3	ND	0.2
Diazinon	334-41-5	ND	0.2
Dichlorvos	62-73-7	ND	0.2
Disulfoton	298-04-4	ND	0.2
Ethoprop	13194-48-4	ND	0.2
Fensulfothion	115-90-2	ND	0.2
Fenthion	55-38-9	ND	0.2
Merphos	150-50-5	ND	0.2
Mevinphos	7786-34-7	ND	0.2
Naled	300-76-5	ND	0.2
Parathion methyl	298-00-0	ND	0.2
Phorate	298-02-2	ND	0.2
Ronnel	299-84-3	ND	0.2
Stirophos (Tetrachlorovinphos)	22248-79-9	ND	0.2
Tokuthion (Protothiofos)	34643-46-4	ND	0.2
Trichloronate	327-98-0	ND	0.2
Surrogates		**Recovery (%)**	**QC Limits (%)**
2-Nitro-m-xylene	81-20-9	101	40 - 150

ND: Not detected at or above limit of detection
--: Information not available or not applicable
Results are reported on a wet weight basis, as received

Note: Detection limits increased due to limited sample volume.

Results of Analysis
for
Anametrix Inc.

Client Reference: 9301057
Clayton Project No. 93010.53

Sample Identification:	2	Date Sampled:	01/07/93
Lab Number:	9301053-02A	Date Received:	01/08/93
Sample Matrix/Media:	SOIL	Date Extracted:	01/11/93
Extraction Method:	EPA 3550	Date Analyzed:	01/15/93
Analytical Method:	EPA 8140		

Analyte	CAS #	Concentration (mg/kg)	Limit of Detection (mg/kg)
Organophosphorus Pesticides			
Azinphos methyl	86-50-0	ND	0.2
Bolstar (Sulprofos)	35400-43-2	ND	0.2
Chlorpyrifos	2921-88-2	ND	0.2
Coumaphos	56-72-4	ND	0.2
Demeton, O and S	8065-48-3	ND	0.2
Diazinon	334-41-5	ND	0.2
Dichlorvos	62-73-7	ND	0.2
Disulfoton	298-04-4	ND	0.2
Ethoprop	13194-48-4	ND	0.2
Fensulfothion	115-90-2	ND	0.2
Fenthion	55-38-9	ND	0.2
Merphos	150-50-5	ND	0.2
Mevinphos	7786-34-7	ND	0.2
Naled	300-76-5	ND	0.2
Parathion methyl	298-00-0	ND	0.2
Phorate	298-02-2	ND	0.2
Ronnel	299-84-3	ND	0.2
Stirophos (Tetrachlorovinphos)	22248-79-9	ND	0.2
Tokuthion (Protothiofos)	34643-46-4	ND	0.2
Trichloronate	327-98-0	ND	0.2
Surrogates		**Recovery (%)**	**QC Limits (%)**
2-Nitro-m-xylene	81-20-9	87	40 - 150

ND: Not detected at or above limit of detection
--: Information not available or not applicable
Results are reported on a wet weight basis, as received

Note: Detection limits increased due to limited sample volume.

Results of Analysis
for
Anametrix Inc.

Client Reference: 9301057
Clayton Project No. 93010.53

Sample Identification:	3	Date Sampled:	01/07/93
Lab Number:	9301053-03A	Date Received:	01/08/93
Sample Matrix/Media:	SOIL	Date Extracted:	01/11/93
Extraction Method:	EPA 3550	Date Analyzed:	01/15/93
Analytical Method:	EPA 8140		

Analyte	CAS #	Concentration (mg/kg)	Limit of Detection (mg/kg)
Organophosphorus Pesticides			
Azinphos methyl	86-50-0	ND	0.2
Bolstar (Sulprofos)	35400-43-2	ND	0.2
Chlorpyrifos	2921-88-2	ND	0.2
Coumaphos	56-72-4	ND	0.2
Demeton, O and S	8065-48-3	ND	0.2
Diazinon	334-41-5	ND	0.2
Dichlorvos	62-73-7	ND	0.2
Disulfoton	298-04-4	ND	0.2
Ethoprop	13194-48-4	ND	0.2
Fensulfothion	115-90-2	ND	0.2
Fenthion	55-38-9	ND	0.2
Merphos	150-50-5	ND	0.2
Mevinphos	7786-34-7	ND	0.2
Naled	300-76-5	ND	0.2
Parathion methyl	298-00-0	ND	0.2
Phorate	298-02-2	ND	0.2
Ronnel	299-84-3	ND	0.2
Stirophos (Tetrachlorovinphos)	22248-79-9	ND	0.2
Tokuthion (Protothiofos)	34643-46-4	ND	0.2
Trichloronate	327-98-0	ND	0.2
Surrogates		**Recovery (%)**	**QC Limits (%)**
2-Nitro-m-xylene	81-20-9	88	40 - 150

ND: Not detected at or above limit of detection
--: Information not available or not applicable
Results are reported on a wet weight basis, as received

Note: Detection limits increased due to limited sample volume.

Results of Analysis
for
Anametrix Inc.

Client Reference: 9301057
Clayton Project No. 93010.53

Sample Identification: 4
Lab Number: 9301053-04A
Sample Matrix/Media: SOIL
Extraction Method: EPA 3550
Analytical Method: EPA 8140

Date Sampled: 01/07/93
Date Received: 01/08/93
Date Extracted: 01/11/93
Date Analyzed: 01/15/93

Analyte	CAS #	Concentration (mg/kg)	Limit of Detection (mg/kg)
Organophosphorus Pesticides			
Azinphos methyl	86-50-0	ND	0.2
Bolstar (Sulprofos)	35400-43-2	ND	0.2
Chlorpyrifos	2921-88-2	ND	0.2
Coumaphos	56-72-4	ND	0.2
Demeton, O and S	8065-48-3	ND	0.2
Diazinon	334-41-5	ND	0.2
Dichlorvos	62-73-7	ND	0.2
Disulfoton	298-04-4	ND	0.2
Ethoprop	13194-48-4	ND	0.2
Fensulfothion	115-90-2	ND	0.2
Fenthion	55-38-9	ND	0.2
Merphos	150-50-5	ND	0.2
Mevinphos	7786-34-7	ND	0.2
Naled	300-76-5	ND	0.2
Parathion methyl	298-00-0	ND	0.2
Phorate	298-02-2	ND	0.2
Ronnel	299-84-3	ND	0.2
Stirophos (Tetrachlorovinphos)	22248-79-9	ND	0.2
Tokuthion (Protothiofos)	34643-46-4	ND	0.2
Trichloronate	327-98-0	ND	0.2

Surrogates		Recovery (%)	QC Limits (%)
2-Nitro-m-xylene	81-20-9	92	40 - 150

ND: Not detected at or above limit of detection
--: Information not available or not applicable
Results are reported on a wet weight basis, as received

Note: Detection limits increased due to limited sample volume.

Results of Analysis
for
Anametrix Inc.

Client Reference: 9301057
Clayton Project No. 93010.53

Sample Identification:	METHOD BLANK	Date Sampled:	--
Lab Number:	9301053-05A	Date Received:	--
Sample Matrix/Media:	SOIL	Date Extracted:	01/11/93
Extraction Method:	EPA 3550	Date Analyzed:	01/15/93
Analytical Method:	EPA 8140		

Analyte	CAS #	Concentration (mg/kg)	Limit of Detection (mg/kg)
Organophosphorus Pesticides			
Azinphos methyl	86-50-0	ND	0.05
Bolstar (Sulprofos)	35400-43-2	ND	0.05
Chlorpyrifos	2921-88-2	ND	0.05
Coumaphos	56-72-4	ND	0.05
Demeton, O and S	8065-48-3	ND	0.05
Diazinon	334-41-5	ND	0.05
Dichlorvos	62-73-7	ND	0.05
Disulfoton	298-04-4	ND	0.05
Ethoprop	13194-48-4	ND	0.05
Fensulfothion	115-90-2	ND	0.05
Fenthion	55-38-9	ND	0.05
Merphos	150-50-5	ND	0.05
Mevinphos	7786-34-7	ND	0.05
Naled	300-76-5	ND	0.05
Parathion methyl	298-00-0	ND	0.05
Phorate	298-02-2	ND	0.05
Ronnel	299-84-3	ND	0.05
Stirophos (Tetrachlorovinphos)	22248-79-9	ND	0.05
Tokuthion (Protothiofos)	34643-46-4	ND	0.05
Trichloronate	327-98-0	ND	0.05
Surrogates		**Recovery (%)**	**QC Limits (%)**
2-Nitro-m-xylene	81-20-9	98	40 - 150

ND: Not detected at or above limit of detection
--: Information not available or not applicable
Results are reported on a wet weight basis, as received

18:20 MB

9301057 (10/20)

Chain-of-Custody Record

No. 547

Date: 1/7/92

Page 1 of 1

Project No.: 1856.02

Samplers (Signatures):

	Date	Time	Sample Number	EPA Method 8010	EPA Method 8020	EPA Method 8240	EPA Method 8270	TPH as gasoline	TPH as diesel	TPH as BTEX		EPA 8080	EPA 8140										Cooled	Soil (S) or water (W)	Acidified	Number of containers
1	1/7/92	9:05	NS-1									X	X										X	S		1
2		8:40	NS-2									X	X										X	S		1
3		9:20	NS-3									X	X										X	S		1
4		9:15	NS-4									X	X										X	S		1

ANALYSES

REMARKS

Additional comments

LAB REF # 1892 J

Turnaround time: STANDARD

Results to: JEFF NELSON

Total No. of containers: 4

Relinquished by: Daniel DelGrande	Date: 1/7/92	Relinquished by: Benny S. Carrizosa	Date: 1/7/93	Relinquished by:	Date:	Method of shipment: LAB PICK UP	
Signature: DANIEL DELGRANDE		Signature: BENNY S. CARRIZOSA		Signature:		Laboratory comments and Log No.:	
Printed name: GEOMATRIX		Printed name: ANAMETRIX		Printed name:			
Company:		Company:		Company:			
Received by: Benny S. Carrizosa	Time: 2:28	Received by: Maria S. Barajas	Time: 1633	Received by:	Time:		
Signature: BENNY S. CARRIZOSA		Signature:		Signature:			
Printed name: ANAMETRIX		Printed name:		Printed name:			
Company:		Company: Anametrix		Company:			

Geomatrix Consultants
100 Pine St. 10th Floor
San Francisco, CA. 94111
(415) 434-9400

ANAMETRIX CHAIN-OF-CUSTODY RECORD

ANAMETRIX Workorder Number: 9301057

Send Report Attention of: Cristina Velasquez

Report Due: 1-22-93

Verbal Due:

Sample Number	Date	Time	Comp	Grab	Station Location	Number of Cntnrs	Type of Containers	Type of Analysis: TPH 8140	Condition of Samples	Initial
1	1/7/93			501		1	JAR	X		
2	↓			↓		1	↓	X		
3						1		X		
4						1		X		

Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Date/Time
[signature]	1/8/93 0955	[signature]	1-8-93 0955
[signature]	1-8-93 1035	Received by: (Signature)	Date/Time
Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Date/Time
		[signature]	1/8/93 10:35am

Remarks: subbed to Clayton

ANAMETRIX INC
LABORATORY SERVICES
1961 Concourse Drive, Suite E, San Jose, CA 95131
Phone: (408)432-8192 Fax: (408)432-8198

ANAMETRIX INC
Environmental & Analytical Chemistry

Part of INCHCAPE ENVIRONMENTAL

REPORT

MR. JEFF NELSON
GEOMATRIX CONSULTANTS INC.
100 PINE STREET, SUITE 1000
SAN FRANCISCO, CA 94111

Workorder # : 9302213
Date Received : 02/16/93
Project ID : 1886.02
Purchase Order: N/A

The following samples were received at Anametrix, Inc. for analysis :

ANAMETRIX ID	CLIENT SAMPLE ID
9302213- 1	B1-1
9302213- 2	B1-2
9302213- 3	B1-3
9302213- 4	B2-1
9302213- 5	B2-2
9302213- 6	B2-3
9302213- 7	B3-1
9302213- 8	B3-2
9302213- 9	B3-3
9302213-10	B4-1
9302213-11	B4-2
9302213-12	B4-3

This report consists of 8 pages not including the cover letter, and is organized in sections according to the specific Anametrix laboratory group or section which performed the analysis(es) and generated the data. The Report Summary that precedes each section will help you determine which Anametrix group is responsible for those test results, and will bear the signatures of the department supervisor and the chemist who have reviewed the analytical data. Please refer all questions to the department supervisor who signed the form.

Anametrix is certified by the California Department of Health Services (DHS) to perform environmental testing under Certificate Number 1234. A detailed list of the approved fields of testing can be obtained by calling our office, or the DHS Environmental Laboratory Accreditation Program at (415)540-2800.

If you have any further questions or comments on this report, please give us a call as soon as possible. Thank you for using Anametrix.

Sarah Schoen, Ph.D.
Laboratory Director

02-25-93
Date

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

MR. JEFF NELSON
GEOMATRIX CONSULTANTS INC.
100 PINE STREET, SUITE 1000
SAN FRANCISCO, CA 94111

Workorder # : 9302213
Date Received : 02/16/93
Project ID : 1886.02
Purchase Order: N/A
Department : GC
Sub-Department: PEST

QA/QC SUMMARY :

- No QA/QC problems encountered for samples.

Department Supervisor 2/24/93 Date

Chemist 2/24/93 Date

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

Project ID	: 1886.02	Anametrix I.D.	: 9302213-01
Sample ID	: B1-1	Elec. File I.D.	: EPF21301
Matrix	: SOIL	Analyst	:
Date Sampled	: 02/16/93	Supervisor	: SM
Date Extracted	: 02/18/93	Weight ext.(g)	: 30
Date Analyzed	: 02/22/93	pH	: N/A
Instrument ID	: HP22	Final Vol. (ml)	: 10
Dilution	: NONE	Inj. Vol. (ul)	: 1

CAS #	Compound Name	Reporting Limit (ug/Kg)	Amount Found (ug/Kg)
319-84-6	alpha-BHC	8.0	ND
58-89-9	gamma-BHC	8.0	ND
76-44-8	Heptachlor	8.0	ND
309-00-2	Aldrin	8.0	ND
319-85-7	beta-BHC	8.0	ND
319-86-8	delta-BHC	8.0	ND
1024-57-3	Heptachlor Epoxide	8.0	ND
959-98-8	Endosulfan I	8.0	ND
72-55-9	4,4'-DDE	16.0	ND
60-57-1	Dieldrin	16.0	ND
72-20-8	Endrin	16.0	ND
33212-65-9	Endosulfan II	16.0	ND
72-54-8	4,4'-DDD	16.0	ND
50-29-3	4,4'-DDT	16.0	ND
7421-93-4	Endrin Aldehyde	16.0	ND
1031-07-8	Endosulfan Sulfate	16.0	ND
72-43-5	Methoxychlor	80.0	ND
53494-70-5	Endrin Ketone	16.0	ND
12789-03-6	Tech. Chlordane	80.0	ND
8001-35-2	Toxaphene	160.0	ND
12674-11-2	Aroclor 1016	80.0	ND
1104-28-2	Aroclor 1221	80.0	ND
11141-16-5	Aroclor 1232	80.0	ND
53469-21-9	Aroclor 1242	80.0	ND
12672-29-6	Aroclor 1248	80.0	ND
11097-69-1	Aroclor 1254	160.0	ND
11096-82-5	Aroclor 1260	160.0	ND
	SURROGATE	% Recovery	Rec Limits *
2051-24-3	Decachlorobiphenyl	75%	30-130%

ND : Not detected at or above the practical quantitation limit for the method.
* Anametrix advisory limits, based on the OLM01.8 (CLP) contract.

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

Project ID	: 1886.02	Anametrix I.D.	: 9302213-04
Sample ID	: B2-1	Elec. File I.D.	: EPF21304
Matrix	: SOIL	Analyst	:
Date Sampled	: 02/16/93	Supervisor	:
Date Extracted	: 02/18/93	Weight ext.(g)	: 30
Date Analyzed	: 02/22/93	pH	: N/A
Instrument ID	: HP22	Final Vol. (ml)	: 10
Dilution	: NONE	Inj. Vol. (ul)	: 1

CAS #	Compound Name	Reporting Limit (ug/Kg)	Amount Found (ug/Kg)
319-84-6	alpha-BHC	8.0	ND
58-89-9	gamma-BHC	8.0	ND
76-44-8	Heptachlor	8.0	ND
309-00-2	Aldrin	8.0	ND
319-85-7	beta-BHC	8.0	ND
319-86-8	delta-BHC	8.0	ND
1024-57-3	Heptachlor Epoxide	8.0	ND
959-98-8	Endosulfan I	8.0	ND
72-55-9	4,4'-DDE	16.0	ND
60-57-1	Dieldrin	16.0	20
72-20-8	Endrin	16.0	17
33212-65-9	Endosulfan II	16.0	ND
72-54-8	4,4'-DDD	16.0	ND
50-29-3	4,4'-DDT	16.0	ND
7421-93-4	Endrin Aldehyde	16.0	ND
1031-07-8	Endosulfan Sulfate	16.0	ND
72-43-5	Methoxychlor	80.0	ND
53494-70-5	Endrin Ketone	16.0	ND
12789-03-6	Tech. Chlordane	80.0	ND
8001-35-2	Toxaphene	160.0	ND
12674-11-2	Aroclor 1016	80.0	ND
1104-28-2	Aroclor 1221	80.0	ND
11141-16-5	Aroclor 1232	80.0	ND
53469-21-9	Aroclor 1242	80.0	ND
12672-29-6	Aroclor 1248	80.0	ND
11097-69-1	Aroclor 1254	160.0	ND
11096-82-5	Aroclor 1260	160.0	ND
	SURROGATE	% Recovery	Rec Limits *
2051-24-3	Decachlorobiphenyl	75%	30-130%

ND : Not detected at or above the practical quantitation limit for the method.
* Anametrix advisory limits, based on the OLM01.8 (CLP) contract.

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

Project ID	: 1886.02	Anametrix I.D.	: 9302213-07
Sample ID	: B3-1	Elec. File I.D.	: EPF13007
Matrix	: SOIL	Analyst	: DL
Date Sampled	: 02/16/93	Supervisor	: SM
Date Extracted	: 02/18/93	Weight ext.(g)	: 30
Date Analyzed	: 02/22/93	pH	: N/A
Instrument ID	: HP22	Final Vol. (ml)	: 10
Dilution	: NONE	Inj. Vol. (ul)	: 1

CAS #	Compound Name	Reporting Limit (ug/Kg)	Amount Found (ug/Kg)
319-84-6	alpha-BHC	8.0	ND
58-89-9	gamma-BHC	8.0	ND
76-44-8	Heptachlor	8.0	ND
309-00-2	Aldrin	8.0	ND
319-85-7	beta-BHC	8.0	ND
319-86-8	delta-BHC	8.0	ND
1024-57-3	Heptachlor Epoxide	8.0	ND
959-98-8	Endosulfan I	8.0	ND
72-55-9	4,4'-DDE	16.0	ND
60-57-1	Dieldrin	16.0	ND
72-20-8	Endrin	16.0	ND
33212-65-9	Endosulfan II	16.0	ND
72-54-8	4,4'-DDD	16.0	ND
50-29-3	4,4'-DDT	16.0	ND
7421-93-4	Endrin Aldehyde	16.0	ND
1031-07-8	Endosulfan Sulfate	16.0	ND
72-43-5	Methoxychlor	80.0	ND
53494-70-5	Endrin Ketone	16.0	ND
12789-03-6	Tech. Chlordane	80.0	ND
8001-35-2	Toxaphene	160.0	ND
12674-11-2	Aroclor 1016	80.0	ND
1104-28-2	Aroclor 1221	80.0	ND
11141-16-5	Aroclor 1232	80.0	ND
53469-21-9	Aroclor 1242	80.0	ND
12672-29-6	Aroclor 1248	80.0	ND
11097-69-1	Aroclor 1254	160.0	ND
11096-82-5	Aroclor 1260	160.0	ND
	SURROGATE	% Recovery	Rec Limits *
2051-24-3	Decachlorobiphenyl	82%	30-130%

ND : Not detected at or above the practical quantitation limit for the method.
* Anametrix advisory limits, based on the OLM01.8 (CLP) contract.

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

Project ID	: 1886.02	Anametrix I.D.	: 9302213-10
Sample ID	: B4-1	Elec. File I.D.	: EPF21310
Matrix	: SOIL	Analyst	:
Date Sampled	: 02/16/93	Supervisor	:
Date Extracted	: 02/18/93	Weight ext.(g)	: 30
Date Analyzed	: 02/22/93	pH	: N/A
Instrument ID	: HP22	Final Vol. (ml)	: 10
Dilution	: NONE	Inj. Vol. (ul)	: 1

CAS #	Compound Name	Reporting Limit (ug/Kg)	Amount Found (ug/Kg)
319-84-6	alpha-BHC	8.0	ND
58-89-9	gamma-BHC	8.0	ND
76-44-8	Heptachlor	8.0	ND
309-00-2	Aldrin	8.0	ND
319-85-7	beta-BHC	8.0	ND
319-86-8	delta-BHC	8.0	ND
1024-57-3	Heptachlor Epoxide	8.0	ND
959-98-8	Endosulfan I	8.0	ND
72-55-9	4,4'-DDE	16.0	ND
60-57-1	Dieldrin	16.0	ND
72-20-8	Endrin	16.0	ND
33212-65-9	Endosulfan II	16.0	24
72-54-8	4,4'-DDD	16.0	ND
50-29-3	4,4'-DDT	16.0	ND
7421-93-4	Endrin Aldehyde	16.0	ND
1031-07-8	Endosulfan Sulfate	16.0	ND
72-43-5	Methoxychlor	80.0	ND
53494-70-5	Endrin Ketone	16.0	ND
12789-03-6	Tech. Chlordane	80.0	ND
8001-35-2	Toxaphene	160.0	ND
12674-11-2	Aroclor 1016	80.0	ND
1104-28-2	Aroclor 1221	80.0	ND
11141-16-5	Aroclor 1232	80.0	ND
53469-21-9	Aroclor 1242	80.0	ND
12672-29-6	Aroclor 1248	80.0	ND
11097-69-1	Aroclor 1254	160.0	ND
11096-82-5	Aroclor 1260	160.0	ND
	SURROGATE	% Recovery	Rec Limits *
2051-24-3	Decachlorobiphenyl	83%	30-130%

ND : Not detected at or above the practical quantitation limit for the method.
* Anametrix advisory limits, based on the OLM01.8 (CLP) contract.

MATRIX SPIKE RECOVERY FORM --- EPA METHOD 8080
ANAMETRIX, INC. (408)432-8192

Project ID	: 1886.02	Anametrix I.D.	: 9302213-01
Sample ID	: B1-1	Elec. File I.D.	: EMF21301
Matrix	: SOIL	Analyst	: DL
Date Sampled	: 02/16/93	Supervisor	: SDR
Date Extracted	: 02/18/93	Weight ext.(g)	: 30
Date Analyzed	: 02/22/93	pH	: N/A
Instrument ID	: HP22	Final Vol. (ml)	: 10
Dilution	: NONE	Inj. Vol. (ul)	: 1

COMPOUND	SPIKE ADDED (ug/Kg)	MS CONCENTRATION (ug/Kg)	MSD CONCENTRATION (ug/Kg)
gamma-BHC	16.7	12.9	14.2
Heptachlor	16.7	12.5	13.7
Aldrin	16.7	12.5	13.9
Dieldrin	33.3	30.6	33.0
Endrin	33.3	31.3	33.6
4,4'-DDT	33.3	33.0	37.6

COMPOUND	MS % RECOVERY	MSD % RECOVERY	% REC LIMITS
gamma-BHC	77	85	41-123
Heptachlor	75	82	41-124
Aldrin	75	83	37-123
Dieldrin	92	99	44-112
Endrin	94	101	41-117
4,4'-DDT	99	113	35-134

COMPOUND	% RPD	% RPD LIMITS
gamma-BHC	10	50
Heptachlor	9	31
Aldrin	10	43
Dieldrin	7	38
Endrin	7	45
4,4'-DDT	13	50

Surrogate	MS REC	MSD REC	REC LIMITS**
DCB	84%	77%	30-130%

* Value is outside of Anametrix QC limits
** Anametrix advisory limits, based on the OLM01.8 (CLP) contract.

LABORATORY CONTROL SPIKE RECOVERY FORM --- EPA METHOD 8080
ANAMETRIX, INC. (408)432-8192

Project ID	: N/A	Anametrix I.D.	: PSLCS021893B
Sample ID	: LCS	Elec. File I.D.	: MF2104P1
Matrix	: SOIL	Analyst	:
Date Sampled	: N/A	Supervisor	: SPR
Date Extracted	: 02/18/93	Weight ext.(g)	: 30
Date Analyzed	: 02/22/93	pH	: N/A
Instrument ID	: HP22	Final Vol. (ml)	: 10
Dilution	: NONE	Inj. Vol. (ul)	: 1

COMPOUND	SPIKE ADDED (ug/L)	LCS CONCENTRATION (ug/L)	% REC
gamma-BHC	16.7	12.7	76%
Heptachlor	16.7	12.4	74%
Aldrin	16.7	12.7	76%
Dieldrin	33.3	28.0	84%
Endrin	33.3	28.0	84%
4,4'-DDT	33.3	29.3	88%

COMPOUND	% REC LIMITS
gamma-BHC	41-123
Heptachlor	41-124
Aldrin	37-123
Dieldrin	44-112
Endrin	41-117
4,4'-DDT	35-134

Surrogate	LCS REC	REC LIMITS**
DCB	87%	30-130%

* Value is outside of Anametrix QC limits
** Anametrix advisory limits, based on the OLM01.8 (CLP) contract.

ANAMETRIX INC
Environmental & Analytical Chemistry

Part of INCHCAPE ENVIRONMENTAL

REPORT

MR. JEFF NELSON
GEOMATRIX CONSULTANTS INC.
100 PINE STREET, SUITE 1000
SAN FRANCISCO, CA 94111

Workorder # : 9302214
Date Received : 02/16/93
Project ID : 1886.02
Purchase Order: N/A

The following samples were received at Anametrix, Inc. for analysis :

ANAMETRIX ID	CLIENT SAMPLE ID
9302214- 1	B5-1
9302214- 2	B5-2
9302214- 3	B5-3
9302214- 4	B6-1
9302214- 5	B6-2
9302214- 6	B6-3
9302214- 7	B7-1
9302214- 8	B7-2
9302214- 9	B7-3
9302214-10	B8-1
9302214-11	B8-2
9302214-12	B8-3

This report consists of 8 pages not including the cover letter, and is organized in sections according to the specific Anametrix laboratory group or section which performed the analysis(es) and generated the data. The Report Summary that precedes each section will help you determine which Anametrix group is responsible for those test results, and will bear the signatures of the department supervisor and the chemist who have reviewed the analytical data. Please refer all questions to the department supervisor who signed the form.

Anametrix is certified by the California Department of Health Services (DHS) to perform environmental testing under Certificate Number 1234. A detailed list of the approved fields of testing can be obtained by calling our office, or the DHS Environmental Laboratory Accreditation Program at (415)540-2800.

If you have any further questions or comments on this report, please give us a call as soon as possible. Thank you for using Anametrix.

Sarah Schoen

Sarah Schoen, Ph.D.
Laboratory Director

02-25-93
Date

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

MR. JEFF NELSON
GEOMATRIX CONSULTANTS INC.
100 PINE STREET, SUITE 1000
SAN FRANCISCO, CA 94111

Workorder # : 9302214
Date Received : 02/16/93
Project ID : 1886.02
Purchase Order: N/A
Department : GC
Sub-Department: PEST

SAMPLE INFORMATION:

ANAMETRIX SAMPLE ID	CLIENT SAMPLE ID	MATRIX	DATE SAMPLED	METHOD
9302214- 1	B5-1	SOIL	02/16/93	8080
9302214- 4	B6-1	SOIL	02/16/93	8080
9302214- 7	B7-1	SOIL	02/16/93	8080
9302214-10	B8-1	SOIL	02/16/93	8080

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

MR. JEFF NELSON
GEOMATRIX CONSULTANTS INC.
100 PINE STREET, SUITE 1000
SAN FRANCISCO, CA 94111

Workorder # : 9302214
Date Received : 02/16/93
Project ID : 1886.02
Purchase Order: N/A
Department : GC
Sub-Department: pest

QA/QC SUMMARY :

- No QA/QC problems encountered for samples.

Department Supervisor — Date: 2/25/93

Chemist — Date: 2/25/93

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

Project ID	: 1886.02	Anametrix I.D.	: 9302214-01
Sample ID	: B5-1	Elec. File I.D.	: EPF21401
Matrix	: SOIL	Analyst	:
Date Sampled	: 02/16/93	Supervisor	:
Date Extracted	: 02/17/93	Weight ext.(g)	: 30
Date Analyzed	: 02/22/93	pH	: N/A
Instrument ID	: HP22	Final Vol. (ml)	: 10
Dilution	: NONE	Inj. Vol. (ul)	: 1

CAS #	Compound Name	Reporting Limit (ug/Kg)	Amount Found (ug/Kg)
319-84-6	alpha-BHC	8.0	ND
58-89-9	gamma-BHC	8.0	ND
76-44-8	Heptachlor	8.0	ND
309-00-2	Aldrin	8.0	ND
319-85-7	beta-BHC	8.0	ND
319-86-8	delta-BHC	8.0	ND
1024-57-3	Heptachlor Epoxide	8.0	ND
959-98-8	Endosulfan I	8.0	22
72-55-9	4,4'-DDE	16.0	ND
60-57-1	Dieldrin	16.0	ND
72-20-8	Endrin	16.0	ND
33212-65-9	Endosulfan II	16.0	72
72-54-8	4,4'-DDD	16.0	ND
50-29-3	4,4'-DDT	16.0	ND
7421-93-4	Endrin Aldehyde	16.0	ND
1031-07-8	Endosulfan Sulfate	16.0	ND
72-43-5	Methoxychlor	80.0	ND
53494-70-5	Endrin Ketone	16.0	ND
12789-03-6	Tech. Chlordane	80.0	ND
8001-35-2	Toxaphene	160.0	ND
12674-11-2	Aroclor 1016	80.0	ND
1104-28-2	Aroclor 1221	80.0	ND
11141-16-5	Aroclor 1232	80.0	ND
53469-21-9	Aroclor 1242	80.0	ND
12672-29-6	Aroclor 1248	80.0	ND
11097-69-1	Aroclor 1254	160.0	ND
11096-82-5	Aroclor 1260	160.0	ND
	SURROGATE	% Recovery	Rec Limits *
2051-24-3	Decachlorobiphenyl	64%	30-130%

ND : Not detected at or above the practical quantitation limit for the method.
* Anametrix advisory limits, based on the OLM01.8 (CLP) contract.

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

Project ID	: 1886.02	Anametrix I.D.	: 9302214-04
Sample ID	: B6-1	Elec. File I.D.	: EPF21404
Matrix	: SOIL	Analyst	:
Date Sampled	: 02/16/93	Supervisor	: SR
Date Extracted	: 02/17/93	Weight ext.(g)	: 30
Date Analyzed	: 02/22/93	pH	: N/A
Instrument ID	: HP22	Final Vol. (ml)	: 10
Dilution	: NONE	Inj. Vol. (ul)	: 1

CAS #	Compound Name	Reporting Limit (ug/Kg)	Amount Found (ug/Kg)
319-84-6	alpha-BHC	8.0	ND
58-89-9	gamma-BHC	8.0	ND
76-44-8	Heptachlor	8.0	ND
309-00-2	Aldrin	8.0	ND
319-85-7	beta-BHC	8.0	ND
319-86-8	delta-BHC	8.0	ND
1024-57-3	Heptachlor Epoxide	8.0	ND
959-98-8	Endosulfan I	8.0	ND
72-55-9	4,4'-DDE	16.0	ND
60-57-1	Dieldrin	16.0	ND
72-20-8	Endrin	16.0	ND
33212-65-9	Endosulfan II	16.0	ND
72-54-8	4,4'-DDD	16.0	ND
50-29-3	4,4'-DDT	16.0	ND
7421-93-4	Endrin Aldehyde	16.0	ND
1031-07-8	Endosulfan Sulfate	16.0	ND
72-43-5	Methoxychlor	80.0	ND
53494-70-5	Endrin Ketone	16.0	ND
12789-03-6	Tech. Chlordane	80.0	ND
8001-35-2	Toxaphene	160.0	ND
12674-11-2	Aroclor 1016	80.0	ND
1104-28-2	Aroclor 1221	80.0	ND
11141-16-5	Aroclor 1232	80.0	ND
53469-21-9	Aroclor 1242	80.0	ND
12672-29-6	Aroclor 1248	80.0	ND
11097-69-1	Aroclor 1254	160.0	ND
11096-82-5	Aroclor 1260	160.0	ND
	SURROGATE	% Recovery	Rec Limits *
2051-24-3	Decachlorobiphenyl	64%	30-130%

ND : Not detected at or above the practical quantitation limit for the method.
* Anametrix advisory limits, based on the OLM01.8 (CLP) contract.

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

Project ID	: 1886.02	Anametrix I.D.	: 9302214-07
Sample ID	: B7-1	Elec. File I.D.	: EPF21407
Matrix	: SOIL	Analyst	:
Date Sampled	: 02/16/93	Supervisor	:
Date Extracted	: 02/17/93	Weight ext.(g)	: 30
Date Analyzed	: 02/22/93	pH	: N/A
Instrument ID	: HP22	Final Vol. (ml)	: 10
Dilution	: NONE	Inj. Vol. (ul)	: 1

CAS #	Compound Name	Reporting Limit (ug/Kg)	Amount Found (ug/Kg)
319-84-6	alpha-BHC	8.0	ND
58-89-9	gamma-BHC	8.0	ND
76-44-8	Heptachlor	8.0	ND
309-00-2	Aldrin	8.0	ND
319-85-7	beta-BHC	8.0	ND
319-86-8	delta-BHC	8.0	ND
1024-57-3	Heptachlor Epoxide	8.0	ND
959-98-8	Endosulfan I	8.0	ND
72-55-9	4,4'-DDE	16.0	ND
60-57-1	Dieldrin	16.0	ND
72-20-8	Endrin	16.0	ND
33212-65-9	Endosulfan II	16.0	ND
72-54-8	4,4'-DDD	16.0	ND
50-29-3	4,4'-DDT	16.0	ND
7421-93-4	Endrin Aldehyde	16.0	ND
1031-07-8	Endosulfan Sulfate	16.0	ND
72-43-5	Methoxychlor	80.0	ND
53494-70-5	Endrin Ketone	16.0	ND
12789-03-6	Tech. Chlordane	80.0	ND
8001-35-2	Toxaphene	160.0	ND
12674-11-2	Aroclor 1016	80.0	ND
1104-28-2	Aroclor 1221	80.0	ND
11141-16-5	Aroclor 1232	80.0	ND
53469-21-9	Aroclor 1242	80.0	ND
12672-29-6	Aroclor 1248	80.0	ND
11097-69-1	Aroclor 1254	160.0	ND
11096-82-5	Aroclor 1260	160.0	ND
	SURROGATE	% Recovery	Rec Limits *
2051-24-3	Decachlorobiphenyl	70%	30-130%

ND : Not detected at or above the practical quantitation limit for the method.
* Anametrix advisory limits, based on the OLM01.8 (CLP) contract.

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

Project ID	: 1886.02	Anametrix I.D.	: 9302214-10
Sample ID	: B8-1	Elec. File I.D.	: EPF21410
Matrix	: SOIL	Analyst	:
Date Sampled	: 02/16/93	Supervisor	:
Date Extracted	: 02/17/93	Weight ext.(g)	: 30
Date Analyzed	: 02/22/93	pH	: N/A
Instrument ID	: HP22	Final Vol. (ml)	: 10
Dilution	: NONE	Inj. Vol. (ul)	: 1

CAS #	Compound Name	Reporting Limit (ug/Kg)	Amount Found (ug/Kg)
319-84-6	alpha-BHC	8.0	ND
58-89-9	gamma-BHC	8.0	ND
76-44-8	Heptachlor	8.0	ND
309-00-2	Aldrin	8.0	ND
319-85-7	beta-BHC	8.0	ND
319-86-8	delta-BHC	8.0	ND
1024-57-3	Heptachlor Epoxide	8.0	ND
959-98-8	Endosulfan I	8.0	ND
72-55-9	4,4'-DDE	16.0	ND
60-57-1	Dieldrin	16.0	ND
72-20-8	Endrin	16.0	ND
33212-65-9	Endosulfan II	16.0	ND
72-54-8	4,4'-DDD	16.0	ND
50-29-3	4,4'-DDT	16.0	ND
7421-93-4	Endrin Aldehyde	16.0	ND
1031-07-8	Endosulfan Sulfate	16.0	ND
72-43-5	Methoxychlor	80.0	ND
53494-70-5	Endrin Ketone	16.0	ND
12789-03-6	Tech. Chlordane	80.0	ND
8001-35-2	Toxaphene	160.0	ND
12674-11-2	Aroclor 1016	80.0	ND
1104-28-2	Aroclor 1221	80.0	ND
11141-16-5	Aroclor 1232	80.0	ND
53469-21-9	Aroclor 1242	80.0	ND
12672-29-6	Aroclor 1248	80.0	ND
11097-69-1	Aroclor 1254	160.0	ND
11096-82-5	Aroclor 1260	160.0	ND
	SURROGATE	% Recovery	Rec Limits *
2051-24-3	Decachlorobiphenyl	71%	30-130%

ND : Not detected at or above the practical quantitation limit for the method.
* Anametrix advisory limits, based on the OLM01.8 (CLP) contract.

MATRIX SPIKE RECOVERY FORM --- EPA METHOD 8080
ANAMETRIX, INC. (408)432-8192

Project ID	: 1886.02	Anametrix I.D.	: 9302214-01
Sample ID	: B5-1	Elec. File I.D.	: EMF21401
Matrix	: SOIL	Analyst	:
Date Sampled	: 02/16/93	Supervisor	:
Date Extracted	: 02/18/93	Weight ext.(g)	: 30
Date Analyzed	: 02/22/93	pH	: N/A
Instrument ID	: HP22	Final Vol. (ml)	: 10
Dilution	: NONE	Inj. Vol. (ul)	: 1

COMPOUND	SPIKE ADDED (ug/Kg)	MS CONCENTRATION (ug/Kg)	MSD CONCENTRATION (ug/Kg)
gamma-BHC	16.7	12.0	15.4
Heptachlor	16.7	11.4	13.9
Aldrin	16.7	11.4	13.2
Dieldrin	33.3	29.3	32.0
Endrin	33.3	38.6	45.3
4,4'-DDT	33.3	32.6	35.3

COMPOUND	MS % RECOVERY	MSD % RECOVERY	% REC LIMITS
gamma-BHC	72	92	41-123
Heptachlor	68	83	41-124
Aldrin	68	79	37-123
Dieldrin	88	96	44-112
Endrin	116	136	41-117
4,4'-DDT	98	106	35-134

COMPOUND	% RPD	% RPD LIMITS
gamma-BHC	25	50
Heptachlor	20	31
Aldrin	15	43
Dieldrin	9	38
Endrin	16	45
4,4'-DDT	8	50

Surrogate	MS REC	MSD REC	REC LIMITS**
DCB	84%	77%	30-130%

* Value is outside of Anametrix QC limits
** Anametrix advisory limits, based on the OLM01.8 (CLP) contract.

LABORATORY CONTROL SPIKE RECOVERY FORM --- EPA METHOD 8080
ANAMETRIX, INC. (408)432-8192

Project ID	: N/A	Anametrix I.D.	: PSLCS021893B
Sample ID	: LCS	Elec. File I.D.	: MF2104P1
Matrix	: SOIL	Analyst	:
Date Sampled	: N/A	Supervisor	:
Date Extracted	: 02/18/93	Weight ext.(g)	: 30
Date Analyzed	: 02/22/93	pH	: N/A
Instrument ID	: HP22	Final Vol. (ml)	: 10
Dilution	: NONE	Inj. Vol. (ul)	: 1

COMPOUND	SPIKE ADDED (ug/L)	LCS CONCENTRATION (ug/L)	% REC
gamma-BHC	16.7	12.7	76%
Heptachlor	16.7	12.4	74%
Aldrin	16.7	12.7	76%
Dieldrin	33.3	28.0	84%
Endrin	33.3	28.0	84%
4,4'-DDT	33.3	29.3	88%

COMPOUND	% REC LIMITS
gamma-BHC	41-123
Heptachlor	41-124
Aldrin	37-123
Dieldrin	44-112
Endrin	41-117
4,4'-DDT	35-134

Surrogate	LCS REC	REC LIMITS**
DCB	87%	30-130%

* Value is outside of Anametrix QC limits
** Anametrix advisory limits, based on the OLM01.8 (CLP) contract.

9302213 (10/37)

13:50 [illegible]

Chain-of-Custody Record

№ 2628 | Date: 02/16/93 | Page 1 of 2

Project No.: 1886.02

Samplers (Signatures): James M Carolan

	Date	Time	Sample Number	EPA Method 8010	EPA Method 8020	EPA Method 8240	EPA Method 8270	TPH as gasoline	TPH as diesel	TPH as BTEX	method 8080	HOLD	Cooled	Soil (S) or water (W)	Acidified	Number of containers
1	02/16	08:45	31-1								X		X	S		1
2		09:00	B1-2									X	X	S		1
3		09:10	B1-3									X	X	S		1
4		09:20	B2-1								X		X	S		1
5		09:30	B2-2									X	X	S		1
6		09:40	B2-3									X	X	S		1
7		09:50	B3-1								X		X	S		1
8		10:00	B3-2									X	X	S		1
9		10:10	B3-3									X	X	S		1
10		11:20	B4-1								X		X	S		1
11		11:25	B4-2									X	X	S		1
12		11:35	B4-3									X	X	S		1

REMARKS — Additional comments:

Homogenize Samples before extraction.

~~Perform extraction on all samples designated as HOLD. Do not analyze~~

Extract all 'hold' samples for possible analyses in the future, as per J. Nelson. JM 2-17-93

Turnaround time: ~~Standard~~ 10 work days

Results to: Jeff Nelson

Total No. of containers: 12

Relinquished by:	Date:	Relinquished by:	Date:	Relinquished by:	Date:	Method of shipment:
Signature: James M Carolan	02/16/93	Signature: Benny S. Carrizosa	2/16/93	Signature:		Lab Pickup
Printed name: Jim Carolan		Printed name: ANAMETRIX		Printed name:		Laboratory comments and Log No.:
Company: Geomatrix		Company:		Company:		
Received by:	**Time:**	**Received by:**	**Time:**	**Received by:**	**Time:**	
Signature: Benny S. Carrizosa	14:45	Signature: Maria Barajas	1600	Signature:		
Printed name: ANAMETRIX		Printed name:		Printed name:		
Company:		Company: Anametrix		Company:		

Geomatrix Consultants
100 Pine St. 10th Floor
San Francisco, CA 94111
(415) 434-9400

18:50 (10/37) 9302214

Chain-of-Custody Record

No 2629 | Date: 02/16/93 | Page 2 of 2

Project No.: 1886.02

Samplers (Signatures): James M Carolan

	Date	Time	Sample Number	EPA Method 8010	EPA Method 8020	EPA Method 8240	EPA Method 8270	TPH as gasoline	TPH as diesel	TPH as BTEX	method 8080	HOLD	Cooled	Soil (S) or water (W)	Acidified	Number of containers
1	02/10	10:55	B5 - 1								X		X	S		1
2		11:00	B5 - 2									X	X	S		1
3		11:10	B5 - 3									X	X	S		1
4		10:20	B6 - 1								X		X	S		1
5		10:30	B6 - 2									X	X	S		1
6		10:40	B6 - 3									X	X	S		1
7		11:45	B7 - 1								X		X	S		1
8		11:55	B7 - 2									X	X	S		1
9		12:00	B7 - 3									X	X	S		1
10		12:15	B8 - 1								X		X	S		1
11		12:20	B8 - 2									X	X	S		1
12		12:25	B8 - 3									X	X	S		1

REMARKS — Additional comments:

Homogenize samples before extraction.

~~Perform extraction on all samples designated as HOLD. Do not analyze~~

Extract all "hold" samples for "possible" analyses in the future, as per J. Nelson. JM 2-17-93

Turnaround time: ~~Standard~~ 10 gm 7 work days

Results to: Jeff Nelson

Total No. of containers: 12

Relinquished by:	Date:	Relinquished by:	Date:	Relinquished by:	Date:
Signature: James M Carolan	02/16/93	Signature: Benny S. Carrizosa	2/16/93	Signature:	
Printed name: Jim Carolan		Printed name: BENNY S. CARRIZOSA / ANAMETRIX		Printed name:	
Company: Geomatrix		Company:		Company:	
Received by:	**Time:**	**Received by:**	**Time:**	**Received by:**	**Time:**
Signature: Benny S. Carrizosa	14:45	Signature: Maria Barajas	1600	Signature:	
Printed name: BENNY S. CARRIZOSA / ANAMETRIX		Printed name:		Printed name:	
Company:		Company: Anametrix		Company:	

Method of shipment: Lab Pickup

Laboratory comments and Log No.:

Geomatrix Consultants
100 Pine St. 10th Floor
San Francisco, CA. 94111
(415) 434-9400

ANAMETRIX INC
Environmental & Analytical Chemistry

Part of INCHCAPE ENVIRONMENTAL

REPORT

MR. JEFF NELSON
GEOMATRIX CONSULTANTS INC.
100 PINE STREET, SUITE 1000
SAN FRANCISCO, CA 94111

Workorder # : 9304070
Date Received : 04/07/93
Project ID : 1886.02
Purchase Order: N/A

The following samples were received at Anametrix, Inc. for analysis :

ANAMETRIX ID	CLIENT SAMPLE ID
9304070- 1	B9-1
9304070- 2	B10-1
9304070- 3	B11-1
9304070- 4	B12-1
9304070- 5	B13-1

This report consists of 10 pages not including the cover letter, and is organized in sections according to the specific Anametrix laboratory group or section which performed the analysis(es) and generated the data. The Report Summary that precedes each section will help you determine which Anametrix group is responsible for those test results, and will bear the signatures of the department supervisor and the chemist who have reviewed the analytical data. Please refer all questions to the department supervisor who signed the form.

Anametrix is certified by the California Department of Health Services (DHS) to perform environmental testing under Certificate Number 1234. A detailed list of the approved fields of testing can be obtained by calling our office, or the DHS Environmental Laboratory Accreditation Program at (415)540-2800.

If you have any further questions or comments on this report, please give us a call as soon as possible. Thank you for using Anametrix.

Sarah Schoen, Ph.D.
Laboratory Director

4-19-93
Date

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

MR. JEFF NELSON
GEOMATRIX CONSULTANTS INC.
100 PINE STREET, SUITE 1000
SAN FRANCISCO, CA 94111

Workorder # : 9304070
Date Received : 04/07/93
Project ID : 1886.02
Purchase Order: N/A
Department : GC
Sub-Department: PEST

SAMPLE INFORMATION:

ANAMETRIX SAMPLE ID	CLIENT SAMPLE ID	MATRIX	DATE SAMPLED	METHOD
9304070- 1	B9-1	SOIL	04/07/93	8080
9304070- 2	B10-1	SOIL	04/07/93	8080
9304070- 3	B11-1	SOIL	04/07/93	8080
9304070- 4	B12-1	SOIL	04/07/93	8080
9304070- 5	B13-1	SOIL	04/07/93	8080

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

MR. JEFF NELSON
GEOMATRIX CONSULTANTS INC.
100 PINE STREET, SUITE 1000
SAN FRANCISCO, CA 94111

Workorder # : 9304070
Date Received : 04/07/93
Project ID : 1886.02
Purchase Order: N/A
Department : GC
Sub-Department: PEST

QA/QC SUMMARY :

- No QA/QC problems encountered for samples.

Department Supervisor 4/16/93 Date

Chemist M. Hosseinian 4/16/93 Date

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

Project ID	: 1886.02	Anametrix I.D.	: 9304070-01
Sample ID	: B9-1	Elec. File I.D.	: ERA07001
Matrix	: SOIL	Analyst	:
Date Sampled	: 04/07/93	Supervisor	:
Date Extracted	: 04/13/93	Weight ext.(g)	: 30
Date Analyzed	: 04/16/93	pH	: N/A
Instrument ID	: HP22	Final Vol. (ml)	: 10
Dilution	: 5	Inj. Vol. (ul)	: 1

CAS #	Compound Name	Reporting Limit (ug/Kg)	Amount Found (ug/Kg)
319-84-6	alpha-BHC	8.0	ND
58-89-9	gamma-BHC	8.0	ND
76-44-8	Heptachlor	8.0	ND
309-00-2	Aldrin	8.0	ND
319-85-7	beta-BHC	8.0	ND
319-86-8	delta-BHC	8.0	ND
1024-57-3	Heptachlor Epoxide	8.0	ND
959-98-8	Endosulfan I	8.0	ND
72-55-9	4,4'-DDE	16.0	ND
60-57-1	Dieldrin	16.0	ND
72-20-8	Endrin	16.0	ND
33212-65-9	Endosulfan II	16.0	54
72-54-8	4,4'-DDD	16.0	ND
50-29-3	4,4'-DDT	16.0	ND
7421-93-4	Endrin Aldehyde	16.0	ND
1031-07-8	Endosulfan Sulfate	16.0	ND
72-43-5	Methoxychlor	80.0	ND
53494-70-5	Endrin Ketone	16.0	ND
12789-03-6	Tech. Chlordane	80.0	ND
8001-35-2	Toxaphene	160.0	ND
12674-11-2	Aroclor 1016	80.0	ND
1104-28-2	Aroclor 1221	80.0	ND
11141-16-5	Aroclor 1232	80.0	ND
53469-21-9	Aroclor 1242	80.0	ND
12672-29-6	Aroclor 1248	80.0	ND
11097-69-1	Aroclor 1254	160.0	ND
11096-82-5	Aroclor 1260	160.0	ND
	SURROGATE	% Recovery	Rec Limits *
2051-24-3	Decachlorobiphenyl	101%	30-130%

ND : Not detected at or above the practical quantitation limit for the method.
* Anametrix advisory limits, based on the OLM01.8 (CLP) contract.

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

Project ID	: 1886.02	Anametrix I.D.	: 9304070-02
Sample ID	: B10-1	Elec. File I.D.	: ERA07002
Matrix	: SOIL	Analyst	:
Date Sampled	: 04/07/93	Supervisor	:
Date Extracted	: 04/13/93	Weight ext.(g)	: 30
Date Analyzed	: 04/16/93	pH	: N/A
Instrument ID	: HP22	Final Vol. (ml)	: 10
Dilution	: 2	Inj. Vol. (ul)	: 1

CAS #	Compound Name	Reporting Limit (ug/Kg)	Amount Found (ug/Kg)
319-84-6	alpha-BHC	8.0	ND
58-89-9	gamma-BHC	8.0	ND
76-44-8	Heptachlor	8.0	ND
309-00-2	Aldrin	8.0	ND
319-85-7	beta-BHC	8.0	ND
319-86-8	delta-BHC	8.0	ND
1024-57-3	Heptachlor Epoxide	8.0	ND
959-98-8	Endosulfan I	8.0	ND
72-55-9	4,4'-DDE	16.0	ND
60-57-1	Dieldrin	16.0	ND
72-20-8	Endrin	16.0	22
33212-65-9	Endosulfan II	16.0	ND
72-54-8	4,4'-DDD	16.0	ND
50-29-3	4,4'-DDT	16.0	41
7421-93-4	Endrin Aldehyde	16.0	ND
1031-07-8	Endosulfan Sulfate	16.0	ND
72-43-5	Methoxychlor	80.0	ND
53494-70-5	Endrin Ketone	16.0	ND
12789-03-6	Tech. Chlordane	80.0	ND
8001-35-2	Toxaphene	160.0	ND
12674-11-2	Aroclor 1016	80.0	ND
1104-28-2	Aroclor 1221	80.0	ND
11141-16-5	Aroclor 1232	80.0	ND
53469-21-9	Aroclor 1242	80.0	ND
12672-29-6	Aroclor 1248	80.0	ND
11097-69-1	Aroclor 1254	160.0	ND
11096-82-5	Aroclor 1260	160.0	ND
	SURROGATE	% Recovery	Rec Limits *
2051-24-3	Decachlorobiphenyl	56%	30-130%

ND : Not detected at or above the practical quantitation limit for the method.
* Anametrix advisory limits, based on the OLM01.8 (CLP) contract.

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

Project ID	: 1886.02	Anametrix I.D.	: 9304070-03
Sample ID	: B11-1	Elec. File I.D.	: EPA07003
Matrix	: SOIL	Analyst	:
Date Sampled	: 04/07/93	Supervisor	:
Date Extracted	: 04/13/93	Weight ext.(g)	: 30
Date Analyzed	: 04/14/93	pH	: N/A
Instrument ID	: HP22	Final Vol. (ml)	: 10
Dilution	: NONE	Inj. Vol. (ul)	: 1

CAS #	Compound Name	Reporting Limit (ug/Kg)	Amount Found (ug/Kg)
319-84-6	alpha-BHC	8.0	ND
58-89-9	gamma-BHC	8.0	ND
76-44-8	Heptachlor	8.0	ND
309-00-2	Aldrin	8.0	ND
319-85-7	beta-BHC	8.0	ND
319-86-8	delta-BHC	8.0	ND
1024-57-3	Heptachlor Epoxide	8.0	ND
959-98-8	Endosulfan I	8.0	25
72-55-9	4,4'-DDE	16.0	19
60-57-1	Dieldrin	16.0	ND
72-20-8	Endrin	16.0	ND
33212-65-9	Endosulfan II	16.0	83
72-54-8	4,4'-DDD	16.0	ND
50-29-3	4,4'-DDT	16.0	ND
7421-93-4	Endrin Aldehyde	16.0	ND
1031-07-8	Endosulfan Sulfate	16.0	68
72-43-5	Methoxychlor	80.0	ND
53494-70-5	Endrin Ketone	16.0	ND
12789-03-6	Tech. Chlordane	80.0	ND
8001-35-2	Toxaphene	160.0	ND
12674-11-2	Aroclor 1016	80.0	ND
1104-28-2	Aroclor 1221	80.0	ND
11141-16-5	Aroclor 1232	80.0	ND
53469-21-9	Aroclor 1242	80.0	ND
12672-29-6	Aroclor 1248	80.0	ND
11097-69-1	Aroclor 1254	160.0	ND
11096-82-5	Aroclor 1260	160.0	ND
	SURROGATE	% Recovery	Rec Limits *
2051-24-3	Decachlorobiphenyl	110%	30-130%

ND : Not detected at or above the practical quantitation limit for the method.
* Anametrix advisory limits, based on the OLM01.8 (CLP) contract.

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

Project ID	: 1886.02	Anametrix I.D.	: 9304070-04
Sample ID	: B12-1	Elec. File I.D.	: EPA07004
Matrix	: SOIL	Analyst	:
Date Sampled	: 04/07/93	Supervisor	:
Date Extracted	: 04/13/93	Weight ext.(g)	: 30
Date Analyzed	: 04/15/93	pH	: N/A
Instrument ID	: HP22	Final Vol. (ml)	: 10
Dilution	: NONE	Inj. Vol. (ul)	: 1

CAS #	Compound Name	Reporting Limit (ug/Kg)	Amount Found (ug/Kg)
319-84-6	alpha-BHC	8.0	ND
58-89-9	gamma-BHC	8.0	ND
76-44-8	Heptachlor	8.0	ND
309-00-2	Aldrin	8.0	ND
319-85-7	beta-BHC	8.0	ND
319-86-8	delta-BHC	8.0	ND
1024-57-3	Heptachlor Epoxide	8.0	ND
959-98-8	Endosulfan I	8.0	ND
72-55-9	4,4'-DDE	16.0	ND
60-57-1	Dieldrin	16.0	ND
72-20-8	Endrin	16.0	ND
33212-65-9	Endosulfan II	16.0	ND
72-54-8	4,4'-DDD	16.0	ND
50-29-3	4,4'-DDT	16.0	ND
7421-93-4	Endrin Aldehyde	16.0	ND
1031-07-8	Endosulfan Sulfate	16.0	ND
72-43-5	Methoxychlor	80.0	ND
53494-70-5	Endrin Ketone	16.0	ND
12789-03-6	Tech. Chlordane	80.0	ND
8001-35-2	Toxaphene	160.0	ND
12674-11-2	Aroclor 1016	80.0	ND
1104-28-2	Aroclor 1221	80.0	ND
11141-16-5	Aroclor 1232	80.0	ND
53469-21-9	Aroclor 1242	80.0	ND
12672-29-6	Aroclor 1248	80.0	ND
11097-69-1	Aroclor 1254	160.0	ND
11096-82-5	Aroclor 1260	160.0	ND
	SURROGATE	% Recovery	Rec Limits *
2051-24-3	Decachlorobiphenyl	102%	30-130%

ND : Not detected at or above the practical quantitation limit for the method.
* Anametrix advisory limits, based on the OLM01.8 (CLP) contract.

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

Project ID	: 1886.02	Anametrix I.D.	: 9304070-05
Sample ID	: B13-1	Elec. File I.D.	: EPA07005
Matrix	: SOIL	Analyst	:
Date Sampled	: 04/07/93	Supervisor	:
Date Extracted	: 04/13/93	Weight ext.(g)	: 30
Date Analyzed	: 04/15/93	pH	: N/A
Instrument ID	: HP22	Final Vol. (ml)	: 10
Dilution	: NONE	Inj. Vol. (ul)	: 1

CAS #	Compound Name	Reporting Limit (ug/Kg)	Amount Found (ug/Kg)
319-84-6	alpha-BHC	8.0	ND
58-89-9	gamma-BHC	8.0	ND
76-44-8	Heptachlor	8.0	ND
309-00-2	Aldrin	8.0	ND
319-85-7	beta-BHC	8.0	ND
319-86-8	delta-BHC	8.0	ND
1024-57-3	Heptachlor Epoxide	8.0	ND
959-98-8	Endosulfan I	8.0	18
72-55-9	4,4'-DDE	16.0	ND
60-57-1	Dieldrin	16.0	ND
72-20-8	Endrin	16.0	ND
33212-65-9	Endosulfan II	16.0	53
72-54-8	4,4'-DDD	16.0	ND
50-29-3	4,4'-DDT	16.0	ND
7421-93-4	Endrin Aldehyde	16.0	ND
1031-07-8	Endosulfan Sulfate	16.0	59
72-43-5	Methoxychlor	80.0	ND
53494-70-5	Endrin Ketone	16.0	ND
12789-03-6	Tech. Chlordane	80.0	ND
8001-35-2	Toxaphene	160.0	ND
12674-11-2	Aroclor 1016	80.0	ND
1104-28-2	Aroclor 1221	80.0	ND
11141-16-5	Aroclor 1232	80.0	ND
53469-21-9	Aroclor 1242	80.0	ND
12672-29-6	Aroclor 1248	80.0	ND
11097-69-1	Aroclor 1254	160.0	ND
11096-82-5	Aroclor 1260	160.0	ND
	SURROGATE	% Recovery	Rec Limits *
2051-24-3	Decachlorobiphenyl	102%	30-130%

ND : Not detected at or above the practical quantitation limit for the method.
* Anametrix advisory limits, based on the OLM01.8 (CLP) contract.

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

Project ID	: N/A	Anametrix I.D.	: BA13H1P1
Sample ID	: BLANK	Analyst	:
Matrix	: SOIL	Supervisor	:
Date Sampled	: N/A	Weight ext.(g)	: 30
Date Extracted	: 04/13/93	pH	: N/A
Date Analyzed	: 04/14/93	Final Vol. (ml)	: 10
Instrument ID	: HP22	Inj. Vol. (ul)	: 1
Dilution	: NONE		

CAS #	Compound Name	Reporting Limit (ug/Kg)	Amount Found (ug/Kg)
319-84-6	alpha-BHC	8.0	ND
58-89-9	gamma-BHC	8.0	ND
76-44-8	Heptachlor	8.0	ND
309-00-2	Aldrin	8.0	ND
319-85-7	beta-BHC	8.0	ND
319-86-8	delta-BHC	8.0	ND
1024-57-3	Heptachlor Epoxide	8.0	ND
959-98-8	Endosulfan I	8.0	ND
72-55-9	4,4'-DDE	16.0	ND
60-57-1	Dieldrin	16.0	ND
72-20-8	Endrin	16.0	ND
33212-65-9	Endosulfan II	16.0	ND
72-54-8	4,4'-DDD	16.0	ND
50-29-3	4,4'-DDT	16.0	ND
7421-93-4	Endrin Aldehyde	16.0	ND
1031-07-8	Endosulfan Sulfate	16.0	ND
72-43-5	Methoxychlor	80.0	ND
53494-70-5	Endrin Ketone	16.0	ND
12789-03-6	Tech. Chlordane	80.0	ND
8001-35-2	Toxaphene	160.0	ND
12674-11-2	Aroclor 1016	80.0	ND
1104-28-2	Aroclor 1221	80.0	ND
11141-16-5	Aroclor 1232	80.0	ND
53469-21-9	Aroclor 1242	80.0	ND
12672-29-6	Aroclor 1248	80.0	ND
11097-69-1	Aroclor 1254	160.0	ND
11096-82-5	Aroclor 1260	160.0	ND
	SURROGATE	% Recovery	Rec Limits *
2051-24-3	Decachlorobiphenyl	118%	30-130%

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

* Anametrix advisory limits, based on the OLM01.8 (CLP) contract.

MATRIX SPIKE RECOVERY FORM --- EPA METHOD 8080
ANAMETRIX, INC. (408)432-8192

Project ID	: 1886.02	Anametrix I.D.	: 9304070-05 MS
Sample ID	: B13-1	Elec. File I.D.	: EMA07005
Matrix	: SOIL	Analyst	:
Date Sampled	: 04/07/93	Supervisor	:
Date Extracted	: 04/13/93	Weight ext.(g)	: 30
Date Analyzed	: 04/15/93	pH	: N/A
Instrument ID	: HP22	Final Vol. (ml)	: 10
Dilution	: NONE	Inj. Vol. (ul)	: 1

COMPOUND	SPIKE ADDED (ug/Kg)	MS CONCENTRATION (ug/Kg)	MSD CONCENTRATION (ug/Kg)
gamma-BHC	16.7	13.2	13.5
Heptachlor	16.7	15.4	16.2
Aldrin	16.7	13.2	13.7
Dieldrin	33.3	30.0	30.6
Endrin	33.3	31.6	31.6
4,4'-DDT	33.3	30.0	29.3

COMPOUND	MS % RECOVERY	MSD % RECOVERY	% REC LIMITS
gamma-BHC	79	81	41-123
Heptachlor	92	97	41-124
Aldrin	79	82	37-123
Dieldrin	90	92	44-112
Endrin	95	95	41-117
4,4'-DDT	90	88	35-134

COMPOUND	% RPD	% RPD LIMITS
gamma-BHC	2	50
Heptachlor	5	31
Aldrin	4	43
Dieldrin	2	38
Endrin	0	45
4,4'-DDT	2	50

Surrogate	MS REC	MSD REC	REC LIMITS**
DCB	107%	101%	30-130%

* Value is outside of Anametrix QC limits
** Anametrix advisory limits, based on the OLM01.8 (CLP) contract.

LABORATORY CONTROL SPIKE RECOVERY FORM --- EPA METHOD 8080
ANAMETRIX, INC. (408)432-8192

Project ID	: N/A	Anametrix I.D.	: MA13H1P1
Sample ID	: LCS	Analyst	:
Matrix	: SOIL	Supervisor	:
Date Sampled	: N/A	Weight ext.(g)	: 30
Date Extracted	: 04/13/93	pH	: N/A
Date Analyzed	: 04/14/93	Final Vol. (ml)	: 10
Instrument ID	: HP22	Inj. Vol. (ul)	: 1
Dilution	: NONE		

COMPOUND	SPIKE ADDED (ug/L)	LCS CONCENTRATION (ug/L)	% REC
gamma-BHC	16.7	11.9	71%
Heptachlor	16.7	14.0	84%
Aldrin	16.7	12.2	73%
Dieldrin	33.3	27.3	82%
Endrin	33.3	28.3	85%
4,4'-DDT	33.3	32.6	98%

COMPOUND	% REC LIMITS
gamma-BHC	41-123
Heptachlor	41-124
Aldrin	37-123
Dieldrin	44-112
Endrin	41-117
4,4'-DDT	35-134

Surrogate	LCS REC	REC LIMITS**
DCB	105%	30-130%

* Value is outside of Anametrix QC limits
** Anametrix advisory limits, based on the OLM01.8 (CLP) contract.

9304070 19:30 MO

Chain-of-Custody Record

No 545

Date: 04/07/93

Page 1 of 1

Project No.: 1886.02

Samplers (Signatures): James M Carolan

	Date	Time	Sample Number	EPA Method 8010	EPA Method 8020	EPA Method 8240	EPA Method 8270	TPH as gasoline	TPH as diesel	TPH as BTEX	8080	Cooled	Soil (S) or water (W)	Acidified	Number of containers
1	04/07	13:31	B9-1								X	X	S		1
2		13:39	B10-1								X	X	S		1
3		13:50	B11-1								X	X	S		1
4		14:00	B12-1								X	X	S		1
5		14:06	B13-1								X	X	S		1

ANALYSES

REMARKS

Additional comments

Homogenize samples before extraction

Turnaround time: Standard

Results to: Jeff Nelson

Total No. of containers: 5

Relinquished by:	Date:	Relinquished by:	Date:	Relinquished by:	Date:	Method of shipment:	
Signature: James M Carolan	4/9/93	Signature: KENNY S. CARRIZOSA	4/7/93	Signature:		Lab Pickup	
Printed name: Jim Carolan		Printed name: ANAMETRIX		Printed name:		Laboratory comments and Log No.:	
Company: Geomatrix		Company:		Company:			
Received by: Kenny S. Carrizosa	Time: 15:10	Received by:	Time:	Received by:	Time:		
Signature: KENNY S. CARRIZOSA		Signature: Maria Barajas	1L 8	Signature:			
Printed name: ANAMETRIX		Printed name: Anametrix		Printed name:			
Company:		Company:		Company:			

Geomatrix Consultants
100 Pine St. 10th Floor
San Francisco, CA. 94111
(415) 434-9400

ANAMETRIX INC
Environmental & Analytical Chemistry

Part of INCHCAPE ENVIRONMENTAL

REPORT

MR. JEFF NELSON
GEOMATRIX CONSULTANTS INC.
100 PINE STREET, SUITE 1000
SAN FRANCISCO, CA 94111

Workorder # : 9304375
Date Received : 04/30/93
Project ID : 1886.02
Purchase Order: N/A

The following samples were received at Anametrix, Inc. for analysis :

ANAMETRIX ID	CLIENT SAMPLE ID
9304375- 1	C-1W
9304375- 2	C-2C
9304375- 3	C-3E

This report consists of 8 pages not including the cover letter, and is organized in sections according to the specific Anametrix laboratory group or section which performed the analysis(es) and generated the data. The Report Summary that precedes each section will help you determine which Anametrix group is responsible for those test results, and will bear the signatures of the department supervisor and the chemist who have reviewed the analytical data. Please refer all questions to the department supervisor who signed the form.

Anametrix is certified by the California Department of Health Services (DHS) to perform environmental testing under Certificate Number 1234. A detailed list of the approved fields of testing can be obtained by calling our office, or the DHS Environmental Laboratory Accreditation Program at (415)540-2800.

If you have any further questions or comments on this report, please give us a call as soon as possible. Thank you for using Anametrix.

Sarah Schoen,Ph.D.
Laboratory Director

05-07-93
Date

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

MR. JEFF NELSON
GEOMATRIX CONSULTANTS INC.
100 PINE STREET, SUITE 1000
SAN FRANCISCO, CA 94111

Workorder # : 9304375
Date Received : 04/30/93
Project ID : 1886.02
Purchase Order: N/A
Department : GC
Sub-Department: PEST

SAMPLE INFORMATION:

ANAMETRIX SAMPLE ID	CLIENT SAMPLE ID	MATRIX	DATE SAMPLED	METHOD
9304375- 1	C-1W	SOIL	04/29/93	8080
9304375- 2	C-2C	SOIL	04/29/93	8080
9304375- 3	C-3E	SOIL	04/29/93	8080

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

MR. JEFF NELSON
GEOMATRIX CONSULTANTS INC.
100 PINE STREET, SUITE 1000
SAN FRANCISCO, CA 94111

Workorder # : 9304375
Date Received : 04/30/93
Project ID : 1886.02
Purchase Order: N/A
Department : GC
Sub-Department: PEST

QA/QC SUMMARY :

- No QA/QC problems encountered for samples.

Department Supervisor 5/6/93 Date

Chemist M. Harrsinian 5/6/93 Date

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

Project ID	: 1886.02	Anametrix I.D.	: 9304375-01
Sample ID	: C-1W	Analyst	:
Matrix	: SOIL	Supervisor	:
Date Sampled	: 04/29/93	Weight ext.(g)	: 30
Date Extracted	: 05/04/93	pH	: N/A
Date Analyzed	: 05/05/93	Final Vol. (ml)	: 10
Instrument ID	: HP22	Inj. Vol. (ul)	: 1
Dilution	: NONE		

CAS #	Compound Name	Reporting Limit (ug/Kg)	Amount Found (ug/Kg)
319-84-6	alpha-BHC	8.0	ND
58-89-9	gamma-BHC	8.0	ND
76-44-8	Heptachlor	8.0	ND
309-00-2	Aldrin	8.0	ND
319-85-7	beta-BHC	8.0	ND
319-86-8	delta-BHC	8.0	ND
1024-57-3	Heptachlor Epoxide	8.0	ND
959-98-8	Endosulfan I	8.0	ND
72-55-9	4,4'-DDE	16.0	ND
60-57-1	Dieldrin	16.0	ND
72-20-8	Endrin	16.0	ND
33212-65-9	Endosulfan II	16.0	ND
72-54-8	4,4'-DDD	16.0	ND
50-29-3	4,4'-DDT	16.0	ND
7421-93-4	Endrin Aldehyde	16.0	ND
1031-07-8	Endosulfan Sulfate	16.0	ND
72-43-5	Methoxychlor	80.0	ND
53494-70-5	Endrin Ketone	16.0	ND
12789-03-6	Tech. Chlordane	80.0	ND
8001-35-2	Toxaphene	160.0	ND
12674-11-2	Aroclor 1016	80.0	ND
1104-28-2	Aroclor 1221	80.0	ND
11141-16-5	Aroclor 1232	80.0	ND
53469-21-9	Aroclor 1242	80.0	ND
12672-29-6	Aroclor 1248	80.0	ND
11097-69-1	Aroclor 1254	160.0	ND
11096-82-5	Aroclor 1260	160.0	ND
	SURROGATE	% Recovery	Rec Limits *
2051-24-3	Decachlorobiphenyl	86%	30-130%

ND : Not detected at or above the practical quantitation limit for the method.
* Anametrix advisory limits, based on the OLM01.8 (CLP) contract.

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

Project ID	: 1886.02	Anametrix I.D.	: 9304375-02
Sample ID	: C-2C	Analyst	:
Matrix	: SOIL	Supervisor	:
Date Sampled	: 04/29/93	Weight ext.(g)	: 30
Date Extracted	: 05/04/93	pH	: N/A
Date Analyzed	: 05/05/93	Final Vol. (ml)	: 10
Instrument ID	: HP22	Inj. Vol. (ul)	: 1
Dilution	: NONE		

CAS #	Compound Name	Reporting Limit (ug/Kg)	Amount Found (ug/Kg)
319-84-6	alpha-BHC	8.0	ND
58-89-9	gamma-BHC	8.0	ND
76-44-8	Heptachlor	8.0	ND
309-00-2	Aldrin	8.0	ND
319-85-7	beta-BHC	8.0	ND
319-86-8	delta-BHC	8.0	ND
1024-57-3	Heptachlor Epoxide	8.0	ND
959-98-8	Endosulfan I	8.0	ND
72-55-9	4,4'-DDE	16.0	ND
60-57-1	Dieldrin	16.0	ND
72-20-8	Endrin	16.0	ND
33212-65-9	Endosulfan II	16.0	ND
72-54-8	4,4'-DDD	16.0	ND
50-29-3	4,4'-DDT	16.0	ND
7421-93-4	Endrin Aldehyde	16.0	ND
1031-07-8	Endosulfan Sulfate	16.0	ND
72-43-5	Methoxychlor	80.0	ND
53494-70-5	Endrin Ketone	16.0	ND
12789-03-6	Tech. Chlordane	80.0	ND
8001-35-2	Toxaphene	160.0	ND
12674-11-2	Aroclor 1016	80.0	ND
1104-28-2	Aroclor 1221	80.0	ND
11141-16-5	Aroclor 1232	80.0	ND
53469-21-9	Aroclor 1242	80.0	ND
12672-29-6	Aroclor 1248	80.0	ND
11097-69-1	Aroclor 1254	160.0	ND
11096-82-5	Aroclor 1260	160.0	ND
	SURROGATE	% Recovery	Rec Limits *
2051-24-3	Decachlorobiphenyl	86%	30-130%

ND : Not detected at or above the practical quantitation limit for the method.
* Anametrix advisory limits, based on the OLM01.8 (CLP) contract.

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

Project ID	: 1886.02	Anametrix I.D.	: 9304375-03
Sample ID	: C-3E	Analyst	:
Matrix	: SOIL	Supervisor	:
Date Sampled	: 04/29/93	Weight ext.(g)	: 30
Date Extracted	: 05/04/93	pH	: N/A
Date Analyzed	: 05/05/93	Final Vol. (ml)	: 10
Instrument ID	: HP22	Inj. Vol. (ul)	: 1
Dilution	: NONE		

CAS #	Compound Name	Reporting Limit (ug/Kg)	Amount Found (ug/Kg)
319-84-6	alpha-BHC	8.0	ND
58-89-9	gamma-BHC	8.0	ND
76-44-8	Heptachlor	8.0	ND
309-00-2	Aldrin	8.0	ND
319-85-7	beta-BHC	8.0	ND
319-86-8	delta-BHC	8.0	ND
1024-57-3	Heptachlor Epoxide	8.0	ND
959-98-8	Endosulfan I	8.0	ND
72-55-9	4,4'-DDE	16.0	ND
60-57-1	Dieldrin	16.0	ND
72-20-8	Endrin	16.0	ND
33212-65-9	Endosulfan II	16.0	ND
72-54-8	4,4'-DDD	16.0	ND
50-29-3	4,4'-DDT	16.0	ND
7421-93-4	Endrin Aldehyde	16.0	ND
1031-07-8	Endosulfan Sulfate	16.0	ND
72-43-5	Methoxychlor	80.0	ND
53494-70-5	Endrin Ketone	16.0	ND
12789-03-6	Tech. Chlordane	80.0	ND
8001-35-2	Toxaphene	160.0	ND
12674-11-2	Aroclor 1016	80.0	ND
1104-28-2	Aroclor 1221	80.0	ND
11141-16-5	Aroclor 1232	80.0	ND
53469-21-9	Aroclor 1242	80.0	ND
12672-29-6	Aroclor 1248	80.0	ND
11097-69-1	Aroclor 1254	160.0	ND
11096-82-5	Aroclor 1260	160.0	ND
	SURROGATE	% Recovery	Rec Limits *
2051-24-3	Decachlorobiphenyl	88%	30-130%

ND : Not detected at or above the practical quantitation limit for the method.
* Anametrix advisory limits, based on the OLM01.8 (CLP) contract.

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

Project ID	: N/A	Anametrix I.D.	: BY04H1P1
Sample ID	: BLANK	Analyst	:
Matrix	: SOIL	Supervisor	: SR
Date Sampled	: N/A	Weight ext.(g)	: 30
Date Extracted	: 05/04/93	pH	: N/A
Date Analyzed	: 05/05/95	Final Vol. (ml)	: 10
Instrument ID	: HP22	Inj. Vol. (ul)	: 1
Dilution	: NONE		

CAS #	Compound Name	Reporting Limit (ug/Kg)	Amount Found (ug/Kg)
319-84-6	alpha-BHC	8.0	ND
58-89-9	gamma-BHC	8.0	ND
76-44-8	Heptachlor	8.0	ND
309-00-2	Aldrin	8.0	ND
319-85-7	beta-BHC	8.0	ND
319-86-8	delta-BHC	8.0	ND
1024-57-3	Heptachlor Epoxide	8.0	ND
959-98-8	Endosulfan I	8.0	ND
72-55-9	4,4'-DDE	16.0	ND
60-57-1	Dieldrin	16.0	ND
72-20-8	Endrin	16.0	ND
33212-65-9	Endosulfan II	16.0	ND
72-54-8	4,4'-DDD	16.0	ND
50-29-3	4,4'-DDT	16.0	ND
7421-93-4	Endrin Aldehyde	16.0	ND
1031-07-8	Endosulfan Sulfate	16.0	ND
72-43-5	Methoxychlor	80.0	ND
53494-70-5	Endrin Ketone	16.0	ND
12789-03-6	Tech. Chlordane	80.0	ND
8001-35-2	Toxaphene	160.0	ND
12674-11-2	Aroclor 1016	80.0	ND
1104-28-2	Aroclor 1221	80.0	ND
11141-16-5	Aroclor 1232	80.0	ND
53469-21-9	Aroclor 1242	80.0	ND
12672-29-6	Aroclor 1248	80.0	ND
11097-69-1	Aroclor 1254	160.0	ND
11096-82-5	Aroclor 1260	160.0	ND
	SURROGATE	% Recovery	Rec Limits *
2051-24-3	Decachlorobiphenyl	103%	30-130%

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

* Anametrix advisory limits, based on the OLM01.8 (CLP) contract.

MATRIX SPIKE RECOVERY FORM --- EPA METHOD 8080

ANAMETRIX, INC. (408)432-8192

Project ID	: 1886.02	Anametrix I.D.	: 9304375-01 MS
Sample ID	: C-1W	Analyst	:
Matrix	: SOIL	Supervisor	: SR
Date Sampled	: 04/29/93	Weight ext.(g)	: 30
Date Extracted	: 05/04/93	pH	: N/A
Date Analyzed	: 05/05/93	Final Vol. (ml)	: 10
Instrument ID	: HP22	Inj. Vol. (ul)	: 1
Dilution	: NONE		

COMPOUND	SPIKE ADDED (ug/Kg)	MS CONCENTRATION (ug/Kg)	MSD CONCENTRATION (ug/Kg)
gamma-BHC	16.7	15.1	14.9
Heptachlor	16.7	15.4	15.5
Aldrin	16.7	14.2	13.9
Dieldrin	33.3	33.1	32.8
Endrin	33.3	32.7	32.6
4,4'-DDT	33.3	30.4	30.6

COMPOUND	MS % RECOVERY	MSD % RECOVERY	% REC LIMITS
gamma-BHC	90	89	41-123
Heptachlor	92	93	41-124
Aldrin	85	83	37-123
Dieldrin	99	98	44-112
Endrin	98	98	41-117
4,4'-DDT	91	92	35-134

COMPOUND	% RPD	% RPD LIMITS
gamma-BHC	1	50
Heptachlor	1	31
Aldrin	2	43
Dieldrin	1	38
Endrin	0	45
4,4'-DDT	1	50

Surrogate	MS REC	MSD REC	REC LIMITS**
DCB	89%	91%	30-130%

* Value is outside of Anametrix QC limits

** Anametrix advisory limits, based on the OLM01.8 (CLP) contract.

LABORATORY CONTROL SPIKE RECOVERY FORM --- EPA METHOD 8080
ANAMETRIX, INC. (408)432-8192

Project ID	: N/A	Anametrix I.D.	: MY04H1P1
Sample ID	: LCS	Analyst	:
Matrix	: SOIL	Supervisor	:
Date Sampled	: N/A	Weight ext.(g)	: 30
Date Extracted	: 05/04/93	pH	: N/A
Date Analyzed	: 05/05/93	Final Vol. (ml)	: 10
Instrument ID	: HP22	Inj. Vol. (ul)	: 1
Dilution	: NONE		

COMPOUND	SPIKE ADDED (ug/L)	LCS CONCENTRATION (ug/L)	% REC
gamma-BHC	16.7	15.6	93%
Heptachlor	16.7	16.3	98%
Aldrin	16.7	15.5	93%
Dieldrin	33.3	35.5	107%
Endrin	33.3	34.1	102%
4,4'-DDT	33.3	33.1	99%

COMPOUND	% REC LIMITS
gamma-BHC	41-123
Heptachlor	41-124
Aldrin	37-123
Dieldrin	44-112
Endrin	41-117
4,4'-DDT	35-134

Surrogate	LCS REC	REC LIMITS**
DCB	105%	30-130%

* Value is outside of Anametrix QC limits
** Anametrix advisory limits, based on the OLM01.8 (CLP) contract.

9304375 (10/30)

Chain-of-Custody Record

No 1327 | Date: 29 APR 93 | Page 1 of 1

Project No.: 1886.02

Samplers (Signatures): Jeff Nelson

	Date	Time	Sample Number	EPA Method 8010	EPA Method 8020	EPA Method 8240	EPA Method 8270	TPH as gasoline	TPH as diesel	TPH as BTEX	EPA Method 8260 with TCLP	Cooled	Soil (S) or water (W)	Acidified	Number of containers
1	29 APR 93	9:15	C-1W								X	X	X		1
2	29 APR 93	9:20	C-2C								X X	X	X		1
3	29 APR 93	9:25	C-3E								X	X	X		1

REMARKS

Additional comments

Please perform TCLP on Sample C-2C... in addition to standard EPA Method 8260

Turnaround time: ASAP

Results to: Jeff Nelson

Total No. of containers: 3

Relinquished by:	Date:	Relinquished by:	Date:	Relinquished by:	Date:
Jeff Nelson	30/April/93	Preston Gaines	30/April/93	J L Thompson	4/30/93
Signature: Jeff Nelson		Signature:		Signature: J L THOMPSON	
Printed name: Geomatrix		Printed name: Geomatrix		Printed name:	
Company:		Company:		Company: ANAMETRIX	
Received by:	**Time:**	**Received by:**	**Time:**	**Received by:**	**Time:**
Preston Gaines	1401	J L Thompson	17:45	Maria Barajas	19:15
Signature:		Signature: J L THOMPSON		Signature:	
Printed name: Geomatrix		Printed name:		Printed name:	
Company:		Company: ANAMETRIX		Company: Anametrix	

Method of shipment: Pick Up.

Laboratory comments and Log No.:

Geomatrix Consultants
100 Pine St. 10th Floor
San Francisco, CA. 94111
(415) 434-9400

GEOMATRIX

MEMORANDUM

TO: Jeff Nelson **DATE:** 7 April 1993

FROM: Larry Edwards LE **FILE:** 1886.02

SUBJECT: Environmental Fate (Lifetime) of Endosulfan

Some question has arisen about the probable lifetime of endosulfan in the natural environment. The question arose when trying to reconcile the results of two different samples of the same soil believed to have been contaminated with endosulfan. One set of samples was taken immediately after a nursery had stopped using the site; the other set was taken about three years later. Is it possible that some endosulfan could have been found in the first sampling effort and not in the second? Endosulfan is a compound likely to have been used by the nursery operation.

Calling upon the Hazardous Substances Data Base (an electronic data base much used by toxicologists), the following information was reported on the terrestrial fate of endosulfan[1]:

1) In one study, the half-life of endosulfan applied to soil at 0.35 kg/ha was 5 days (based on concentration in runoff). [Wauchope, R.D. and Leonard, R.A., Journal of Environmental Quality, 9, 665-72 (1980)]

2) In another study , 0.38 ppm of endosulfan was applied to soil, and three years later, the most that could be found in several samples was 0.04 ppm. [Mullins, D.E., et al., Journal of Pesticide Monitoring, 5, 268-275 (1971)]

3) In another study, endosulfan "persisted" for 100 days in dry soils and for 120 days in wet soils. [Rao, D.M.R. and A.S. Murty, Journal of Agricultural Food Chemistry, 28, 1099-1101 (1980)] In this case, "persisted" is taken to mean that it was still present in levels above the method detection limit.

4) In another study, the half-life of alpha endosulfan was 60 days and the half-life of beta endosulfan was 800 days. [Stewart, D.K.R. and K.G. Cairns, Journal of Agricultural Food Chemistry, 22, 984-986 (1974)]

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[1] The same information may be found in "Handbook of Environmental Fate and Exposure Data for Organic Chemicals: Volume III Pesticides", Howard, Philip H., Editor. Lewis Publishers, Chelsea, MI., 1991, pp 327-343.

5) In another study, endosulfan was applied at a rate of 0.5 to 1.5 lb/acre to tobacco; time to zero residue level was estimated to be ten days. [Metabolism of Pesticides, pg. 191 (1974)]

6) In another study, at 20°C, the abiotic hydrolysis half-life was reported to be 35.4 days and 150.6 days for alpha endosulfan at pH 7.0 and 5.5, respectively; for beta endosulfan, the hydrolysis half-life was reported to be 37.5 and 187 days for pH 7.0 and 5.5, respectively. [Greve, P.A. and S.L. Wit, Journal of Water Pollution Control 42, 2338-2348 (1971)]

In an unreferenced hydrolysis study, the lifetime of endosulfan in surface waters has been reported to be four weeks (i.e., none was detectable after four weeks).

The most likely degradation mechanisms (not in any particular order) are biodegradation, hydrolysis (especially under alkaline conditions), oxidation and photolysis. The most common byproduct is endosulfan sulfate; this compound would not be reported as endosulfan if analyzed by common laboratory practices (i.e., SW-846).

In general, the picture emerges that endosulfan breaks down in natural settings either biotically or abiotically; while the degradation is pH dependent, most studies report half-lives either on soil or in water of several days to a few months. In three years, this would translate into greater than 99% degradation. Citation #2 above did find endosulfan remaining in a few samples after three years at levels up to 10% of the original concentration. Thus, it is possible to persist in the environment for several years, although such persistence is not favored. In this case, if the pH was above 6, it is unlikely that endosulfan remained in detectable quantities three years after its initial application. However, it is probable that endosulfan was detectable 60 days after application and could have been found in the earlier testing.