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NWS EARLE
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# FINAL WORK PLAN FOR REMEDIAL ACTIONS AT FORMER PESTICIDE SHOP

## NAVAL WEAPONS STATION – EARLE

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# DRAFT WORK PLAN
# FOR REMEDIAL ACTIONS
# FORMER PESTICIDE SHOP

## NAVAL WEAPONS STATION - EARLE
## COLTS NECK, NEW JERSEY

## TABLE OF CONTENTS

**Section** **Page**


1.0 INTRODUCTION/PROJECT OBJECTIVES ..... 1

2.0 PROJECT LOCATION AND DESCRIPTION ..... 1
2.1 PREVIOUS INVESTIGATIONS ..... 1

3.0 SCOPE OF WORK ..... 6
3.1 TASK 1 - PROJECT PLANNING/MANAGEMENT ..... 6
3.1.1 Sub-task 1A - Pre-Construction Submittals ..... 6
3.1.2 Sub-task 1B - Mobilization ..... 7
3.1.3 Sub-task 1C - Home Office Support ..... 7
3.2 TASK 2 - PERMIT AND REPORT PREPARATION/SUBMISSION ..... 7
3.2.1 Soil Erosion and Sediment Control Plan ..... 7
3.3 TASK 3 - DELINEATION OF AREA TO BE EXCAVATED ..... 8
3.4 TASK 4 - DEMOLITION OF THE FORMER PESTICIDE SHOP ..... 8
3.4.1 Electrical Disconnection ..... 10
3.4.2 Removal of Transite Roof ..... 10
3.4.3 Demolition of Concrete Block Building ..... 10
3.5 TASK 5 - CLEAR CUTTING ..... 10
3.6 TASK 6 - SOIL EXCAVATION ..... 11
3.7 TASK 7 - SURVEY OF EXCAVATION AND SAMPLE LOCATIONS ..... 12
3.8 TASK 8 - BACKFILLING OF EXCAVATION ..... 12

4.0 FIELD SAMPLING AND ANALYSIS PLAN ..... 13
4.1 INTRODUCTION ..... 13
4.2 PERSONNEL RESPONSIBILITIES ..... 13
4.3 FIELD SAMPLING ACTIVITIES ..... 14
4.3.1 Sample Tracking System ..... 14
4.3.2 Sample Analytical Requirements ..... 15
4.3.3 Sample Packaging and Shipping ..... 15
4.3.4 Sample Documentation ..... 21

5.0 FIELD INVESTIGATION ACTIVITIES ..... 22
5.1 STANDARD OPERATING PROCEDURES ..... 22
5.2 FIELD INVESTIGATION PROGRAM ..... 22
5.2.1 Mobilization/Demobilization ..... 22
5.2.2 Delineation Soil Sampling ..... 23
5.2.3 Construction Debris Classification Sampling ..... 23
5.2.4 Soil Waste Classification ..... 24

# TABLE OF CONTENTS

**Section** **Page**


5.2.5 Post-Excavation Sampling ..... 25
5.2.6 Decon Water Classification Sampling ..... 25
5.3 DECONTAMINATION ..... 26

6.0 QA/QC VERIFICATION ..... 27
6.1 QA/QC FIELD AUDITS ..... 27
6.2 FIELD CHANGES AND CORRECTIVE ACTIONS ..... 27

7.0 HEATLH AND SAFETY REQUIREMENTS ..... 27

8.0 WASTE REMOVAL/REGUALTORY COMPLIANCE ..... 28
8.1 HAZARDOUS SOILS ..... 28
8.2 NON-HAZARDOUS SOILS ..... 28
8.3 TRANSITE ROOFING MATERIAL ..... 28
8.4 DEMOLITION DEBRIS ..... 28
8.5 DECON WATER ..... 29
8.6 INVESTIGATIVE DERIVED WASTE ..... 29
8.7 MANIFEST/SHIPPING PAPERS ..... 29
8.8 WASTE TRANSPORT AND DISPOSAL ..... 29
8.9 HAZARDOUS WASTE MANAGEMENT ..... 30

9.0 PROJECT MANAGEMENT ..... 32
9.1 PROJECT SCHEDULE ..... 32
9.2 PROJECT STAFFING PLAN ..... 32

10.0 QUALITY ASSURANCE/QUALITY CONTROL ..... 35
10.1 ORGANIZATION AND RESPONSIBILITIES ..... 35
10.2 PROBLEM OR WORK DEFICIENCY MEETINGS ..... 35
10.3 SUBMITTALS ..... 35
10.4 CHANGES ..... 36
10.5 DOCUMENTATION ..... 36
10.5.1 Operations Record Keeping ..... 36
10.5.2 Photographic Documentation ..... 36

# TABLE OF CONTENTS

## LIST OF TABLES


| Table | | Page |
|---|---|---|
| 4-1 | Sampling and Analysis Requirements | 16 |
| 4-2 | Bottleware and Holding Times | 18 |


## LIST OF FIGURES


| Figure | | Page |
|---|---|---|
| 2-1 | Regional Site Map | 2 |
| 2-2 | Site Location Map | 3 |
| 2-3 | Former Sample Location Map | 5 |
| 3-1 | Anticipated Soil Removal Area | 9 |
| 9-1 | Schedule | 33 |
| 9-2 | Project Staffing Plan | 34 |


## APPENDICES


APPENDIX A:NUS/BROWN AND ROOT INVESTIGATION RESULTS

APPENDIX B: FOSTER WHEELER INVESTIGATION RESULTS

APPENDIX C: SPECIFICATIONS

APPENDIX D: NJDEP HISTORICAL TASK FORCE,ORGANOCHLORINE PESTICE CLEANUP CRITERIA, MARCH 1999. NJDEP CLEANUP CRITERIA

## 1.0 INTRODUCTION/ PROJECT OBJECTIVES

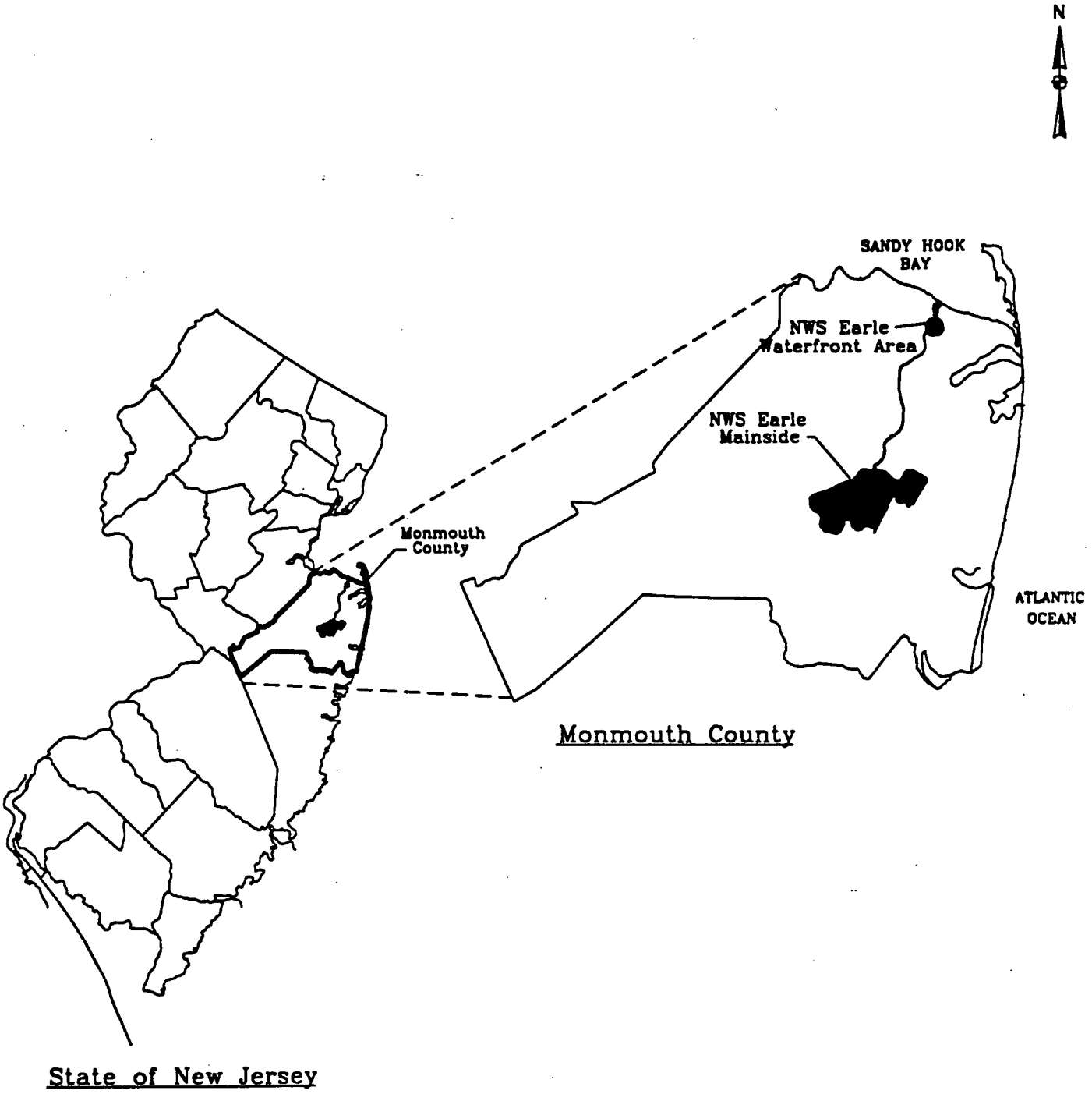
Foster Wheeler Environmental Corporation (Foster Wheeler Environmental) has been contracted by the Northern Division, Naval Facilities Engineering Command (Northern Division) to further delineate and excavate pesticide-and herbicide contaminated soils for off-site disposal at the Former Pesticide Shop at the Naval Weapons Station (NWS) Earle located in Colts Neck, NJ. The soil excavation will include the excavation of the former septic tank, and all associated pipes, sludge, and contaminated soils. The scope also includes the demolition and removal of the former pesticide building. This Work Plan is being submitted to satisfy the pre-construction submittal requirements included in paragraph 1.2.1, Pre- and Post-Construction Documentation of the Statement of Services for Delivery Order No. 0034, under Remedial Action Contract No. N62472-94-D-0398.

## 2.0 PROJECT LOCATION AND DESCRIPTION

NWS-Earle is located in east-central Monmouth County in the town of Colts Neck, New Jersey. Figure 2-1 depicts the Regional Site Map. Building S-86 (Former Pesticide Shop) is located on the Mainside portion of the base, north of the intersection of Esperance and Macassar Roads. Figure 2-2 depicts the site location.

The building served as the former base pesticide shop, but is no longer in service. Apparently, containers and spraying containers were periodically rinsed out and some of the wastewaters were deposited outside the building. According to Navy personnel, the pesticides shop operated prior 1976, before RCRA regulations.

The Former Pesticide Shop (the shop) is located in a grassy wooded area between Building C-54 and Building C-23. The shop consists of a small concrete block building (25 ft. x 12 ft.) with an asbestos transite roof. The block building sits atop a poured concrete slab. There is also a 15 ft by 8 ft. concrete pad on the northwestern side of the building. The shop is bordered to the east by an asphalt parking lot, to the south by a grassy area and Building C-23, to the west by a grassy, wooded area and Building C-54, and to the north by a wooded area. The shop sits atop a small knoll, which slopes to the north and northwest. An in-ground former septic leach tank is located approximately 15 feet north of the shop. It is assumed that piping runs from the septic tank to the Former Pesticide Shop. The primitive septic tank consists of a concrete block in-ground structure, approximately 4 feet deep. The concrete blocks are spaced apart on the bottom to allow seepage to the surrounding area. A concrete lid covers the top of the tank. There are no drawings or plans available for the septic tank, but if it is similar to other tanks excavated at the facility, pea gravel or other more permeable material surrounds the concrete-block pit. The Former Pesticide Shop has an electrical line that runs underground from southern side of the building to the basement of Building C-23. An overhead telephone line runs from the adjacent Building C-23 to the Former Pesticide Shop. There are no other known utilities entering the shop.



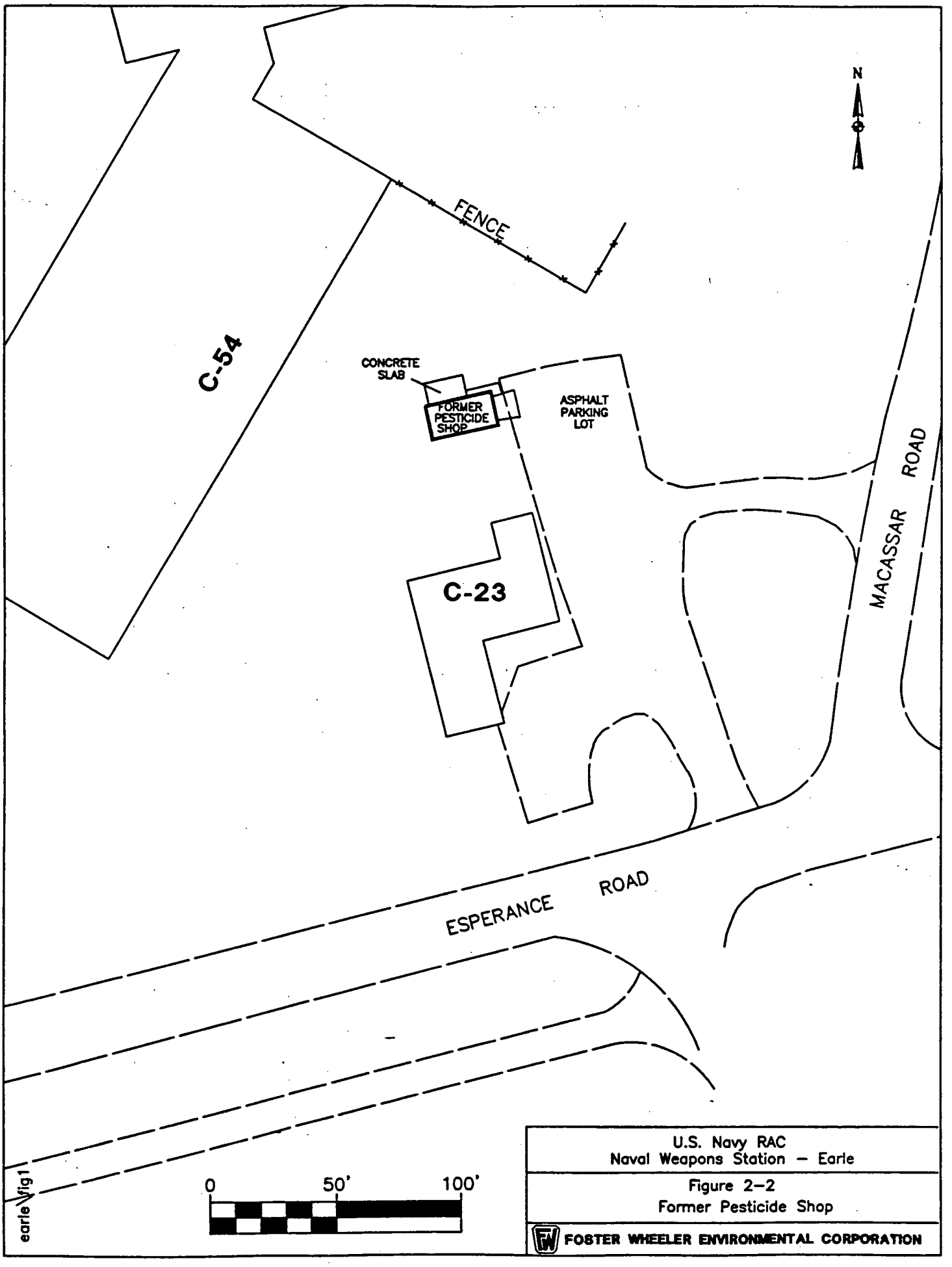

NOT TO SCALE

U.S. Navy RAC
NWS-Earle, Colts Neck, N.J.

Figure 2-1
Regional Site Map

FOSTER WHEELER ENVIRONMENTAL CORPORATION

earle\county




U.S. Navy RAC
Naval Weapons Station – Earle

Figure 2–2
Former Pesticide Shop

FOSTER WHEELER ENVIRONMENTAL CORPORATION

## 2.1 PREVIOUS INVESTIGATIONS

Brown and Root Environmental conducted a soil investigation at the Former Pesticide Shop on April 21 and 22, 1998. Twenty-three soil borings around the Former Pesticide

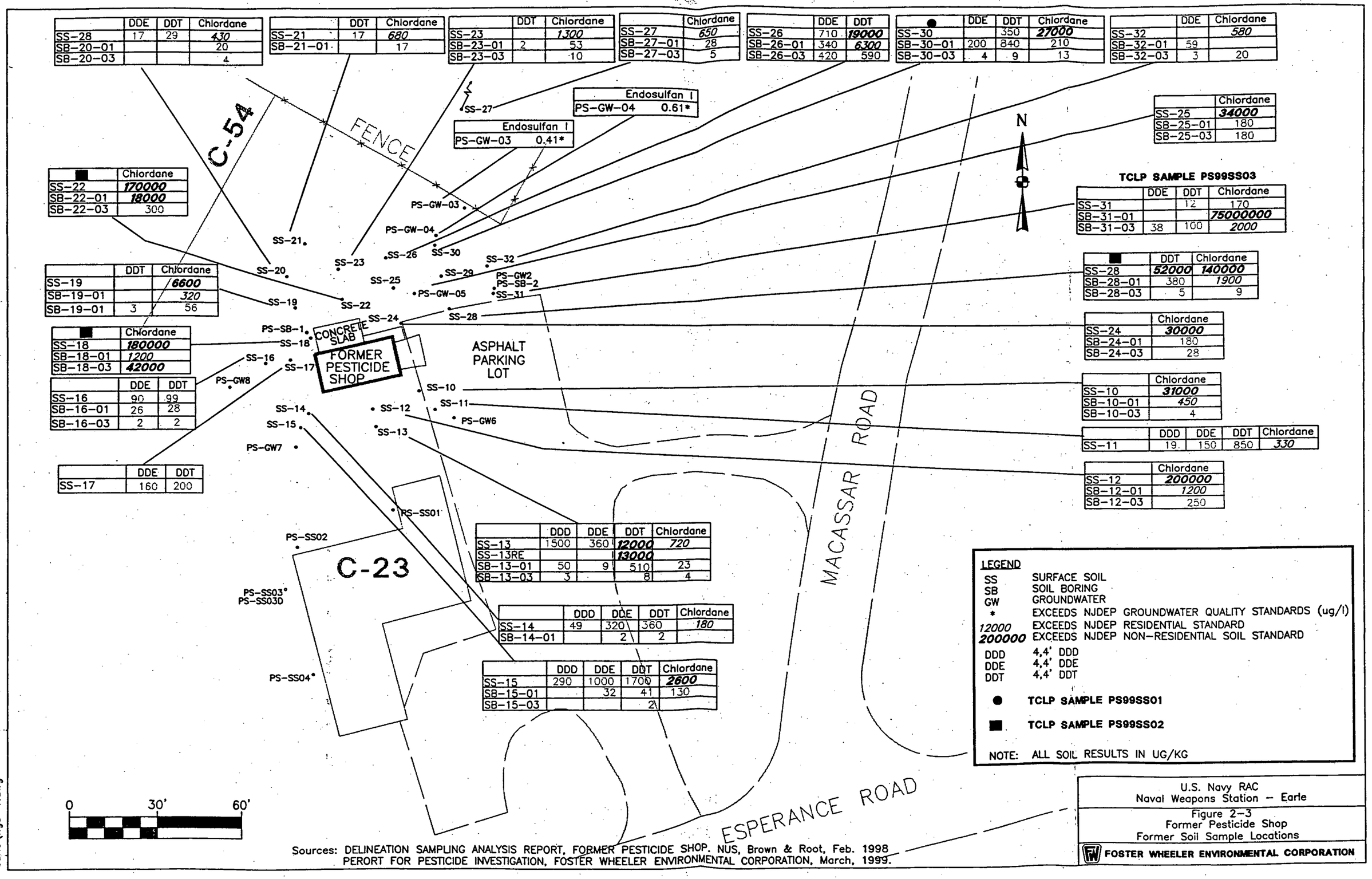
Shop were sampled from three discrete depths (surface, one and three-feet below grade). The soil samples were analyzed for chlorinated organic pesticides by SW-846 Method 8081A. Chlordane and 4,4'-DDT were the most frequently detected pesticides found in the soil samples. Chlordane was found in 20 of 23 surface soil samples; and 4,4' DDT was found in 13 of 23 surface soil samples. The laboratory analyses of soil samples collected in the area around the pesticide shop revealed the presence of: chlordane (up to 75,000 ppm); 4,4' DDD (up to 1.5 ppm); 4,4' DDE (up to 1 ppm); and 4,4' DDT (up to 52 ppm). Appendix A contains the Delineation Sampling and Analysis Report from the Old Pesticide Shop. Soils at the site are fine grained sands with some silt and minor pebbles. Some elevated photo-ionization detector (PID) readings (1 to 10.8 ppm) and a sweet aromatic odor were detected during the sampling effort.

On December 4, 1998 and January 9, 1999, Foster Wheeler Environmental conducted a soil and groundwater investigation at the Former Pesticide Shop. The project objectives included utilizing direct-push methods to collect soil samples and groundwater samples for the laboratory analyses of pesticides. The purpose of the sample collection was twofold. Soil samples were collected to further delineate the vertical extent of pesticide contamination in the soils at the previously identified "hotspots". Groundwater samples were collected at the site to determine if pesticides impacted the groundwater. Figure 2-3 depicts the locations and concentrations of soil samples collected from all previous investigations and the concentrations of constituents detected during the groundwater/hydropunch sampling.

To further delineate the two hot spots found during the previous investigation, additional subsurface soil samples were collected on December 4, 1998 at the former SB-18 and SB-31 locations. Samples were collected to a depth of 24 feet below grade and analyzed for pesticides to determine the maximum depth of contamination. Soil boring PS-SB-01 was adjacent to the original location of SB-18 and PS-SB02 was adjacent to the original location of SB-31. The Geoprobe was used to advance a macro-core sampler to a starting depth of 4 feet below grade at the PS-SB-01 and 6 feet below grade at PS-SB-02. At each location, continuous subsurface samples were collected from 2' intervals down to 24 feet below grade.

Groundwater was not found at either location within 24 feet below grade during the initial geoprobe work. Hydropunch samples were obtained at PS-SB01 and PS-SB-02 during the re-mobilization of the geoprobe on January 7, 1999 because a NJDEP permit was necessary to probe greater than 25 feet below grade.

A hydropunch was used install temporary groundwater monitoring wells to collect groundwater samples for the laboratory analyses of pesticides. Nine soil borings surrounding the former Pesticide Shop were completed on December 4, 1998 and January 7, 1999. A groundwater sample was




| | DDE | DDT | Chlordane |
|---|---|---|---|
| SS-28 | 17 | 29 | 430 |
| SB-20-01 | | | 20 |
| SB-20-03 | | | 4 |

| | DDT | Chlordane |
|---|---|---|
| SS-21 | 17 | 680 |
| SB-21-01 | | 17 |

| | DDT | Chlordane |
|---|---|---|
| SS-23 | | 1300 |
| SB-23-01 | 2 | 53 |
| SB-23-03 | | 10 |

| | Chlordane |
|---|---|
| SS-27 | 650 |
| SB-27-01 | 28 |
| SB-27-03 | 5 |

| | DDE | DDT |
|---|---|---|
| SS-26 | 710 | 19000 |
| SB-26-01 | 340 | 6300 |
| SB-26-03 | 420 | 590 |

| ● | DDE | DDT | Chlordane |
|---|---|---|---|
| SS-30 | | 350 | 27000 |
| SB-30-01 | 200 | 840 | 210 |
| SB-30-03 | 4 | 9 | 13 |

| | DDE | Chlordane |
|---|---|---|
| SS-32 | | 580 |
| SB-32-01 | 59 | |
| SB-32-03 | 3 | 20 |

| | Endosulfan I |
|---|---|
| PS-GW-04 | 0.61* |

| | Endosulfan I |
|---|---|
| PS-GW-03 | 0.41* |

| | Chlordane |
|---|---|
| SS-25 | 34000 |
| SB-25-01 | 180 |
| SB-25-03 | 180 |

| ■ | Chlordane |
|---|---|
| SS-22 | 170000 |
| SB-22-01 | 18000 |
| SB-22-03 | 300 |

**TCLP SAMPLE PS99SS03**

| | DDE | DDT | Chlordane |
|---|---|---|---|
| SS-31 | | 12 | 170 |
| SB-31-01 | | | 75000000 |
| SB-31-03 | 38 | 100 | 2000 |

| | DDT | Chlordane |
|---|---|---|
| SS-19 | | 6600 |
| SB-19-01 | | 320 |
| SB-19-01 | 3 | 56 |

| ■ | DDT | Chlordane |
|---|---|---|
| SS-28 | 52000 | 140000 |
| SB-28-01 | 380 | 1900 |
| SB-28-03 | 5 | 9 |

| ■ | Chlordane |
|---|---|
| SS-18 | 180000 |
| SB-18-01 | 1200 |
| SB-18-03 | 42000 |

| | Chlordane |
|---|---|
| SS-24 | 30000 |
| SB-24-01 | 180 |
| SB-24-03 | 28 |

| | DDE | DDT |
|---|---|---|
| SS-16 | 90 | 99 |
| SB-16-01 | 26 | 28 |
| SB-16-03 | 2 | 2 |

| | Chlordane |
|---|---|
| SS-10 | 31000 |
| SB-10-01 | 450 |
| SB-10-03 | 4 |

| | DDD | DDE | DDT | Chlordane |
|---|---|---|---|---|
| SS-11 | 19 | 150 | 850 | 330 |

| | DDE | DDT |
|---|---|---|
| SS-17 | 160 | 200 |

| | Chlordane |
|---|---|
| SS-12 | 200000 |
| SB-12-01 | 1200 |
| SB-12-03 | 250 |

| | DDD | DDE | DDT | Chlordane |
|---|---|---|---|---|
| SS-13 | 1500 | 360 | 12000 | 720 |
| SS-13RE | | | 13000 | |
| SB-13-01 | 50 | 9 | 510 | 23 |
| SB-13-03 | 3 | | 8 | 4 |

| | DDD | DDE | DDT | Chlordane |
|---|---|---|---|---|
| SS-14 | 49 | 320 | 360 | 180 |
| SB-14-01 | | 2 | 2 | |

| | DDD | DDE | DDT | Chlordane |
|---|---|---|---|---|
| SS-15 | 290 | 1000 | 1700 | 2600 |
| SB-15-01 | | 32 | 41 | 130 |
| SB-15-03 | | | 2 | |

LEGEND

| | |
|---|---|
| SS | SURFACE SOIL |
| SB | SOIL BORING |
| GW | GROUNDWATER |
| * | EXCEEDS NJDEP GROUNDWATER QUALITY STANDARDS (ug/l) |
| 12000 | EXCEEDS NJDEP RESIDENTIAL STANDARD |
| 200000 | EXCEEDS NJDEP NON-RESIDENTIAL SOIL STANDARD |
| DDD | 4,4' DDD |
| DDE | 4,4' DDE |
| DDT | 4,4' DDT |
| ● | TCLP SAMPLE PS99SS01 |
| ■ | TCLP SAMPLE PS99SS02 |

NOTE: ALL SOIL RESULTS IN UG/KG

Sources: DELINEATION SAMPLING ANALYSIS REPORT, FORMER PESTICIDE SHOP. NUS, Brown & Root, Feb. 1998
PEROPT FOR PESTICIDE INVESTIGATION, FOSTER WHEELER ENVIRONMENTAL CORPORATION, March, 1999.

U.S. Navy RAC
Naval Weapons Station – Earle

Figure 2-3
Former Pesticide Shop
Former Soil Sample Locations

FOSTER WHEELER ENVIRONMENTAL CORPORATION

earle\fig3-1.dwg

collected from each of the nine temporary well locations. No soil samples were obtained from these nine soil borings. The collection depth of the groundwater samples was determined by water table depth and input from the Site Geologist. The depths of the water table ranged from 18 feet to approximately 35 feet.

An underground septic tank exists to the north of the former Pesticide Shop. A stainless steel auger was used to access the sludge at the bottom of the tank. The sample (PS-SL01) was collected from a six inch interval of sludge near the bottom of the tank. The six inch interval was field composited and placed into the sample jars for laboratory analysis. The laboratory analysis of the sludge revealed a chlordane concentration of 9,500 mg/kg.

Both the soil and groundwater samples were analyzed for Chlorinated Organic Pesticides, SW846 Method 608/8081A. Four soil samples were analyzed for Nitroamines, SW846 Method 8332. Appendix B contains the Foster Wheeler Environmental Investigation Report, including all the analytical data.

On April 4, 1999, Foster Wheeler collected soil samples in order to obtain preliminary waste classification information for the soils at the Former Pesticide Shop. The soil samples were analyzed for TCLP pesticides and volatile organics. Appendix B contains the Analytical Report.

## 3.0 SCOPE OF WORK

The objectives of the this effort are to further delineate and excavate soils with pesticide and herbicide concentrations over the NJDEP Non-Residential Cleanup Criteria, excavate and remove all sludge, soils and piping associated with the former septic tank, and demolish the former pesticide building. The building demolition will include the removal of an asbestos transit roof, and the removal of all concrete pads associated with the building.

### 3.1 TASK 1 - PROJECT PLANNING/MANAGEMENT

Project Planning/Management activities include the preparation of pre-construction submittals, coordinating utility requirements, mobilization to the site, and providing Home Office support functions during the estimated period of performance. The subtasks involved in Project Planning/Management are described below.

#### 3.1.1 Subtask 1A - Pre-Construction Submittals

Foster Wheeler Environmental will prepare and submit the following pre-construction documents to the Navy:

***Work Plan***
The current document represents the Work Plan which presents Foster Wheeler Environmental's approach to executing the project, including the site description, statement of work, procurement

approach, field procedures, materials, transportation and disposal data, and sampling and analytical requirements.

***Health and Safety Plan (HASP)***

A site-specific Health and Safety Plan (HASP) shall be submitted as a separate document. The HASP shall include Foster Wheeler Environmental's approach to providing for the health and safety of its employees during the project.

***Asbestos Abatement Plan***

An Asbestos Abatement Plan shall be submitted for the removal of the transite roof of the Former Pesticide Shop.

3.1.2 Subtask 1B - Mobilization

Mobilization will consist of contacting appropriate Navy personnel at NWS Earle to arrange for contractor passes, and to coordinate support requirements for the remedial work. A utility survey shall be conducted to determine all utility lines in the area. Subsurface utilities shall be located by NWS-Earle Public Works personnel. A dig permit shall be obtained prior to any intrusive work.

3.1.3 Subtask 1C - Home Office Support

Foster Wheeler Environmental's Langhorne, Pennsylvania office will provide home office support for the project duration. Home office support includes the preparation of the required monthly progress, financial and technical reports.

## 3.2 TASK 2 - PERMIT PREPARATION/SUBMISSION

### 3.2.1 Soil Erosion Sediment Control Permit

A Soil Erosion and Sediment Control Plan shall be prepared and submitted to the Freehold Soil Conservation District in accordance to the Soil Erosion and Sediment Control Act, Chapter 251, P1.L 1975, as amended (NJSA 4:24-39 et seq). The Plan shall detail the proposed excavation area of the site, the erosion controls to be implemented, and the appropriate seeding requirements.

## 3.3 TASK 3 – DELINEATION OF AREA TO BE EXCAVATED

Previous investigations at the Former Pesticide Shop have indicated that the surface soils in the surrounding area are contaminated with chlordane and DDT above the NJDEP Residential and Non-Residential Cleanup Criteria. Based on the existing analytical data, the majority of the pesticide contamination is restricted to the top one to two feet of soil across the area of impact. There are also

allegations that herbicides may have been handled at the Former Pesticide Shop, in particular 2,4,5-trichlorophenoxyacetic acid (2,4,5-T). There are areas where elevated pesticide concentrations were detected to 3 feet below grade. The scope of this removal action is to remove the soils with pesticide/herbicide concentrations above the NJDEP Non-Residential Cleanup Criteria. In order to establish the area to be excavated, additional surface soil samples need to be obtained and analyzed to delineate the boundaries of the pesticide/herbicide contamination above the NJDEP Non-Residential Cleanup Criteria.

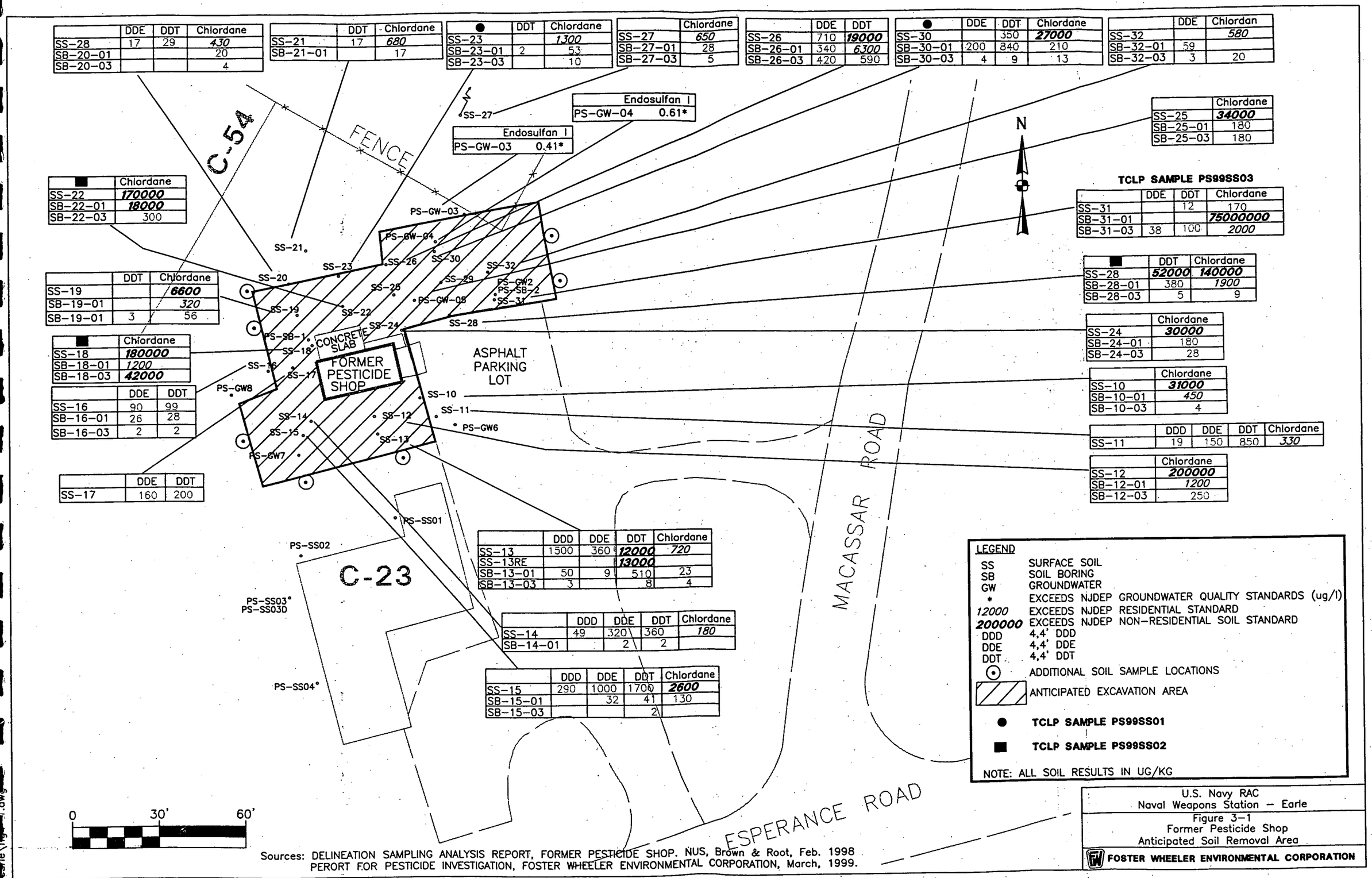
The area directly to the north of the Former Pesticide Shop is the only direction in which sufficient analytical data exist to establish the excavation boundary in that direction. Three soil samples (SS-20, SS-21 and SS-23) collected north of the Former Pesticide Shop contained pesticide concentrations below the NJDEP Non-Residential Cleanup Criteria. Figure 3-1 depicts the locations and concentrations of former soil samples collected at the site, and the anticipated area to be excavated. The area to the south of the Former Pesticide Shop requires further delineation in order to establish the limits of excavation between Building C-23 and the Pesticide Shop. The area to the west, between the Former Pesticide Shop and Building C-54, requires further delineation in order to establish the limits of excavation in this direction. The area to the northeast requires additional delineation in order to establish the limits of excavation to the northeast of the existing parking lot. Figure 3-1 depicts the proposed delineation sample locations.

Sections 4 and 5 contain the Sampling and Analysis Plan and Field Investigation Activities that detail the location, collection, and analyses of the soil samples.

If the laboratory analytical results of the delineation samples reveal concentrations of pesticides/herbicides above the NJDEP Non-Residential Cleanup Criteria, additional soil samples will be collected in order to determine the extent of the area to be excavated. The additional soil samples will be collected in accordance with the Sampling and Analysis Plan in Sections 4 and 5.

## 3.4 TASK 4 – DEMOLITION OF THE FORMER PESTICIDE SHOP

The existing structure that was the Former Pesticide Shop is a 12-foot by 28-foot concrete block structure set upon poured concrete. The building is approximately 12 feet tall and has a transite asbestos roof. It is also reported that the roofing material may be painted with a lead-based paint. There is a 10-foot by 14-foot concrete pad located immediately north of the building.




| | DDE | DDT | Chlordane |
|---|---|---|---|
| SS-28 | 17 | 29 | 430 |
| SB-20-01 | | | 20 |
| SB-20-03 | | | 4 |

| | DDT | Chlordane |
|---|---|---|
| SS-21 | 17 | 680 |
| SB-21-01 | | 17 |

| | DDT | Chlordane |
|---|---|---|
| SS-23 | | 1300 |
| SB-23-01 | 2 | 53 |
| SB-23-03 | | 10 |

| | Chlordane |
|---|---|
| SS-27 | 650 |
| SB-27-01 | 28 |
| SB-27-03 | 5 |

| | DDE | DDT |
|---|---|---|
| SS-26 | 710 | 19000 |
| SB-26-01 | 340 | 6300 |
| SB-26-03 | 420 | 590 |

| | DDE | DDT | Chlordane |
|---|---|---|---|
| SS-30 | | 350 | 27000 |
| SB-30-01 | 200 | 840 | 210 |
| SB-30-03 | 4 | 9 | 13 |

| | DDE | Chlordan |
|---|---|---|
| SS-32 | | 580 |
| SB-32-01 | 59 | |
| SB-32-03 | 3 | 20 |

| | Endosulfan I |
|---|---|
| PS-GW-04 | 0.61* |

| | Endosulfan I |
|---|---|
| PS-GW-03 | 0.41* |

| | Chlordane |
|---|---|
| SS-25 | 34000 |
| SB-25-01 | 180 |
| SB-25-03 | 180 |

| | Chlordane |
|---|---|
| SS-22 | 170000 |
| SB-22-01 | 18000 |
| SB-22-03 | 300 |

**TCLP SAMPLE PS99SS03**

| | DDE | DDT | Chlordane |
|---|---|---|---|
| SS-31 | | 12 | 170 |
| SB-31-01 | | | 75000000 |
| SB-31-03 | 38 | 100 | 2000 |

| | DDT | Chlordane |
|---|---|---|
| SS-19 | | 6600 |
| SB-19-01 | | 320 |
| SB-19-01 | 3 | 56 |

| | DDT | Chlordane |
|---|---|---|
| SS-28 | 52000 | 140000 |
| SB-28-01 | 380 | 1900 |
| SB-28-03 | 5 | 9 |

| | Chlordane |
|---|---|
| SS-24 | 30000 |
| SB-24-01 | 180 |
| SB-24-03 | 28 |

| | Chlordane |
|---|---|
| SS-18 | 180000 |
| SB-18-01 | 1200 |
| SB-18-03 | 42000 |

| | Chlordane |
|---|---|
| SS-10 | 31000 |
| SB-10-01 | 450 |
| SB-10-03 | 4 |

| | DDE | DDT |
|---|---|---|
| SS-16 | 90 | 99 |
| SB-16-01 | 26 | 28 |
| SB-16-03 | 2 | 2 |

| | DDD | DDE | DDT | Chlordane |
|---|---|---|---|---|
| SS-11 | 19 | 150 | 850 | 330 |

| | Chlordane |
|---|---|
| SS-12 | 200000 |
| SB-12-01 | 1200 |
| SB-12-03 | 250 |

| | DDE | DDT |
|---|---|---|
| SS-17 | 160 | 200 |

| | DDD | DDE | DDT | Chlordane |
|---|---|---|---|---|
| SS-13 | 1500 | 360 | 12000 | 720 |
| SS-13RE | | | 13000 | |
| SB-13-01 | 50 | 9 | 510 | 23 |
| SB-13-03 | 3 | | 8 | 4 |

| | DDD | DDE | DDT | Chlordane |
|---|---|---|---|---|
| SS-14 | 49 | 320 | 360 | 180 |
| SB-14-01 | | 2 | 2 | |

| | DDD | DDE | DDT | Chlordane |
|---|---|---|---|---|
| SS-15 | 290 | 1000 | 1700 | 2600 |
| SB-15-01 | | 32 | 41 | 130 |
| SB-15-03 | | | 2 | |

LEGEND

| | |
|---|---|
| SS | SURFACE SOIL |
| SB | SOIL BORING |
| GW | GROUNDWATER |
| * | EXCEEDS NJDEP GROUNDWATER QUALITY STANDARDS (ug/l) |
| 12000 | EXCEEDS NJDEP RESIDENTIAL STANDARD |
| 200000 | EXCEEDS NJDEP NON-RESIDENTIAL SOIL STANDARD |
| DDD | 4,4' DDD |
| DDE | 4,4' DDE |
| DDT | 4,4' DDT |
| ⊙ | ADDITIONAL SOIL SAMPLE LOCATIONS |
| ▨ | ANTICIPATED EXCAVATION AREA |
| ● | TCLP SAMPLE PS99SS01 |
| ■ | TCLP SAMPLE PS99SS02 |

NOTE: ALL SOIL RESULTS IN UG/KG

Sources: DELINEATION SAMPLING ANALYSIS REPORT, FORMER PESTICIDE SHOP. NUS, Brown & Root, Feb. 1998
PEROPT FOR PESTICIDE INVESTIGATION, FOSTER WHEELER ENVIRONMENTAL CORPORATION, March, 1999.

U.S. Navy RAC
Naval Weapons Station – Earle

Figure 3-1
Former Pesticide Shop
Anticipated Soil Removal Area

FOSTER WHEELER ENVIRONMENTAL CORPORATION

The scope of work includes the removal of the transite panels, and the demolition of the building and the associated concrete pads.

### 3.4.1 Electrical Disconnection

The existing electrical line that supplies the Former Pesticide Shop will be disconnected by a licensed electrician. The Former Pesticide Shop has an electrical line that runs underground from southern side of the building to the basement of Building C-23. An overhead telephone line runs from the adjacent Building C-23 to the Former Pesticide Shop. The electrical line shall be disconnected at Building C-23, and all associated conduit from inside Building C-23 to the Former Pesticide Shop shall be removed. The former overhead telephone lines shall be disconnected on the outside of Building C-23.

### 3.4.2 Removal of Transite Roof

A sample of the asbestos transite roof shall be analyzed for TCLP Metals to ensure that the past lead-based painting of the transit panels have not resulted in a hazardous classification of the material. Sections 4 and 5 provide details on the sampling and analyses. The transite panels will be removed from the building prior to demolition. A man-lift shall be used to lift a person to the required height to pry and remove the transit panels from the top of the structure. The nails attaching the panels to the support beams will be removed, and the panels pulled off as one piece, taking care not to break or damage the panels. The panels shall be adequately wetted down with water during the removal. The panels shall be removed, plastic double plastic bags, sealed, and placed in a lined roll-off container, with a cover, for transportation and disposal. Based upon the waste classification, the material shall be transported to a non-hazardous or hazardous waste landfill.

### 3.4.3 Demolition of Concrete Block Building

A backhoe, equipped with a hydraulic hammer, shall be used to break apart the concrete block wall and concrete foundation and stage the broken debris on plastic. If necessary, a water spray shall be used to minimize dust during the demolition. The concrete block wall shall be placed in a separate pile from the concrete floor debris. Both the concrete and concrete block piles shall be sampled and analyzed for waste characterization and disposal. Sections 4 and 5 provide details on the sampling and analyses of the demolition debris. There are no water or sewer lines entering or leaving the building. There is an old septic line that drains to a septic tank, to the north of the building. The septic tank, and the associated line, shall be excavated and removed as part of the soil excavation activities.

## 3.5 TASK 5 – CLEAR CUTTING

Approximately 0.5 acres shall be clear-cut in order to complete the soil removal activities around the Former Pesticide Shop. Mature trees and brush are located to the west, north and northeast of the Former Pesticide Shop, in the areas requiring soil excavation. Trees shall be cut down to the stumps and removed from the site for recycling. The stumps shall be excavated and disposed with the soils

removed from the site. The brush removed from the site shall be chipped on site and removed for recycling. The wood chips will either be used on site, or taken to an off-site recycling facility.

## 3.6 TASK 6 – SOIL EXCAVATION

The area to be excavated shall be staked out based on previous analytical results of soil samples, as well as the analytical results of additional soil delineation samples collected during this remedial action. Based upon the available analytical data, hazardous and non-hazardous soils will be generated during the remedial action at the Former Pesticide Shop. The majority of the excavated soil is anticipated to be non-hazardous. The soils on site shall be excavated and stock-piled based upon previous and newly obtained analytical results. The suspected hazardous soils shall be stock-piled in a separate location from the suspected non-hazardous soils. All soils will be properly sampled and analyzed to determine the proper waste classification. The Sampling and Analysis Plan in Sections 4 and 5 describe the specific sampling and analysis procedures. Section 8.8 discusses hazardous waste management.

Based on the existing data, it appears the soils associated with the former septic tank, as well as soils located just north of the existing parking lot, contain concentrations of chlordane which may result in a hazardous classification. This assumption is based upon existing total pesticide and TCLP pesticide laboratory data of soil samples obtained from these areas. The TCLP sample (PS99SS03) obtained from north of the parking lot area had a chlordane concentration of 0.29 mg/l, which is above the criteria for hazardous constituents (0.03 mg/l ) for chlordane. According to 40CFR δ261.30, wastes exhibiting a TCLP chlordane concentration of 0.03 mg/l or greater are hazardous (D020) due to the characteristic of toxicity. A soil sample from the former septic tank contained a chlordane concentration of 9,500 mg/kg. No TCLP sample was obtained from the septic tank. Confirmatory soil samples shall be obtained from the hazardous soil excavation area. The confirmatory soil samples shall be analyzed for Total Pesticides and Herbicides and TCLP Pesticides and Herbicides to verify that the hazardous concentrations of soils were excavated, and determine if NJDEP Clean-Up Criteria are met. The Sampling and Analysis Plan in Sections 4 and 5 describe the specific sampling and analysis procedures

The soils from the septic tank, including the piping, shall be stock-piled with the soils excavated from the area to the adjacent to the northern edge of the asphalt parking lot. The soils suspected to be hazardous shall be excavated, stock-piled and sampled for waste characterization prior to any other soils to ensure that the soils are removed from the site before 90-days to comply with federal and state regulations.

The potentially hazardous soils will be placed on double-lined polyurethane sheeting (poly). Hay bales will be placed around the soil piles, and the poly will be placed up and around the hay bales to prevent run-off from the piles as well as prevent surface run-on. The piles will be covered with poly and anchored down. The Sampling and Analysis Plan in Sections 4 and 5 details the waste characteristic sampling of the soils. Section 8.8 discusses hazardous waste management. Any

stormwater indirectly contacting the exposed stockpiles will be collected and disposed as RCRA hazardous waste, as per RCRA contact rule.

The area of excavation shall be delineated with stakes prior to excavation. Grading stakes shall also be used to determine the approximate depth of excavation below existing grade. The majority of the site shall be excavated to a depth of 1.5 feet below the existing grade. This depth is based on the available data depicting the soil concentrations greater than the Non-Residential Cleanup Criteria. Several areas will require excavation to a depth greater than 1.5 feet below grade. It is anticipated that the areas around the concrete slab, north of the Pesticide Shop, and the area north of the asphalt parking lot will be excavated to a depth of three to four feet below grade. The former septic tank, which is four feet below grade, shall also be excavated to five to six feet below grade in the immediate area of the tank. Figure 3-1 depicts the anticipated area of soil excavation based on the available data.

## 3.7 TASK 7 – SURVEY OF EXCAVATION AND SAMPLE LOCATIONS

Once the excavation is completed, a licensed surveyor shall survey the extent of the excavation, and the locations of the individual confirmatory soil samples. The survey data shall be included in the Final Close-Out Report.

## 3.8 TASK 8 – BACKFILLING OF EXCAVATION

The excavation shall be backfilled and re-graded after a review of the confirmatory soil laboratory analytical results. Sections 4 and 5 detail the collection and laboratory analyses of the confirmatory soil samples. The excavation shall not be backfilled until a review of the confirmatory soil laboratory analyses determine that all the soils with concentrations of pesticides and herbicides over the NJDEP Non-Residential Cleanup Criteria have been removed and Navy direction is received.

Certified-clean fill and topsoil will be placed in the excavation to restore the site to the original grade elevations. A tracked bulldozer and a vibratory roller shall be used to place, grade and compact the fill material in accordance with the specifications contained in Appendix C. The fill material shall be placed to within 6 inches of the final grade. The final 6 inches of the surface shall be backfilled with topsoil and seeded in accordance with the Soil and Sediment Erosion Control Plan.

The topsoil shall be treated with lime and fertilizer, seeded and mulched upon the completion of the final grade. The topsoil will be tested in an approved laboratory to determine fertilization and liming requirements. The seed shall be placed in accordance with the specifications contained in Appendix C.

## 4.0 FIELD SAMPLING AND ANALYSIS PLAN

### 4.1 INTRODUCTION

Foster Wheeler Environmental Corporation (FWENC) is submitting this Sampling and Analysis Plan (SAP) for the remedial activities at the Former Pesticide Shop at the Naval Weapons Station (NWS) Earle located in Colts Neck, NJ. The purpose of the sampling is: 1) to further delineate the lateral extent of pesticide and herbicide soil concentrations higher than the NJDEP Non-Residential Cleanup Criteria; 2) obtain confirmatory soil samples to verify the soils above these cleanup criteria have been excavated; 3) and to characterize the excavated soils and demolition debris for off-site disposal. This work is being performed under Delivery Order No. 0034 to Navy Contract N62472-94-D-0398

The SAP presents the procedures to be followed during the remedial activities. The SAP specifically addresses the following areas:

- Analytical Requirements
- Responsibilities of Site Personnel
- Sample Analytical Program
- Sample Packing and Shipping
- Documentation
- Field Sampling Program
- Quality Assurance/Quality Control
- Procedures for Field Changes and Corrective Actions

Site-specific Standard Operating Procedures have been included (Section 5) to describe the sampling procedures. Any modifications necessary to these SOPs due to field conditions or other unforeseen situations shall be recorded in the site logbook, documented on the appropriate forms by site personnel, and approved by the Project Manager (See Section 4.2).

### 4.2 PERSONNEL RESPONSIBILITIES

The project team will include the following personnel:

The Senior Project Engineer/Manager (SPEM) has final responsibility for the development of the SAP and management of the project team.

The Project Superintendent (PS) is responsible for assuring that proper collection, packaging, preservation, and shipping of samples is performed in accordance with the SAP. In addition, the PS is responsible for coordinating with the subcontracted laboratory during sample analysis and for reviewing the analytical data received from the laboratory. The PS is health and safety cross trained and shall also function as the Site Health and Safety Officer (SHSO). The SHSO is responsible for the safety of all site personnel as detailed in the site-specific Health and Safety Plan (HASP), presented under separate cover.

The Laboratory Subcontractor is responsible for supplying all services (including labor), equipment, and material required to perform the analysis of the environmental samples. The laboratory subcontractors are responsible for following all specified methodology protocols, including quality assurance/quality control (QA/QC) requirements. In addition, the laboratory subcontractors are responsible for the proper disposal, including all associated costs, of the environmental samples upon completion of the analytical work.

## 4.3 FIELD SAMPLING ACTIVITIES

This section addresses the field investigation activities, including:

- Sample Tracking System
- Sample Analytical Requirements
- Sample Packaging and Shipping
- Sample Documentation

### 4.3.1 SAMPLE TRACKING SYSTEM

The objective of the sample identification system is to provide a framework for developing sample numbers that are unique to that sample and convey information regarding sample type that will enable data users to easily identify sample locations. The sample designation is established in order to integrate the data into the Navy's Geographical Information System (GIS)

The first two letters of the sample tracking system shall refer to this site-specific location, which in this case is Pesticide Shop (PS). All soil and waste sample identifiers shall begin with the letters PS. In order to identify the specific sample, the date and round shall be appended to the sample name. PSSS01-00-1 would refer to Pesticide Shop, soil sample number 1, taken from the first round in 2000. A "D" would be added to the sample nomenclature to indicate a duplicate sample.

Different letters shall be used in order to identify the type of sample. For the purposes of this sampling effort, the following characters shall be assigned to identify the various matrices:

| | |
|---|---|
| SS = Soil Sample | WC=Waste Characterization |
| CS= Confirmatory Soil | |
| FB= Field Blank | RB= Rinsate Blank |

The SS (Soil Samples) will include the additional delineation samples. **In order to avoid confusion with existing sample numbers of previously collected soil samples, the new soil samples will start with the number 33 since the last numerical sample number at the site was SS-32.** Confirmatory soil samples were assigned the CS identifier in order to avoid confusion with the soil samples obtained at the site. If additional excavation and sampling are required in the area of a specific sample location, the new confirmatory soil sample shall be assigned a sequential number. For example, PS-CS01-00-01 would refer to Pesticide Shop, confirmatory soil sample number one

taken in 2000; PS-CS01-00-02 would refer to the second confirmatory soil sample obtained at location CS01.

A cumulative sampling master log will be maintained as the field program progresses. The samples taken will be referenced to each sampling location in the master log and on a detailed site map.

### 4.3.2 Sample Analytical Requirements

Table 4-1 specifies location, number of samples, matrix, laboratory analyses, and rationale for each sample type. Table 4-2 specifies the laboratory bottleware and the holding times for the samples.

### 4.3.3 Sample Packaging And Shipping

The objective of the sample packaging and shipping requirements are to maintain sample integrity from the time a sample is collected until it is received at the analytical laboratory. Chain-of-custody (COC) forms, sample labels, custody seals, and other sample documents will be completed to maintain sample integrity. Specific procedures for packaging and shipping of environmental samples are presented below. These procedures were obtained from the NJDEP Field Sampling Procedures Manual.

#### 4.3.3.1 Environmental Samples

Low-concentration samples are defined as environmental samples and should be packaged for shipment as follows:

1. A sample label is attached to the sample bottle. The label should be taped over with clear packing tape to preserve legibility.

2. A picnic cooler (such as a Coleman or other sturdy cooler) is typically used as a shipping container. In preparation for shipping samples, the drain plug is taped shut from the inside and outside, and a large plastic bag is used as a liner for the cooler. Approximately 1 inch of packing material, such as asbestos-free vermiculite, perlite, or styrofoam beads, is placed in the bottom of the liner.

3. The sample bottles are placed in the lined picnic cooler. Cardboard separators, and/or additional packing material, should be placed between the bottles to prevent breakage during shipping.

4. Aqueous samples for low or medium-level analysis must be shipped cooled to 4°C with ice. No ice is used in shipping high-level aqueous samples, or soil samples, or dioxin samples. Ice is not required in shipping soil samples, but may be utilized at the option of the sampler. All volatile organic compounds and cyanide samples, however, must be shipped cooled to 4°C.

**TABLE 4-1**
**NAVAL WEAPONS STATION-EARLE**
**DELIVERY ORDER 0034**
**SAMPLING AND ANALYSIS REQUIREMENTS**

| *Media* | *Analyses* | *Frequency* | *Quantity* * | *Method* | *Rationale* |
|---|---|---|---|---|---|
| Soil | Chlorinated Organic Pesticides<br>Chlorinated Organic Herbicides | Soil collected from 0 to 6 inches south, west, and east of the Pesticide Shop area. | 8 * | EPA SW-846 8081A<br>Chlorinated Organic Pesticides<br>EPA SW-846 8151A | To further delineate the pesticide concentrations in soil over the NJDEP Non-Residential Cleanup Criteria in order to establish area of excavation. |
| Soil | Chlorinated Organic Pesticides<br>Chlorinated Organic Herbicides | Soil collected from 0 to 6 inches under the Former Pesticide Shop after demolition. | 2 | EPA SW-846 8081A<br>EPA SW-846 8151A | To determine if the soils under the Former Pesticide Shop contain concentrations of pesticides/herbicides warranting removal. |
| Soil | Full TCLP<br>RCRA Characteristics<br>Paint Filter Test<br>Total Volatile Solids<br>Total Solids<br>Oil and Grease<br>PCBs<br>Chlorinated Herbicides | Homogenize a 5 to 1 composite sample collected from the midpoint of the stockpiled soils. | 3 | TCLP VOAS: SW-846 8260<br>TCLP S-VOCs: SW-846 8270<br>TCLP Metals: SW-846 6010/7000<br>TCLP Pesticides: SW-846 8081<br>TCLP Herbicides: SW-846 8150<br>Corrosivity: SW-9045<br>Ignitability: SW8-846 1010/1020<br>Reactivity: As per SW-846, Chapter 7<br>Paint Filter Test: SW-846 9095<br>Total VOC Solids: EPA 160.3<br>Total Solids: EPA 160.4<br>Oil and Grease: SW-846 9071<br>PCBs: SW-846 8082<br>Chlorinated Herbicides: SW-846 8151A | To characterize the soils for off-site disposal. |
| Soil | TLCP Pesticides/ Herbicides<br>TCLP Metals<br>Chlorinated Herbicides | Homogenize a 5 to 1 composite sample collected from the midpoint of the stockpiled soils. | 5 | TCLP Pesticides: SW-846 8081<br>TCLP Herbicides: SW-846 8150<br>TCLP Metals: SW-846 6010/7000<br>Chlorinated Herbicides: SW-846 8151A | To characterize the soils for off-site disposal. |
| Construction Debris | TCLP Pesticides/ Herbicides<br>TCLP Lead | Homogenize a 5:1 composite sample of the construction debris | 1 | SW 846 Method 8081 8150<br>SW 846 Method 6010/7000 | To characterize the construction debris for off site disposal. |

* Quantities include duplicate samples for quality assurance.

**TABLE 4-1 (Continued)**
**NAVAL WEAPONS STATION-EARLE**
**DELIVERY ORDER 0034**
**SAMPLING AND ANALYSIS REQUIREMENTS**

| *Media* | *Analyses* | *Frequency* | *Quantity ** | *Method* | *Rationale* |
|---|---|---|---|---|---|
| Concrete Debris | TCLP Pesticides /Herbicides<br>TCLP Lead | Homogenize a 5:1 composite sample of the concrete debris | 1 | SW 846 Method 8081 8150<br>SW 846 Method 6010/7000 | To characterize the construction debris for off site disposal. |
| Transite Roofing | TCLP Lead | Homogenize a composite sample broken off 5 separate areas of the transite roof. | 1 | SW 846 Method 6010/7000 | To characterize the asbestos roof for off site disposal. |
| Soil | Chlorinated Organic Pesticides<br>Chlorinated Organic Herbicides | Sidewall sample every 30 linear feet and bottom samples every 900 $ft^2$<br>(As specified in N.J.A.C. 7:26E) | 19 * | EPA SW-846 8081A<br>EPA SW-846 8151A | To verify the removal of soils above the NJDEP Non-Residential Cleanup Criteria for pesticides and herbicides. |
| Water | Total Metals<br>Pesticides/Herbicides<br>RCRA Characteristics | One composite sample obtained from drums of decon water | 1 | Metals: SW-846 6010/7000<br>Pesticides: SW-846 8081<br>Herbicides: SW-846 8150<br>Corrosivity: SW-9045<br>Ignitability: SW8-846 1010/1020<br>Reactivity: As per SW-846, Chapter 7 | To characterize the decon water for off-site disposal. |
| Water | Total Metals<br>Pesticides/Herbicides | One rinsate blank per 20 soil samples | 2 | Metals: SW-846 6010/7000<br>Pesticides: SW-846 8081<br>Herbicides: SW-846 8151A | Document quality assurance/quality control of decontamination procedures |

**TABLE 4-2**
**NAVAL WEAPONS STATION-EARLE**
**FORMER PESTICIDE SHOP**
**BOTTLEWARE AND HOLDING TIMES**

| Media | Analyses | Bottle | Preservative * | Laboratory Holding Times |
|---|---|---|---|---|
| Solid | TCLP Volatile Organics<br>TCLP Semi-Volatile Organics | 1-8 oz. Glass jar | None | 14 days to extract, 40 days to analysis |
| Solid | TCLP Pesticides/Herbicides | 1-8 oz. Glass jar | None | 7 days to extract, 40 days to analysis |
| Solid | TCLP Metals | 1-8 oz glass jar | None | 6 months to extract |
| Solid | TCLP Pesticides/Herbicides | 1 8 oz glass jar | None | 14 days |
| Solid | PCBs | 1 8 oz glass jar | None | 14 days |
| Solid | Reactivity: Sulfides/Cyanides<br>Corrosivity<br>Ignitability<br>Paint Filter Test | 1 8oz glass jar | None | 7 days-As soon as possible |
| Solid | Total Solids, Total Volatile Solids | 1 8 oz glass jar | None | 7 days |
| Solid | Oil and Grease | 1 8 oz glass jar | None | 28 days |
| Soil | Chlorinated Organic Pesticides | One (1) 8 oz. glass jar. | None | 7 days to extraction, 40 days from extraction to laboratory analysis |
| Soil | Lead | One (1) 8 oz. glass jar. | None | 6 months to analysis |
| Soil | Chlorinated Herbicides | One (1) 8 oz glass jar | None | 14 days to extraction, 40 days from extraction to laboratory analysis |
| Aqueous | Chlorinated Organic Pesticides | Two (2) 1 liter amber bottles | None | 7 days to extraction, 40 days from extraction to laboratory analysis |
| Aqueous | Total Metals | One (1) 1 liter poly bottle | Nitric Acid | 6 months |
| Aqueous | RCRA Characteristics | One (1) 1 liter amber bottle | None | As soon as possible |

* All samples will be placed on ice upon collection, and shipped with ice.

5. The lined cooler is filled with packing material (such as asbestos-free vermiculite, perlite, or styrofoam beads), and the large inner liner is taped shut. Sufficient packing materials should be used to prevent sample containers from making contact during shipment.

6. The paperwork being shipped to the laboratory is placed inside a plastic bag. The base is sealed and taped to the inside of the cooler lid. A copy of the COC form should be included in the paperwork sent to the laboratory. The last block on the COC form should indicate the overnight carrier and airbill number. The airbill must be filled out before the samples are handed over to the carrier. The laboratory should be notified if the shipper suspects that the sample contains any substance for which the laboratory personnel should take safety precautions.

7. The cooler is taped shut with strapping tape (filament-type).

8. At least two signed custody seals are placed on the cooler, one on the front and one on the back.

9. The cooler is handed over to the overnight carrier. A standard airbill is necessary for shipping environmental samples.

4.3.3.2 Hazardous Samples

Medium- and high-concentration samples are defined as hazardous and must be packaged as follows:

1. A sample label is attached to the sample bottle. The label should be taped over with clear packaging tape to preserve legibility.

2. Each sample bottle is placed in a plastic bag, and the bag is sealed. For medium-concentration water samples, each VOA vial is wrapped in a paper towel, and the two vials are placed in one bag. As much air as possible is squeezed from the bags before sealing.

3. Each bottle is placed in a separate paint can, the paint can is filled with vermiculite, and the lid is fixed to the can. The lid must be sealed with metal clips, or with filament or evidence tape; if clips are used, the manufacturer normally recommend six clips.

4. Arrows are placed on the can to indicate which end is up.

5. The outside of each can must contain the proper DOT shipping name and identification number for the sample. The information may be placed on stickers or printed legibly. A liquid sample of an uncertain nature is shipped as a flammable liquid with shipping name "FLAMMABLE LIQUID, N.O.S." and the identification number "UN1993." A solid sample of uncertain nature is shipped as a flammable solid with the shipping name "FLAMMABLE SOLID, N.O.S." and the identification number "UN1325." If the nature of the sample is known, 49 CFR 171-177 is consulted to determine the proper labeling and packaging requirements.

6. The cans are placed upright in a cooler lined with a plastic garbage-type bag, with the drain plug taped shut inside and out. Asbestos-free vermiculite, perlite, or styrofoam is placed in the bottom

of the cooler. Two sizes of paint cans are used: half-gallon and gallon. The half-gallon paint cans may be stored on top of each other; however, one-gallon cans are too high to stack. The cooler is filled with packing material and the plastic liner is taped shut.

7. The paperwork going to the laboratory is placed inside a sealable plastic bag and taped to the inside of the cooler lid. A copy of the COC form must be included in the paperwork sent to the laboratory. The sampler keeps one copy of the COC form. The laboratory should be notified if the sample is suspected of containing any substance for which laboratory personnel should take safety precautions.

8. The cooler is closed and sealed with strapping tape. At least two custody seals are placed on the outside of the cooler (one on the front and one on the back).

9. The following markings are placed on top of the cooler:

    - Proper shipping name (49 CFR 172.301)
    - DOT identification number (49 CFR 172.301)
    - Shipper's or consignee's name and address (49 CFR 172.306)
    - "This End Up" legibly written if shipment contains liquid hazardous materials (49 CFR 172.312)

10. The following labels are required on top of the cooler (49 CFR 172.406e):

    - Appropriate hazard class label (placed next to the proper shipping name)
    - "Cargo Aircraft Only" (if applicable as identified in 49 CFR 172.101)

11. Arrow symbols indicating "This Way Up" should be placed on the cooler in addition to the marking and labels described above.

12. Restricted-article airbills are used for shipment indicating the following:

    - Number of packages or number of coolers.

    - Proper shipping name. If unknown, use FLAMMABLE SOLID, N.O.S. or FLAMMABLE LIQUID, N.O.S.

    - Classification; if unknown, use flammable solid or flammable liquid.

    - Identification number; if unknown, use UN1325 (for flammable solids) or UN1993 (for flammable liquids).

    - Net quantity per package or amount of substance in each cooler.

    - Radioactive materials section (leave blank).

- Passenger or cargo aircraft (cross off the nonapplicable). Up to 25 pounds of flammable solid per cooler can be shipped on a passenger or cargo aircraft. Up to 1 quart of flammable liquid per cooler can be shipped on a passenger aircraft, and up to 10 gallons of flammable liquids per cooler can be shipped on a cargo aircraft).

- Name and title of shipper (printed).

- An emergency telephone number at which the shipper can be reached within 24-48 hours.

- Shipper's signature.

NOTE: The penalties for improper shipment of hazardous materials are severe. A fine of $25,000 and five years imprisonment can be imposed for each violation.

#### 4.3.4 Sample Documentation

The following documentation is associated with sample collection and transfer:

- Field Logbooks
- Site Logbooks
- Master Sample Log
- Sample Label
- Chain-of-Custody Form
- Custody Seals
- Shipping Airbill.

## 5.0 FIELD INVESTIGATION ACTIVITIES

### 5.1 STANDARD OPERATING PROCEDURES (SOPs)

Technical guidelines used in preparing this SAP were obtained primarily from the following sources:

- Findings and Recommendation for the Remediation of Historic Pesticide Contamination-Final Report. Historic Pesticide Contamination Task Force. March 1999

- June 1988 Sampling and Chemical Analysis Quality Assurance Requirements for the Navy Installation Restoration Program, NESSA 20.2-047B

- The New Jersey Department of Environmental Protection (NJDEP) Field Sampling Procedures Manual (May 1992)

- The New Jersey Department of Environmental Protection Guidance Document for the Remediation of Contaminated Soils. (June 1996)

All of the aforementioned guidance documents were consulted in preparation of this SAP to ensure that the procedures presented in this SAP are consistent with each document.

## 5.2 FIELD INVESTIGATION PROGRAM

The following sections detail the field investigation program. Primary tasks of the program include Mobilization/Demobilization (Section 5.2.1), Delineation Soil Sampling (Section 5.2.2), Construction Debris Waste Classification Sampling (Section 5.2.3), Soil Waste Classification Sampling (Section 5.2.4), Post-Excavation Sampling (Section 5.2.5), and Decon Water Classification Sampling (Section 5.2.6).

### 5.2.1 Mobilization and Demobilization

Mobilization shall consist mobilizing a site trailer and contacting appropriate Navy personnel at NWS Earle to arrange for contractor passes and to coordinate support requirements for the remedial action.

FWENC shall contact the NWS-Earle Public Works Department to obtain a dig permit and have all utilities marked out prior to advancing the soil borings.

### 5.2.2 Delineation Soil Sampling

***Objectives***

The objectives of collecting subsurface soil samples for laboratory analysis is to laterally delineate the pesticide and herbicide concentrations that exceed the NJDEP Non-Residential Cleanup Criteria to determine the extent of the soil excavation activities.

***Sampling Equipment and Procedures***

Subsurface soil samples shall be collected using a stainless steel trowel or hand auger. The samples shall be collected 0 to 0.5 feet below grade. The soil will be field screened with a Photoionization Detector (PID). If the analytical results of the soil samples determine that the soils in a particular area are greater than the NJDEP Non-Residential Cleanup Criteria, additional soil samples shall be collected an additional 25 feet out from the area of known contamination. Soil samples shall be collected around the perimeter of the proposed excavation area until concentrations of pesticides are determined to be less than the NJDEP Non-Residential Cleanup Criteria.

***Sample Analysis***

Seven (7) soil samples, plus a duplicate, shall initially be collected and analyzed for pesticides and herbicides as described in Table 4-1.

5.2.3 Construction Debris Waste Classification Sampling

***Objective***

The objectives of the construction waste classification sampling and analysis is to characterize the construction debris for off-site disposal.

***Location and Frequency and Analysis***

The asbestos transite roof shall be sampled and laboratory analyzed for TCLP metals. The roof is being analyzed for metals because it is suspected that lead-based paint was used on the transite roof. One grab sample of the transite roof shall be broken off and analyzed.

The construction debris shall be segregated into two specific piles. The construction debris from the walls and roof shall be placed in one pile, while the concrete debris from the floor and pads shall be place in a separate pile. Each construction debris pile shall be sampled once the building has been demolished and the debris stock-piled on plastic. One composite sample, obtained from five (5) separate grab samples shall be obtained from the concrete block and wood pile, and one composite, obtained from five (5) separate grab samples shall also be obtained from the stock-piled concrete from the foundations. The construction debris samples shall be analyzed for TCLP Pesticides/Herbicides and Metals and RCRA Characteristics.

5.2.4 Soil Waste Classification Sampling

***Objective***

The objectives of the soil waste classification sampling and analysis is to characterize the excavated soils for off-site disposal.

***Location and Frequency and Analysis***

In accordance with the NJDEP Guidance Document for the Remediation of Contaminated Soils, 1996, a minimum of two samples shall be collected from the first 100 cubic yards of soil, and one sample for each additional 100 cubic yards of soil excavated and stock-piled. It is anticipated that eight (8) waste characterization samples will be collected from the stock-piled soils. Two (2) soil samples shall be collected from the stock-piled soil that is anticipated to be hazardous. It is anticipated that the hazardous soils will be less than 100 cubic yards. Six (6) soil samples shall be collected from the non-hazardous stock piled soils. Two (2) samples shall be collected from the first 100 cubic yards, and one sample per 100 cubic yards thereafter.

The exact laboratory analyses of the soil samples will be determined by the disposal facilities, but is anticipated that all the soil samples will be analyzed for TCLP pesticides, TCLP herbicides and TCLP metals. The soil is being analyzed for chlorinated herbicides because of the potential presence of 2,4,5-T being in the soils. A minimum of three soil samples shall be analyzed for Full TCLP, RCRA Characteristics (reactivity, ignitability, corrosivity), PCBs, Total Volatile Organics, Paint Filter Test, Dioxins and Oil and Grease. Table 4-1 provides details on the specific analytical methods.

***Equipment and Procedures***

The piles shall be marked in 100 cubic yard grids. A decontaminated stainless steel hand auger shall be used to bore through the soil piles. The soil samples shall be visually examined and screened with a PID. Sample collection shall be biased towards the location of the highest suspected contaminant concentrations based on the field screenings and observations. If no field screening or visual observations are made to locate the areas of highest suspected contamination, the soil sample shall be collected from mid-depth in the pile.

A minimum of two composite soil samples shall be collected from the first 100 cubic yards of soil (Two in each of the suspected hazardous and suspected non-hazardous piles). Each composite sample shall be obtained from five (5) individual grab samples. The grab samples shall be homogenized in a stainless steel bowl and placed into the individual laboratory bottles. One composite soil sample shall then be collected from every 100 cubic yard pile. Each composite sample shall be obtained from five (5) individual grab samples. The grab samples shall be homogenized in a stainless steel bowl and placed into the individual laboratory bottles.

5.2.5 Post-Excavation Sampling

***Objective***

The objectives of the post-excavation soil sampling is to document the removal of all pesticide and herbicide contaminants above the NJDEP Non-Residential Cleanup Criteria.

***Location and Frequency and Analysis***

In accordance with the N.J.A.C. 7:26E-6.4, one confirmatory soil sample shall be obtained from the top of each sidewall for every 30 linear feet of sidewall, and one confirmatory soil sample from the bottom for every 900 square feet of bottom area. Based on the anticipated area of excavation, it is estimated that a total of twelve (12) sidewall samples and six (6) bottom samples shall be collected for post excavation sampling.

Post excavation soil samples shall be obtained from 0 to 6 inches below ground surface (bgs) from the sidewalls and bottom of the excavation. The 0 to 6-inch interval will be collected with a decontaminated stainless steel trowel and placed in a stainless steel mixing bowl for homogenization. The soil will be screened with a PID prior to homogenization. The PID readings will be recorded in logbook, as well as description of the soil, the time, date, laboratory analyses, and any other pertinent field data.

An equipment field blank, a duplicate sample and a MS/MSD sample will be collected at a rate of one per twenty samples collected.

The confirmatory soil samples shall be analyzed for total pesticides and herbicides. Table 4-1 provides the laboratory analyses methodology.

### 5.2.6 Decon Water Classification Sampling

***Objective***

The objective of the decontamination (decon) water classification sampling and analysis is to characterize the water generated during the equipment decontamination for off-site disposal.

***Location and Frequency and Analysis***

Once the decon water has been containerized in 55-gallon drums, aqueous samples shall be obtained from the drums. A disposable glass drum-thief shall be used to collect a composite sample from the drums for waste classification. An equal amount of water shall be obtained from each drum and composited directly into the sample bottles.

The decon water shall be analyzed for pesticides, herbicides, metals, and RCRA characteristics.

## 5.3 DECONTAMINATION

The objective of this section is to provide the methodology for the proper decontamination procedures to be used on chemical sampling and field analytical equipment.

In order to assure that chemical analysis results are reflective of the actual concentrations present at sampling locations, chemical sampling and field analysis equipment must be properly decontaminated prior to the field effort, during the sampling program (i.e. between sample points), and at the conclusion of the sampling program. This will minimize the potential for cross-contamination between sample points and the transfer of contamination off-site.

Prior to sampling, equipment will be decontaminated using the following procedures:

1. Potable water rinse.

2. Alconox or Liquinox detergent wash.

3. Scrubbing with a scrub brush may be required if the equipment is heavily contaminated with heavy or extremely viscous compounds (not anticipated).

4. Potable water rinse.

5. Distilled, deionized water rinse.

6. Methanol rinse.

7. Distilled, deionized water rinse.

8. Air dry.

The heavy equipment utilized at the site shall be decontaminated with a power washer. A decontamination pad shall be constructed to contain the water during decontamination procedures

## 6.0 QA/QC VERIFICATION OF FIELD SAMPLING AND PROCEDURES FOR FIELD CHANGES AND CORRECTIVE ACTION

### 6.1 QA/QC FIELD AUDITS

Quality assurance and quality control during the sampling program will be performed by the Foster Wheeler Environmental Project Superintendent (PS). The PS will supervise all sampling and documentation and subcontractor operations to ensure that all activities are being performed in accordance with the SAP. The PS will report all findings to the SPEM.

### 6.2 FIELD CHANGES AND CORRECTIVE ACTIONS

The SPEM or his designee is responsible for all site activities. In this role, the SPEM is required at times to adjust the field program to accommodate site-specific needs. When it becomes necessary to modify a program, the responsible sampling personnel will notify the SPEM of the anticipated changes prior to implementation. Changes will only be acted upon with the SPEM's concurrence. The SPEM will consult with the Navy Technical Representative (NTR) ahead of time for major changes and receive his/her approval. If changes are implemented that are subsequently determined to be unacceptable, the actions taken during the period of deviation will be evaluated to determine the significance of any departure from established program practices.

The changes in the program will be documented on a Change Request Form (CRF), which will be signed by the PS and the SPEM. The CRFs for each change will be numbered sequentially starting with the number "01." A copy of the CRF will be attached to the file copy of the SAP. The SPEM is responsible for controlling, tracking, and implementing the identified changes.

## 7.0 HEALTH AND SAFETY REQUIREMENTS

A site-specific Health and Safety Plan shall be submitted as a separate document. The HASP shall include Foster Wheeler Environmental's approach to providing for the health and safety of its employees during the project.

## 8.0 WASTE REMOVAL/REGULATORY COMPLIANCE

This section addresses how the various waste streams generated during the former pesticide shop investigation will be handled. These waste streams include non-hazardous soils, hazardous soils, demolition debris, decon water, personal protective equipment (PPE), and other investigation derived wastes.

### 8.1 HAZARDOUS SOILS

The suspected hazardous soils shall be excavated and placed on double-line poly and covered with poly in manner that will prevent surface water run-off and run-on. The soil piles shall be sampled immediately upon excavation for waste characterization and classification. Sections 4 and 5 detail the sample collection and laboratory analyses methodologies. If the soil is classified as hazardous for chlordane, the soil will be classified as (D020) due to the characteristics of toxicity. Each pile will be marked with the date on which the accumulation period begins. Wooden signs with hazardous waste labels shall be placed adjacent to the piles. The hazardous waste storage areas will be marked with signs stating "Hazardous Waste." Section 8.9 details the hazardous waste handling procedures to be employed at the site.

### 8.2 NON-HAZARDOUS SOILS

The suspected non-hazardous soils will be placed upon poly and covered on a daily basis. The soil piles shall be sampled immediately upon excavation for waste characterization and classification. Sections 4 and 5 detail the sample collection and laboratory analyses methodologies. The piles that are classified as non-hazardous shall be marked with wooden signs and labels stating "Non-Hazardous Waste" in order to ensure the hazardous and non-hazardous piles are not confused.

### 8.3 TRANSITE ROOFING MATERIAL

The transite roofing material shall be handled and treated as non-friable asbestos. Based upon the TCLP lead analyses, the transite panels shall be disposed at an approved landfill. Section 4 and 5 detail the sample collection and laboratory analyses methodologies.

## 8.4 DEMOLITION DEBRIS

Based on the laboratory analyses of the demolition debris, the debris will either be disposed of non-regulated construction debris or regulated construction debris. Section 4 and 5 detail the sample collection and laboratory analyses methodologies.

## 8.5 DECON WATER

All decon water shall be containerized in 55-gallon DOT 1A1 Specification drums. The drums shall be stored within secondary containment, and covered with plastic. Aqueous samples shall be obtained from the drums for waste classification. Section 4 and 5 detail the sample collection and laboratory analyses methodologies. The water shall be disposed as either non-hazardous or hazardous based upon the results of the laboratory analyses. It is expected that the analytical results will determine the water classification to be non-hazardous. Decon water shall be disposed off-site at a Foster Wheeler approved disposal facility. The drums will be labeled with non-hazardous labels, if the laboratory analyses indicates the water is RCRA hazardous, hazardous waste labels will be placed on the drums

## 8.6 INVESTIGATION DERIVED WASTES

Several investigation derived waste streams will be generated during the remedial actions. These include decontamination fluids, PPE, and other miscellaneous debris. Any decontamination fluids shall be stored and disposed as discussed in Section 8.4. The PPE generated shall be mixed in with the soils for off-site disposal.

## 8.7 MANIFESTS/SHIPPING PAPERS

Foster Wheeler Environmental shall provide completed waste manifests and/or bills of lading and transport documentation to the Navy for review and signature.

## 8.8 WASTE TRANSPORT AND DISPOSAL

Foster Wheeler Environmental shall subcontract for waste transport and disposal (T&D) services. The T&D subcontractor shall be competitively procured from the five firms with which Foster Wheeler Environmental has preplaced basic ordering agreements. This assures the Navy that solid and/or hazardous wastes will be sent to an EPA/NJDEP-approved facility. All hazardous and solid waste disposal facilities and transporters of the Navy's wastes will be evaluated for regulatory compliance and approved for use in accordance with Foster Wheeler Environmental Corporation Regulatory Compliance Procedures. Approved facilities and transporters will be submitted to the Navy for final approval.

The soils shall be disposed off site in accordance to all applicable federal, state, and local regulations. In accordance to 40CFR §268.42, hazardous soils with organic halogenated organic compounds (HOCs) with total concentrations of greater than or equal to 1,000 mg/kg must be incinerated. The stock-piled soil piles shall be sampled, and if the HOCs are greater than 1,000 mg/kg, the soils will be incinerated. If the HOCs are less than 1,000 mg/kg, the soils shall be disposed in an appropriate regulated landfill.

In accordance with 40CFR §268.43, the hazardous constituents of the soils will be compared to the concentrations of the constituents allowable for land disposal. In particular, if laboratory herbicide analysis of the soils determines that 2,4-D is equal to or greater than 10 mg/kg or 2,4,5-TP is equal to or greater than 7.9 mg/kg, the soils would require incineration.

All non-hazardous soils, if they are below the criteria discussed above, will be disposed in an approved landfill.

## 8.9 HAZARDOUS WASTE MANAGEMENT

RCRA regulated hazardous soils, if present, will be placed on double-line polyurethane sheeting (poly). Hay bales will be placed around the soil piles, and the poly will be placed up and around the hay bales to prevent run-off from the piles as well as prevent surface run-on onto the piles. The piles will be covered with poly and anchored down. FWENC will prepare Waste Profiles, Hazardous Waste Manifests, LDR Notification Forms, and other shipping documentation for Navy review and signature prior to off-site disposal. Copies of certified weight tickets, TSDF signed manifests, and all disposal documentation documents will be forwarded to the Navy.

If on-site storage of hazardous wastes is required, the proposed hazardous waste storage area will meet generator requirements for less than 90 day storage of hazardous waste as per 40 CFR 262.34:

- All stored hazardous wastes will be removed from the project site for off-site disposal within 90 days of first being accumulated.

- Each pile will be marked with the date on which the accumulation period begins. Wooden signs with hazardous waste labels shall be placed adjacent to the piles.

- All hazardous waste storage areas will be marked with signs stating "Hazardous Waste."

- For waste containers containing free liquids, the container storage areas will have a containment system capable of collecting and holding spills, leaks and precipitation. The containment system shall have an impervious base underlying the containers, which is free of leaks, gaps or cracks. The containment capacity will be sufficient to contain the entire volume of the largest container or 10% of the entire volume of all of the containers, whichever is largest. Run on into the containment system will be prevented. Spilled or leaked waste and accumulated precipitation will

be removed from the containment system in as timely a manner as necessary to prevent overflow of the containment system.

- For waste containers which do not contain free liquids, a secondary containment system will not be provided; however, the storage area will be designed and operated to drain and remove liquid resulting from precipitation or the containers will be elevated and removed from contact with accumulated precipitation.

- Containers holding reactive or ignitable waste will be stored at least 50 feet (15 meters) from the property line.

- Each container of hazardous waste will be marked and labeled in accordance with US DOT requirements under 40 CFR 172.

- Hazardous Waste Containers will meet US DOT requirements under 40 CFR Parts 173, 178, and 179. DOT-specific containers will be used.

- Each container of hazardous waste of 110 gallons or less will be marked in accordance with US DOT requirements under 49 CFR 172.304 with the following:

  HAZARDOUS WASTE-FEDERAL LAW PROHIBITS IMPROPER DISPOSAL. If found contact the nearest police or public safety authority or the Environmental Protection Agency.
  Generator name and Address_____
  Manifest Document Number_____

  Commercially available "Hazardous Waste Labels", meeting the NJDEP requirements, shall be used.

- Waste will be placed in containers in good condition. If container begins to leak, the contents will be transferred from the defective container into a good container.

- The containers used will be made of or lined with a material that does not react with and is compatible with the waste.

- The containers shall remain closed during storage except when waste is added or removed from the container.

- The containers will not be opened, stored, or handled in a manner which will cause the container to leak.

- The containers will be labeled to accurately identify their contents.

- The storage area and containers will be inspected at least weekly to identify leaks and/or deterioration. Inspection reports will be documented in writing.

- Incompatible wastes will not be placed within the same container or in an unwashed container that previously held an incompatible waste or material.

- A container holding a waste that is incompatible with other wastes or materials will be segregated from the other materials or protected by means of an impermeable dike, wall, berm or other device.

- Upon project closure, all hazardous waste and hazardous waste residues will be removed from the containment system. The containment system will be decontaminated and all wastes will be disposed off-site at a permitted disposal facility.

- Appropriate hazardous training will be provided to site personnel as per 40 CFR 265.16.

- A Contingency Plan will be developed to handle any fire, spill, or emergency and appropriate emergency response equipment (spill cleanup materials, fire protection equipment, communication devices and alarms to notify workers of an emergency are) and will be present as required under 40 CFR 265 Subparts C & D.

## 9.0 PROJECT MANAGEMENT

The project management team shall be responsible for all technical and administrative aspects of the remediation project.

### 9.1 PROJECT SCHEDULE

The project schedule is provided as Figure 9-1.

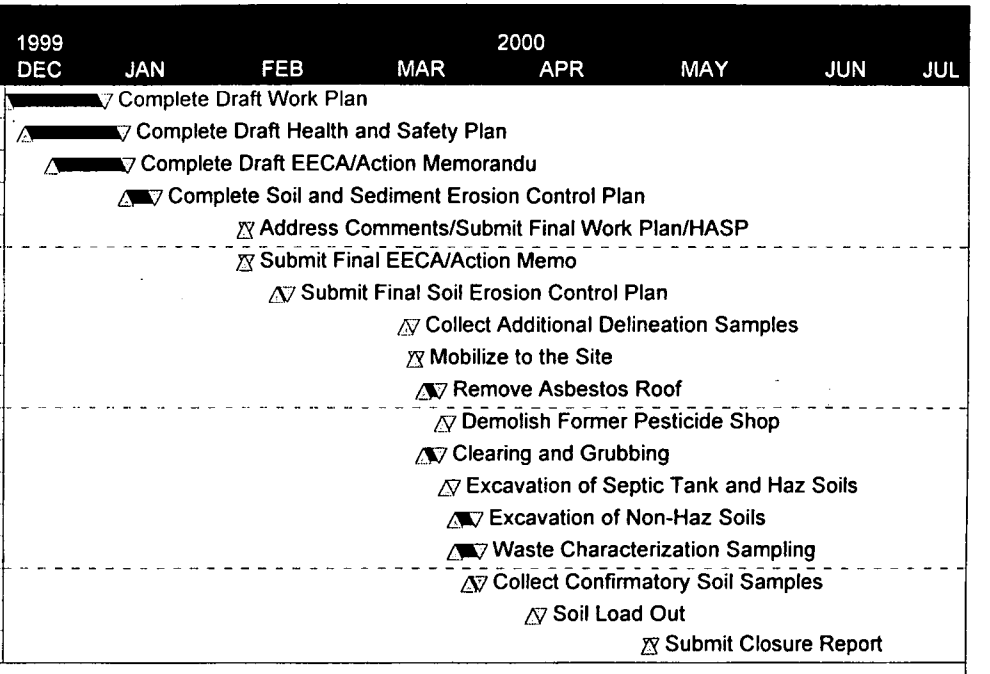
#### 9.1.1 Daily Safety Meetings

Prior to starting work, a daily safety meeting will be conducted by the Foster Wheeler Environmental Health and Safety Officer. All of the day's planned activities will be reviewed, with particular attention focused on PPE and risk. All personnel are required to attend the meeting.

### 9.2 PROJECT STAFFING PLAN

The organization chart for this project is provided in Figure 9-2.

| Act ID | Description | Orig Dur | Rem Dur | Early Start | Early Finish |
|---|---|---|---|---|---|
| 1000 | Complete Draft Work Plan | 1d | 0 | 17DEC99 A | 07JAN00 A |
| 1040 | Complete Draft Health and Safety Plan | 1d | 0 | 21DEC99 A | 11JAN00 A |
| 1050 | Complete Draft EECA/Action Memorandu | 1d | 0 | 27DEC99 A | 12JAN00 A |
| 1070 | Complete Soil and Sediment Erosion Control | 1d | 0 | 12JAN00 A | 18JAN00 A |
| 1080 | Address Comments/Submit Final Work | 1d | 0 | 07FEB00 A | 07FEB00 A |
| 1090 | Submit Final EECA/Action Memo | 1d | 0 | 07FEB00 A | 07FEB00 A |
| 1180 | Submit Final Soil Erosion Control Plan | 1d | 0 | 14FEB00 A | 16FEB00 A |
| 1190 | Collect Additional Delineation Samples | 1d | 0 | 13MAR00 A | 14MAR00 A |
| 1200 | Mobilize to the Site | 1d | 0 | 15MAR00 A | 15MAR00 A |
| 1210 | Remove Asbestos Roof | 1d | 0 | 17MAR00 A | 20MAR00 A |
| 1220 | Demolish Former Pesticide Shop | 1d | 0 | 21MAR00 A | 22MAR00 A |
| 1230 | Clearing and Grubbing | 1d | 0 | 17MAR00 A | 20MAR00 A |
| 1240 | Excavation of Septic Tank and Haz Soils | 1d | 0 | 22MAR00 A | 23MAR00 A |
| 1250 | Excavation of Non-Haz Soils | 1d | 0 | 24MAR00 A | 28MAR00 A |
| 1260 | Waste Characterization Sampling | 1d | 0 | 24MAR00 A | 29MAR00 A |
| 1270 | Collect Confirmatory Soil Samples | 1d | 0 | 27MAR00 A | 29MAR00 A |
| 1280 | Soil Load Out | 1d | 0 | 10APR00 A | 11APR00 A |
| 1290 | Submit Closure Report | 1d | 0 | 05MAY00 A | 05MAY00 A |

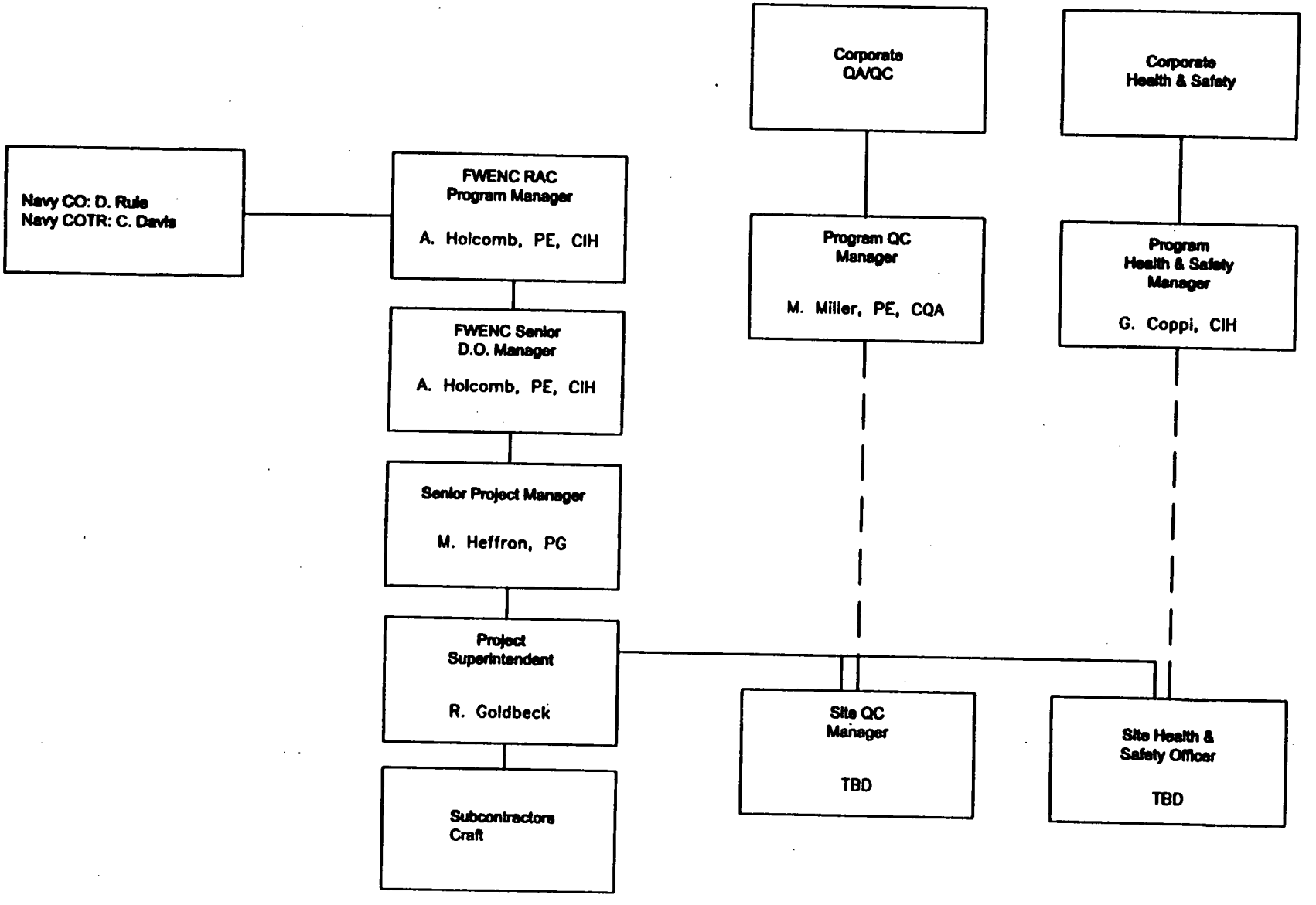



- △ Early start point
- ▽ Early finish point
- Early bar
- ▼ Late finish point
- Total float bar
- Pr gress bar
- Critical bar
- —— Summary bar
- ▲ Progress point
- ▲ Critical point
- Summary point
- ◆ Start milestone point
- ◆ Finish milestone point

**FIGURE 9-1**
**NWS-EARLE**
**PESTICIDE SHOP**
**SCHEDULE OF ACTIVITIES**

| Date | Revision | Checked | Approved |
|---|---|---|---|
| 07JAN00 | | MH | |
| 04FEB00 | 01 | MH | |

# FIGURE 9-2
## Navy / FWENC Organization Chart

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## 10.0 QUALITY ASSURANCE/QUALITY CONTROL

This Quality Assurance/Quality Control (QA/QC) section describes the organization, inspections, tests, procedures, and documentation necessary to produce a completed project which complies with the governing regulations and the technical statement of work.

### 10.1 ORGANIZATION AND RESPONSIBILITIES

QA/QC duties are the responsibility of the Senior Project Engineer/Manager (SPEM). He will employ physical inspections, direct measurement, and confirmatory laboratory testing to verify that work is being performed in accordance with the project plans. All subcontractors will conform to and participate in the program described herein as part of a unified team.

Foster Wheeler Environmental will direct and maintain responsibility for the overall QA/QC program and will manage subcontractors in a manner to maintain project requirements. Subcontractors shall be used for clear cutting, asbestos removal, laboratory analysis, and waste disposal.

### 10.2 PROBLEM OR WORK DEFICIENCY MEETINGS

If a major problem or deficiency occurs or is likely to occur, a special meeting to address related issues will be held. The meeting may be attended by the SPEM, Navy Representative(s) and others, as required. Meetings may be conducted at NWS Earle, Northern Division, or by teleconference. The purpose of the meeting will be to define and resolve potential problems or work deficiencies in the following manner:

- Define and discuss the problem or deficiency
- Review alternative solutions, including their effects on schedule and budget
- Implement plan to resolve the problem or deficiency

### 10.3 SUBMITTALS

The submittals for this task are the Work Plan, Health and Safety Plan, Analytical Results of additional delineation samples, analytical results of the waste characterization samples and confirmatory soil samples and the Remedial Action Report, which will detail all the investigative results and remedial activities.

## 10.4 CHANGES

If circumstances develop during the project that make it necessary or advisable to revise the Work Plan in order to accomplish project objectives, a Change Request Form (CRF) will be forwarded to the Navy for approval. Events such as a change in the site conditions or system performance may result in a CRF. Changes may be discussed with the Navy Design Manager telephonically and followed up with a CRF to avoid negative impacts on the project budget.

## 10.5 DOCUMENTATION

Documentation of operations, record keeping, photographic evidence of work performed and as analytical results will be provided to the Navy in the Closure Report.

### 10.5.1 Operations Record Keeping

All field inspection and testing activities will be documented in a project logbook. The project logbook will be maintained in accordance with the relevant Foster Wheeler Environmental Field Technical Guidelines. The Project Manager will maintain records of quality control operations and activities for subcontractors and suppliers.

### 10.5.2 Photographic Documentation

Still 35mm color photographs will be taken as needed to record work progress. At a minimum, photographs will be taken of the existing conditions before work begins, during the excavation activities and during the groundwater treatment and backfilling operations. Photograph location, date and description of the activity recorded will be entered in a photo documentation log. The photographs and log will be submitted with the Final Report.

# DELINEATION SAMPLING AND ANALYSIS

# OLD PESTICIDE SHOP

# NAVAL WEAPONS STATION

# EARLE, NEW JERSEY

## BACKGROUND AND LOCATION

NWS Earle is located in Monmouth County in east-central New Jersey. It is situated on approximately 11,134 acres, and includes a Mainside area, which is approximately ten miles inland from the Atlantic Ocean at Sandy Hook Bay, and a Waterfront area, which includes an ammunition depot and associated piers. The Mainside and Waterfront areas are linked by a narrow tract of land that serves as a right-of-way for a government road and railroad. The main entrance to NWS Earle is located off State Route 34.

NWS Earle was commissioned as a Naval Ammunition Depot on December 13, 1943, with the primary responsibility of furnishing ammunition to the naval fleet. The station's Ordnance Department coordinates all port services and logistic support for home-ported and visiting ships, conducts safety inspections, supervises ammunition loading for the United States Coast Guard, and provides afloat firefighting capability and standby tug services.

The Mainside area lies in the outer Coastal Plain, approximately ten miles inland from the Atlantic Ocean. The Mainside area is relatively flat, with elevations ranging from approximately 100 to 300 feet above mean sea level (MSL). The most significant topographic relief within the Mainside area is Hominy Hills, a northeast-southwest-trending group of low hills located near the center of the station.

Building S-186 (Old Pesticide Shop) located on the Mainside area, north of the intersection of Esperance and Macassar Roads served as the pesticide shop for the Mainside area. Two soil samples, one surface soil (0-0.5 ft. BGS) and one hand augured subsurface soil (1-2 ft. BGS), were collected north of Building S-186 in August 1995. Pesticides were detected in both of these samples, with the surface soil sample having much higher concentrations (390-140,000 ug/kg) than the subsurface sample (0.13-47 ug/kg). The pesticides detected in both samples included, Heptachlor, Aldrin, Dieldrin, 4,4'-DDD, 4,4'-DDT, alpha-Chlordane, and gamma-Chlordane.

## RESULTS OF SCREENING SAMPLING AND ANALYSIS AT THE OLD PESTICIDE SHOP

Screening sampling was conducted at the Old Pesticide Shop on January 29, 1998. The objectives of the screening sampling and analysis (S&A) program was to determine if operations at the building had resulted in releases which had contaminated the building or surrounding area with organochlorine or organophosphorous pesticides.

The sampling was conducted in accordance with a sampling plan developed by Brown & Root Environmental following the New Jersey Department of Environmental Protection (NJDEP) Field Sampling Procedures Manual dated May 1992 and Brown & Root Environmental sampling standard operating procedures (SOPs). The following samples were obtained.

- Four wipe samples of interior wall surfaces from the Old Pesticide Shop
- Four core samples of concrete from the pad located in front of the Old Pesticide Shop
- Nine composite samples of surface soils surrounding the Old Pesticide Shop
- One sediment sample from the septic tank servicing the Old Pesticide Shop

All samples were analyzed for the full suite of Appendix IX Organochlorine Pesticides by EPA method SW-846 8081A and Appendix IX Organophosphorous pesticides by EPA Method SW-846 8141A.

A report on the results of the screening sampling dated March 11, 1998 stated the following conclusions regarding the soil at the Old Pesticides Shop:

The vertical and horizontal extent of organochlorine pesticide contamination should be further delineated. Additional surface and subsurface soils samples should be collected and analyzed for RCRA Appendix IX organochlorine pesticides. Near subsurface (one foot and three foot) soil samples should be taken to determine if any organochlorine pesticides have migrated to the subsurface. Subsurface samples could be limited to one foot and three foot depths because organochlorine pesticides are generally not mobile in soil. Therefore, little, if any, migration of organochlorine pesticides, found in surface soils, to subsurface soils is expected.

## RESULTS OF DELINEATION SOIL SAMPLING AT OLD PESTICIDE SHOP

Sampling of surface and subsurface soils was conducted at the Old Pesticide Shop on April 21 and 22, 1998. Twenty-three soil locations at the Old Pesticide Shop were sampled at three different depths (surface, and one- and three-feet below ground surface). Attachment 1 contains the report of field sampling activities. All samples were analyzed for chlorinated organic pesticides by SW 846 8081A. Table 1 contains a summary of all positive detections. Included in Table 1 is a comparison to Region III industrial and residential soil standards for pesticides. Information is also included in Table 1 on concentrations of chlordane and heptachlor, which if completely leached, could result in the soil being classified as hazardous waste for disposal purposes.

Chlordane and 4,4'-DDT were the most prevalent pesticides found. Chlordane was found in 20 out of 23 surface soil samples. In eight 8 samples the Region III risk based standard for chlordane in industrial soil was exceeded. One surface soil sample exceeded the Region III chlordane standard for residential soil but was below the industrial standard. Chlordane concentrations decreased with depth. At the 1-foot and 3-foot levels, only 1 sample exceeded Region III industrial soil standards.

4,4'-DDT was found in 13 of 23 surface soil samples. In two surface soil samples the Region III industrial soil standard for 4,4'-DDT was exceeded. Concentrations in the subsurface soils did not exceed the Region III industrial standard.

4,4'-DDD and 4,4'-DDE were detected in several surface soil samples but in all cases in concentrations were well below the Region III industrial soil standards. Both compounds were found to a lesser extent in subsurface soils.

Beta-BHC was found in one surface sample at a low concentration (4 ug/kg) and was not detected in the subsurface. Heptachlor epoxide was found in two surface and one subsurface soil sample at low concentrations relative to the concentrations of other detected organochlorine pesticides.

Figure 1 shows the location of each of the 23 sampling points and the positive results for each of the three soil depths sampled at each point for 4,4'-DDD, 4,4-DDE, 4,4'-DDT and chlordane, the four most prevalent pesticides. Attachment 2 contains the analytical data summary.

TABLE 1

SUMMARY OF POSITIVE PESTICIDE DETECTIONS
OLD PESTICIDE SHOP
NWS EARLE
EARLE, NEW JERSEY


| SAMPLE ID | 4,4'-DDD | 4,4'-DDE | 4,4'-DDT | CHLORDANE | BETA-BHC | HEPTACHLOR EPOXIDE |
|---|---|---|---|---|---|---|
| S il R sidential | 2700 | 1900 | 1900 | 1800(1) | | 140 |
| S il Industrial | 24000 | 17000 | 17000 | 16000(1) | | 1300(2) |
| RB-DATE | | | | | | |
| SS-10 | | | | 31000(1) | | |
| SS-10-DUP | | | | 31000(1) | | |
| SB-10-01 | | | | 450 | | |
| SB-10-03 | | | | 4 | | |
| SS-11 | 19 | 150 | 850 | 330 | | |
| SB -11-01 | | | | | | |
| SB-11-03 | | | | | | |
| SS-12 | | | | 200000(1) | | |
| SB-12-01 | | | | 1200(1) | | |
| SB-12-03 | | | | 250 | | |
| SS-13 | 1500 | 360 | 12000 | 720(1) | | |
| SB-13-01 | 50 | 9 | 510 | 23 | | |
| SB-13-03 | 3 | | 8 | 4 | | |
| SS-14 | 49 | 320 | 360 | 180 | | |
| SB-14-01 | | 2 | 2 | | 4 | |
| SB-14-01 DUP | | 3 | 3 | | | |
| SB-14-03 | | | | | | |
| SS-15 | 290 | 1000 | 1700 | 2600(1) | | |
| SB-15-01 | | 32 | 41 | 130 | | |
| SB-15-03 | | | 2 | | | |
| SS-16 | | 90 | 99 | | | |
| SB-16-01 | | 26 | 28 | | | |
| SB-16-03 | | 2 | 2 | | | |
| SS-17 | | 160 | 200 | | | |
| SB-17-01 | | | | | | |
| SB-17-03 | | | | | | |
| SS-18 | | | | 180000(1) | | |
| SB-18-01 | | | | 1200(1) | | |
| SB-18-03 | | | | 42000(1) | | |
| SB-18-03 DUP | | | | 25000(1) | | |
| SS-19 | | | | 6600(1) | | |
| SB-19-01 | | | | 320 | | |
| SB-19-03 | 3 | | | 56 | | 3 |
| SS-20 | | 17 | 29 | 430 | | 6 |
| SB-20-01 | | | | 20 | | |
| SB-20-03 | | | | 4 | | |
| SS-21 | | | 17 | 680(1) | | 24 |
| SB-21-01 | | | | 17 | | |
| SB-21-03 | | | | | | |
| SB-21-03 DUP | | | | 14 | | |
| SS-22 | | | | 170000(1) | | |
| SB-22-01 | | | | 15000(1) | | |
| SB-22-03 | | | | 300 | | |
| SS-23 | | | | 1300(1) | | |

TABLE 1

SUMMARY OF POSITIVE PESTICIDE DETECTIONS
OLD PESTICIDE SHOP
NWS EARLE
EARLE, NEW JERSEY


| SAMPLE ID | 4,4'-DDD | 4,4'-DDE | 4,4'-DDT | CHLORDANE | BETA-BHC | HEPTACHLOR EPOXIDE |
|---|---|---|---|---|---|---|
| S il Residential | 2700 | 1900 | 1900 | 1800(1) | | 140 |
| S il Industrial | 24000 | 17000 | 17000 | 16000(1) | | 1300(2) |
| SB-23-01 | | | 2 | 53 | | |
| SB-23-03 | | | | 10 | | |
| SS-24 | | | | 30000(1) | | |
| SS-24 DUP | | | | 32000(1) | | |
| SB-24-01 | | | | 180 | | |
| SB-24-03 | | | | 28 | | 2 |
| SS-25 | | | | 34000(1) | | |
| SB-25-01 | | | | 180 | | |
| SB-25-01 DUP | | | | 120 | | |
| SB-25-03 | | | | 180 | | |
| SS-26 | | 710 | 19000 | | | |
| SS-26RE | | | 20000 | | | |
| SB-26-01 | | 340 | 6300 | | | |
| SB-26-03 | | 420 | 590 | | | |
| SS-27 | | | | 650 | | |
| SB-27-01 | | | | 28 | | |
| SB-27-03 | | | | 5 | | |
| SS-28 | | | 32000 | 140000(1) | | |
| SB-28-01 | | | 380 | 1900 | | |
| SB-28-03 | | | 5 | 9 | | |
| SS-29 | | 8 | 16 | 73 | | |
| SB-29-01 | | 55 | 77 | 200 | | |
| SB-29-03 | | 6 | 9 | 19 | | |
| SB-29-03 DUP | | 15 | 35 | 77 | | |
| SS-30 | | | 350 | 2700(1) | | |
| SB-30-01 | | 200 | 840 | 210 | | |
| SB-30-03 | | 4 | 9 | 13 | | |
| SS-31 | | | 12 | 170 | | |
| SB-31-01 | | | | 75000000(1) | | |
| SB-31-03 | | 38 | 100 | 2000(1) | | |
| SS-32 | | | | 580 | | |
| SB-32-01 | 58 | 59 | | | | |
| SB-32-03 | | 3 | | 20 | | |

All results in micrograms/kilogram (ug/kg)

=- Exceeds Region III residential soil standard

=- Exceeds Region III industrial soil standard

1 - Exceeds 20 X TC level of 30 ug/l

2 - Exceeds 20 X TC level of 8 ug/l

n:\data\bbre862\earle\pestdlin-xls

# ATTACHMENT 1

# FIELD TRIP REPORT

# FIELD TRIP REPORT

FOR

# DELINEATION SAMPLING at the OLD PESTICIDE SHOP and SCREENING SAMPLING at the OLD PRECIOUS METALS RECOVERY FACILITY at NWS EARLE

Prepared by

Brown & Root Environmental

May 1998

# 1.0 OLD PESTICIDE SHOP

## 1.1 Introduction

The primary objective of the additional sampling at the Old Pesticide Shop was to further delineate the contamination found during the screening sampling and analysis. In order to accomplish this objective additional sampling and analysis for chlorinated pesticides was conducted. The additional sampling consisted of collecting surface and subsurface soils, surrounding the building, at 23 different locations and from three depths (surface, one foot below ground surface, and three feet below ground surface). All samples were analyzed for chlorinated pesticides. The results of the additional sampling and analysis will be used as the basis for determining the potential extent of pesticide contamination.

## 1.2 Surface soil sampling

On April 20 and 21, 1998, 25 surface soil samples (including two duplicates) were collected at the Old Pesticide Shop. The locations were based upon the previous sampling event results and were selected in the field. The locations were spaced evenly at 7.5-foot by 15 to 20-foot spaces throughout the southern side of the site and 10 foot by 15 foot spaces throughout the northern side of the site.

The soil samples were collected according to NJDEP Field Sampling Procedures Manual dated May 1992 and B&R Environmental SOP SA-1.3. Stainless steel trowels were used to obtain the samples and were decontaminated with Liquidnox, water, methanol, and deionized water between sample locations. The soil samples were placed directly into laboratory supplied 8-ounce jars and stored on ice. All surface soil samples were analyzed for chlorinated pesticides at RECRA Lab Net in University Park, Illinois.

The surface soils generally consisted of grayish-dark brown silty fine grained sand with some organics. No elevated Photo Ionization Detector (PID) readings were observed or noted in the surface soils.

## 1.3 Subsurface soil sampling

On April 20 and 21, 1998, 25 subsurface soil samples (including two duplicates) were collected from a depth of 1-foot below ground surface (bgs) and 26 subsurface soil samples (including three duplicates) were collected from a depth of 3-feet bgs at the Old Pesticide Shop. The location of each subsurface soil sample corresponded with the same location as the surface soil sample.

A stainless steel hand auger and trowel were used to obtain the samples and were decontaminated with Liquidnox, water, methanol, and deionized water between sample locations. The soil samples were placed directly into laboratory supplied 8-ounce jars and stored on ice. All subsurface soil samples were analyzed for chlorinated pesticides at RECRA Lab Net in University Park, Illinois.

The subsurface soils at 1-foot bgs generally consisted of a dark grayish brown to grayish tan silty fine grained sand or an olive green clayey fine grained sand with some silt. Elevated PID readings were observed and noted at locations 25, 26, 28, and 29. These PID readings ranged between 1.0 PPM to 6.0 PPM. There were sweet aromatic odors observed at these same locations.

The subsurface soils at 3-feet bgs generally consisted of tan, orange-tan, or grayish brown silty fine grained sand with some subround pebbles. Elevated PID readings were observed and noted at locations 25, 26, and 29. These PID readings ranged between 1.2 PPM and 10.8 PPM. There were sweet aromatic odors observed at these same locations.

The hand auger soil borings were backfilled with the soil cuttings that were removed from each location.

## 2.0 Old Precious Metals Recovery Facility

### 2.1 Introduction

The primary objective of the sampling at the Precious Metals Recovery Facility was to determine if operations had resulted in contamination of the building interior or exterior structures, of the soil immediately surrounding the building, or of the drainage ditch located east and south of the building complex. In order to accomplish this objective a screening sampling and analysis for Target Analyte List Metals was conducted. The screening sampling consisted of wipe

# ATTACHMENT 2

# PESTICIDE SHOP

# DELINEATION SAMPLING ANALYTICAL DATA

# CTO154 - NWS EARLE
## SOIL DATA
## RECRA LABNET - CHICAGO
## SDG: U04346



| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SAMPLE NUMBER: | 186-DUP-01 | | | 186-DUP-02 | | | 186-SB-10-01 | | | 186-SB-10-03 | | |
| SAMPLE DATE: | 04/20/98 | | | 04/20/98 | | | 04/20/98 | | | 04/20/98 | | |
| LABORATORY ID: | 9804G346-004 | | | 9804G346-014 | | | 9804G346-002 | | | 9804G346-003 | | |
| QC_TYPE: | NORMAL | | | NORMAL | | | NORMAL | | | NORMAL | | |
| % SOLIDS: | 87.8 % | | | 89.4 % | | | 85.2 % | | | 91.1 % | | |
| UNITS: | UG/KG | | | UG/KG | | | UG/KG | | | UG/KG | | |
| FIELD DUPLICATE OF: | | | | | | | | | | | | |
| | RESULT | QUAL | CODE | RESULT | QUAL | CODE | RESULT | QUAL | CODE | RESULT | QUAL | CODE |
| **PESTICIDES/PCBs** | | | | | | | | | | | | |
| 4,4'-DDD | 1900 | U | | 1.8 | U | | 38 | U | | 1.8 | U | |
| 4,4'-DDE | 1900 | U | | 2.9 | | | 38 | U | | 1.8 | U | |
| 4,4'-DDT | 1200 | J | | 2.5 | | | 38 | U | | 1.8 | U | |
| ALDRIN | 940 | U | | 0.90 | U | | 19 | U | | 0.90 | U | |
| ALPHA-BHC | 940 | U | | 0.90 | U | | 19 | U | | 0.90 | U | |
| BETA-BHC | 940 | U | | 0.90 | U | | 19 | U | | 0.90 | U | |
| CHLORDANE | 31000 | | | 3.6 | U | | 450 | | | 3.6 | | |
| DELTA-BHC | 940 | U | | 0.90 | U | | 19 | U | | 0.90 | U | |
| DIELDRIN | 1900 | U | | 1.8 | U | | 38 | U | | 1.8 | U | |
| ENDOSULFAN I | 940 | U | | 0.90 | U | | 19 | U | | 0.90 | U | |
| ENDOSULFAN II | 1900 | U | | 1.8 | U | | 38 | U | | 1.8 | U | |
| ENDOSULFAN SULFATE | 1900 | U | | 1.8 | U | | 38 | U | | 1.8 | U | |
| ENDRIN | 1900 | U | | 1.8 | U | | 38 | U | | 1.8 | U | |
| ENDRIN ALDEHYDE | 1900 | U | | 1.8 | U | | 38 | U | | 1.8 | U | |
| ENDRIN KETONE | 1900 | U | | 1.8 | U | | 38 | U | | 1.8 | U | |
| GAMMA-BHC (LINDANE) | 940 | U | | 0.90 | U | | 19 | U | | 0.90 | U | |
| HEPTACHLOR | 940 | U | | 0.90 | U | | 19 | U | | 0.90 | U | |
| HEPTACHLOR EPOXIDE | 940 | U | | 0.90 | U | | 19 | U | | 0.90 | U | |
| METHOXYCHLOR | 9400 | U | | 9.0 | U | | 190 | U | | 9.0 | U | |
| TOXAPHENE | 19000 | U | | 18 | U | | 380 | U | | 18 | U | |

# CTO154 - NWS EARLE
## SOIL DATA
## RECRA LABNET - CHICAGO
## SDG: U04346



| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SAMPLE NUMBER: | 186-SB-11-01 | | | 186-SB-11-03 | | | 186-SB-12-01 | | | 186-SB-12-03 | | |
| SAMPLE DATE: | 04/20/98 | | | 04/20/98 | | | 04/20/98 | | | 04/20/98 | | |
| LABORATORY ID: | 9804G346-007 | | | 9804G346-005 | | | 9804G346-009 | | | 9804G346-010 | | |
| QC_TYPE: | NORMAL | | | NORMAL | | | NORMAL | | | NORMAL | | |
| % SOLIDS: | 90.1 % | | | 92.9 % | | | 89.0 % | | | 94.8 % | | |
| UNITS: | UG/KG | | | UG/KG | | | UG/KG | | | UG/KG | | |
| FIELD DUPLICATE OF: | | | | | | | | | | | | |
| | RESULT | QUAL | CODE | RESULT | QUAL | CODE | RESULT | QUAL | CODE | RESULT | QUAL | CODE |
| **PESTICIDES/PCBs** | | | | | | | | | | | | |
| 4,4'-DDD | 1.8 | U | | 1.8 | U | | 93 | U | | 17 | U | |
| 4,4'-DDE | 1.8 | U | | 1.8 | U | | 93 | U | | 17 | U | |
| 4,4'-DDT | 1.8 | U | | 1.8 | U | | 93 | U | | 17 | U | |
| ALDRIN | 0.92 | U | | 0.88 | U | | 46 | U | | 8.7 | U | |
| ALPHA-BHC | 0.92 | U | | 0.88 | U | | 46 | U | | 8.7 | U | |
| BETA-BHC | 0.92 | U | | 0.88 | U | | 46 | U | | 8.7 | U | |
| CHLORDANE | 3.7 | U | | 3.5 | U | | 1200 | | | 250 | | |
| DELTA-BHC | 0.92 | U | | 0.88 | U | | 46 | U | | 8.7 | U | |
| DIELDRIN | 1.8 | U | | 1.8 | U | | 93 | U | | 17 | U | |
| ENDOSULFAN I | 0.92 | U | | 0.88 | U | | 46 | U | | 8.7 | U | |
| ENDOSULFAN II | 1.8 | U | | 1.8 | U | | 93 | U | | 17 | U | |
| ENDOSULFAN SULFATE | 1.8 | U | | 1.8 | U | | 93 | U | | 17 | U | |
| ENDRIN | 1.8 | U | | 1.8 | U | | 93 | U | | 17 | U | |
| ENDRIN ALDEHYDE | 1.8 | U | | 1.8 | U | | 93 | U | | 17 | U | |
| ENDRIN KETONE | 1.8 | U | | 1.8 | U | | 93 | U | | 17 | U | |
| GAMMA-BHC (LINDANE) | 0.92 | U | | 0.88 | U | | 46 | U | | 8.7 | U | |
| HEPTACHLOR | 0.92 | U | | 0.88 | U | | 46 | U | | 8.7 | U | |
| HEPTACHLOR EPOXIDE | 0.92 | U | | 0.88 | U | | 46 | U | | 8.7 | U | |
| METHOXYCHLOR | 9.2 | U | | 8.8 | U | | 460 | U | | 87 | U | |
| TOXAPHENE | 18 | U | | 18 | U | | 930 | U | | 170 | U | |

# CTO154 - NWS EARLE
## SOIL DATA
## RECRA LABNET - CHICAGO
## SDG: U04346

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SAMPLE NUMBER: | 186-SB-13-01 | | | 186-SB-13-01RE | | | 186-SB-13-03 | | | 186-SB-14-01 | | |
| SAMPLE DATE: | 04/20/98 | | | 04/20/98 | | | 04/20/98 | | | 04/20/98 | | |
| LABORATORY ID: | 9804G346-012 | | | 9804G346-012 | | | 9804G346-013 | | | 9804G346-016 | | |
| QC_TYPE: | NORMAL | | | NORMAL | | | NORMAL | | | NORMAL | | |
| % SOLIDS: | 90.9 % | | | 90.9 % | | | 93.5 % | | | 91.9 % | | |
| UNITS: | UG/KG | | | UG/KG | | | UG/KG | | | UG/KG | | |
| FIELD DUPLICATE OF: | | | | | | | | | | | | |
| | RESULT | QUAL | CODE | RESULT | QUAL | CODE | RESULT | QUAL | CODE | RESULT | QUAL | CODE |
| **PESTICIDES/PCBs** | | | | | | | | | | | | |
| 4,4'-DDD | 50 | | | 18 | U | | 3.2 | | | 1.8 | U | |
| 4,4'-DDE | 9.0 | | | 18 | U | | 1.8 | U | | 1.8 | | |
| 4,4'-DDT | 510 | | | 500 | | | 7.8 | | | 1.8 | | |
| ALDRIN | 4.5 | U | | 9.0 | U | | 0.88 | U | | 0.90 | U | |
| ALPHA-BHC | 4.5 | U | | 9.0 | U | | 0.88 | U | | 0.90 | U | |
| BETA-BHC | 4.5 | U | | 9.0 | U | | 0.88 | U | | 3.6 | | |
| CHLORDANE | 23 | | | 36 | U | | 4.4 | | | 3.6 | U | |
| DELTA-BHC | 4.5 | U | | 9.0 | U | | 0.88 | U | | 0.90 | U | |
| DIELDRIN | 9.0 | U | | 18 | U | | 1.8 | U | | 1.8 | U | |
| ENDOSULFAN I | 4.5 | U | | 9.0 | U | | 0.88 | U | | 0.90 | U | |
| ENDOSULFAN II | 9.0 | U | | 18 | U | | 1.8 | U | | 1.8 | U | |
| ENDOSULFAN SULFATE | 9.0 | U | | 18 | U | | 1.8 | U | | 1.8 | U | |
| ENDRIN | 9.0 | U | | 18 | U | | 1.8 | U | | 1.8 | U | |
| ENDRIN ALDEHYDE | 9.0 | U | | 18 | U | | 1.8 | U | | 1.8 | U | |
| ENDRIN KETONE | 9.0 | U | | 18 | U | | 1.8 | U | | 1.8 | U | |
| GAMMA-BHC (LINDANE) | 4.5 | U | | 9.0 | U | | 0.88 | U | | 0.90 | U | |
| HEPTACHLOR | 4.5 | U | | 9.0 | U | | 0.88 | U | | 0.90 | U | |
| HEPTACHLOR EPOXIDE | 4.5 | U | | 9.0 | U | | 0.88 | U | | 0.90 | U | |
| METHOXYCHLOR | 45 | U | | 90 | U | | 8.8 | U | | 9.0 | U | |
| TOXAPHENE | 90 | U | | 180 | U | | 18 | U | | 18 | U | |

| SAMPLE NUMBER: | 186-SB-14-03 | | | 186-SB-15-01 | | | 186-SB-15-03 | | | 186-SS-10 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SAMPLE DATE: | 04/20/98 | | | 04/20/98 | | | 04/20/98 | | | 04/20/98 | | |
| LABORATORY ID: | 9804G346-017 | | | 9804G346-019 | | | 9804G346-020 | | | 9804G346-001 | | |
| QC TYPE: | NORMAL | | | NORMAL | | | NORMAL | | | NORMAL | | |
| % SOLIDS: | 92.9 % | | | 89.7 % | | | 94.6 % | | | 90.2 % | | |
| UNITS: | UG/KG | | | UG/KG | | | UG/KG | | | UG/KG | | |
| FIELD DUPLICATE OF: | | | | | | | | | | | | |
| | RESULT | QUAL | CODE | RESULT | QUAL | CODE | RESULT | QUAL | CODE | RESULT | QUAL | CODE |
| **PESTICIDES/PCBs** | | | | | | | | | | | | |
| 4,4'-DDD | 1.8 | U | | 18 | U | | 1.8 | U | | 1800 | U | |
| 4,4'-DDE | 1.8 | U | | 32 | | | 1.4 | J | | 1800 | U | |
| 4,4'-DDT | 1.8 | U | | 41 | | | 2.1 | | | 1800 | U | |
| ALDRIN | 0.89 | U | | 9.2 | U | | 0.88 | U | | 910 | U | |
| ALPHA-BHC | 0.89 | U | | 9.2 | U | | 0.88 | U | | 910 | U | |
| BETA-BHC | 0.89 | U | | 9.2 | U | | 0.88 | U | | 910 | U | |
| CHLORDANE | 3.6 | U | | 130 | | | 3.5 | U | | 31000 | | |
| DELTA-BHC | 0.89 | U | | 9.2 | U | | 0.88 | U | | 910 | U | |
| DIELDRIN | 1.8 | U | | 18 | U | | 1.8 | U | | 1800 | U | |
| ENDOSULFAN I | 0.89 | U | | 9.2 | U | | 0.88 | U | | 910 | U | |
| ENDOSULFAN II | 1.8 | U | | 18 | U | | 1.8 | U | | 1800 | U | |
| ENDOSULFAN SULFATE | 1.8 | U | | 18 | U | | 1.8 | U | | 1800 | U | |
| ENDRIN | 1.8 | U | | 18 | U | | 1.8 | U | | 1800 | U | |
| ENDRIN ALDEHYDE | 1.8 | U | | 18 | U | | 1.8 | U | | 1800 | U | |
| ENDRIN KETONE | 1.8 | U | | 18 | U | | 1.8 | U | | 1800 | U | |
| GAMMA-BHC (LINDANE) | 0.89 | U | | 9.2 | U | | 0.88 | U | | 910 | U | |
| HEPTACHLOR | 0.89 | U | | 9.2 | U | | 0.88 | U | | 910 | U | |
| HEPTACHLOR EPOXIDE | 0.89 | U | | 9.2 | U | | 0.88 | U | | 910 | U | |
| METHOXYCHLOR | 8.9 | U | | 92 | U | | 8.8 | U | | 9100 | U | |
| TOXAPHENE | 18 | U | | 180 | U | | 18 | U | | 18000 | U | |

# CTO154 - NWS EARLE
## SOIL DATA
## RECRA LABNET - CHICAGO
## SDG: U04346

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SAMPLE NUMBER: | 186-SS-11 | | | 186-SS-12 | | | 186-SS-13 | | | 186-SS-13RE | | |
| SAMPLE DATE: | 04/20/98 | | | 04/20/98 | | | 04/20/98 | | | 04/20/98 | | |
| LABORATORY ID: | 9804G346-006 | | | 9804G346-008 | | | 9804G346-011 | | | 9804G346-011 | | |
| QC_TYPE: | NORMAL | | | NORMAL | | | NORMAL | | | NORMAL | | |
| % SOLIDS: | 91.4 % | | | 89.3 % | | | 92.3 % | | | 92.3 % | | |
| UNITS: | UG/KG | | | UG/KG | | | UG/KG | | | UG/KG | | |
| FIELD DUPLICATE OF: | | | | | | | | | | | | |
| | RESULT | QUAL | CODE | RESULT | QUAL | CODE | RESULT | QUAL | CODE | RESULT | QUAL | CODE |
| **PESTICIDES/PCBs** | | | | | | | | | | | | |
| 4,4'-DDD | 19 | | | 18000 | U | | 1500 | | | 890 | U | |
| 4,4'-DDE | 150 | | | 18000 | U | | 360 | | | 890 | U | |
| 4,4'-DDT | 850 | | | 18000 | U | | 12000 | | | 13000 | | |
| ALDRIN | 18 | U | | 9100 | U | | 89 | U | | 450 | U | |
| ALPHA-BHC | 18 | U | | 9100 | U | | 89 | U | | 450 | U | |
| BETA-BHC | 18 | U | | 9100 | U | | 89 | U | | 450 | U | |
| CHLORDANE | 330 | | | 200000 | | | 720 | | | 1800 | U | |
| DELTA-BHC | 18 | U | | 9100 | U | | 89 | U | | 450 | U | |
| DIELDRIN | 36 | U | | 18000 | U | | 180 | U | | 890 | U | |
| ENDOSULFAN I | 18 | U | | 9100 | U | | 89 | U | | 450 | U | |
| ENDOSULFAN II | 36 | U | | 18000 | U | | 180 | U | | 890 | U | |
| ENDOSULFAN SULFATE | 36 | U | | 18000 | U | | 180 | U | | 890 | U | |
| ENDRIN | 36 | U | | 18000 | U | | 180 | U | | 890 | U | |
| ENDRIN ALDEHYDE | 36 | U | | 18000 | U | | 180 | U | | 890 | U | |
| ENDRIN KETONE | 36 | U | | 18000 | U | | 180 | U | | 890 | U | |
| GAMMA-BHC (LINDANE) | 18 | U | | 9100 | U | | 89 | U | | 450 | U | |
| HEPTACHLOR | 18 | U | | 9100 | U | | 89 | U | | 450 | U | |
| HEPTACHLOR EPOXIDE | 18 | U | | 9100 | U | | 89 | U | | 450 | U | |
| METHOXYCHLOR | 180 | U | | 91000 | U | | 890 | U | | 4500 | U | |
| TOXAPHENE | 360 | U | | 180000 | U | | 1800 | U | | 8900 | U | |

# CTO154 - NWS EARLE
## SOIL DATA
## RECRA LABNET - CHICAGO
## SDG: U04346



| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SAMPLE NUMBER: | 186-SS-14 | | | 186-SS-15 | | | / / | | | / / | | |
| SAMPLE DATE: | 04/20/98 | | | 04/20/98 | | | | | | | | |
| LABORATORY ID: | 9804G346-015 | | | 9804G346-018 | | | | | | | | |
| QC_TYPE: | NORMAL | | | NORMAL | | | | | | | | |
| % SOLIDS: | 84.1 % | | | 78.8 % | | | 100.0 % | | | 100.0 % | | |
| UNITS: | UG/KG | | | UG/KG | | | | | | | | |
| FIELD DUPLICATE OF: | | | | | | | | | | | | |
| | RESULT | QUAL | CODE | RESULT | QUAL | CODE | RESULT | QUAL | CODE | RESULT | QUAL | CODE |
| **PESTICIDES/PCBs** | | | | | | | | | | | | |
| 4,4'-DDD | 49 | | | 290 | | | | | | | | |
| 4,4'-DDE | 320 | | | 1000 | | | | | | | | |
| 4,4'-DDT | 360 | | | 1700 | | | | | | | | |
| ALDRIN | 9.8 | U | | 100 | U | | | | | | | |
| ALPHA-BHC | 9.8 | U | | 100 | U | | | | | | | |
| BETA-BHC | 9.8 | U | | 100 | U | | | | | | | |
| CHLORDANE | 180 | | | 2600 | | | | | | | | |
| DELTA-BHC | 9.8 | U | | 100 | U | | | | | | | |
| DIELDRIN | 20 | U | | 210 | U | | | | | | | |
| ENDOSULFAN I | 9.8 | U | | 100 | U | | | | | | | |
| ENDOSULFAN II | 20 | U | | 210 | U | | | | | | | |
| ENDOSULFAN SULFATE | 20 | U | | 210 | U | | | | | | | |
| ENDRIN | 20 | U | | 210 | U | | | | | | | |
| ENDRIN ALDEHYDE | 20 | U | | 210 | U | | | | | | | |
| ENDRIN KETONE | 20 | U | | 210 | U | | | | | | | |
| GAMMA-BHC (LINDANE) | 9.8 | U | | 100 | U | | | | | | | |
| HEPTACHLOR | 9.8 | U | | 100 | U | | | | | | | |
| HEPTACHLOR EPOXIDE | 9.8 | U | | 100 | U | | | | | | | |
| METHOXYCHLOR | 98 | U | | 1000 | U | | | | | | | |
| TOXAPHENE | 200 | U | | 2100 | U | | | | | | | |

# CTO154 - NWS EARLE
## SOIL DATA
## RECRA LABNET - CHICAGO
## SDG: U04347

| SAMPLE NUMBER: | 186-DUP-03 | | | 186-SB-16-01 | | | 186-SB-16-03 | | | 186-SB-17-01 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SAMPLE DATE: | 04/20/98 | | | 04/20/98 | | | 04/20/98 | | | 04/20/98 | | |
| LABORATORY ID: | 9804G347-007 | | | 9804G347-002 | | | 9804G347-003 | | | 9804G347-005 | | |
| QC_TYPE: | NORMAL | | | NORMAL | | | NORMAL | | | NORMAL | | |
| % SOLIDS: | 91.5 % | | | 83.9 % | | | 93.0 % | | | 92.5 % | | |
| UNITS: | UG/KG | | | UG/KG | | | UG/KG | | | UG/KG | | |
| FIELD DUPLICATE OF: | | | | | | | | | | | | |
| | RESULT | QUAL | CODE | RESULT | QUAL | CODE | RESULT | QUAL | CODE | RESULT | QUAL | CODE |
| **PESTICIDES/PCBs** | | | | | | | | | | | | |
| 4,4'-DDD | 1800 | U | | 1.9 | U | | 1.8 | U | | 1.8 | U | |
| 4,4'-DDE | 1800 | U | | 26 | | | 1.8 | | | 1.8 | U | |
| 4,4'-DDT | 1800 | U | | 28 | | | 1.8 | | | 1.8 | U | |
| ALDRIN | 900 | U | | 0.97 | U | | 0.88 | U | | 0.89 | U | |
| ALPHA-BHC | 900 | U | | 0.97 | U | | 0.88 | U | | 0.89 | U | |
| BETA-BHC | 900 | U | | 0.97 | U | | 0.88 | U | | 0.89 | U | |
| CHLORDANE | 25000 | | | 3.9 | U | | 3.5 | U | | 3.6 | U | |
| DELTA-BHC | 900 | U | | 0.97 | U | | 0.88 | U | | 0.89 | U | |
| DIELDRIN | 1800 | U | | 1.9 | U | | 1.8 | U | | 1.8 | U | |
| ENDOSULFAN I | 900 | U | | 0.97 | U | | 0.88 | U | | 0.89 | U | |
| ENDOSULFAN II | 1800 | U | | 1.9 | U | | 1.8 | U | | 1.8 | U | |
| ENDOSULFAN SULFATE | 1800 | U | | 1.9 | U | | 1.8 | U | | 1.8 | U | |
| ENDRIN | 1800 | U | | 1.9 | U | | 1.8 | U | | 1.8 | U | |
| ENDRIN ALDEHYDE | 1800 | U | | 1.9 | U | | 1.8 | U | | 1.8 | U | |
| ENDRIN KETONE | 1800 | U | | 1.9 | U | | 1.8 | U | | 1.8 | U | |
| GAMMA-BHC (LINDANE) | 900 | U | | 0.97 | U | | 0.88 | U | | 0.89 | U | |
| HEPTACHLOR | 900 | U | | 0.97 | U | | 0.88 | U | | 0.89 | U | |
| HEPTACHLOR EPOXIDE | 900 | U | | 0.97 | U | | 0.88 | U | | 0.89 | U | |
| METHOXYCHLOR | 9000 | U | | 9.7 | U | | 8.8 | U | | 8.9 | U | |
| TOXAPHENE | 18000 | U | | 19 | U | | 18 | U | | 18 | U | |

# CTO154 - NWS EARLE
## SOIL DATA
## RECRA LABNET - CHICAGO
## SDG: U04347



| SAMPLE NUMBER: | 186-SB-17-03 | | | 186-SB-18-01 | | | 186-SB-18-03 | | | 186-SB-19-01 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SAMPLE DATE: | 04/20/98 | | | 04/20/98 | | | 04/20/98 | | | 04/20/98 | | |
| LABORATORY ID: | 9804G347-006 | | | 9804G347-009 | | | 9804G347-010 | | | 9804G347-012 | | |
| QC_TYPE: | NORMAL | | | NORMAL | | | NORMAL | | | NORMAL | | |
| % SOLIDS: | 90.8 % | | | 90.2 % | | | 88.1 % | | | 94.7 % | | |
| UNITS: | UG/KG | | | UG/KG | | | UG/KG | | | UG/KG | | |
| FIELD DUPLICATE OF: | | | | | | | | | | | | |
| | RESULT | QUAL | CODE | RESULT | QUAL | CODE | RESULT | QUAL | CODE | RESULT | QUAL | CODE |
| **PESTICIDES/PCBs** | | | | | | | | | | | | |
| 4,4'-DDD | 1.8 | U | | 90 | U | | 940 | U | | 8.7 | U | |
| 4,4'-DDE | 1.8 | U | | 90 | U | | 940 | U | | 8.7 | U | |
| 4,4'-DDT | 1.8 | U | | 90 | U | | 940 | U | | 8.7 | U | |
| ALDRIN | 0.91 | U | | 45 | U | | 470 | U | | 4.4 | U | |
| ALPHA-BHC | 0.91 | U | | 45 | U | | 470 | U | | 4.4 | U | |
| BETA-BHC | 0.91 | U | | 45 | U | | 470 | U | | 4.4 | U | |
| CHLORDANE | 3.6 | U | | 1200 | | | 42000 | | | 320 | | |
| DELTA-BHC | 0.91 | U | | 45 | U | | 470 | U | | 4.4 | U | |
| DIELDRIN | 1.8 | U | | 90 | U | | 940 | U | | 8.7 | U | |
| ENDOSULFAN I | 0.91 | U | | 45 | U | | 470 | U | | 4.4 | U | |
| ENDOSULFAN II | 1.8 | U | | 90 | U | | 940 | U | | 8.7 | U | |
| ENDOSULFAN SULFATE | 1.8 | U | | 90 | U | | 940 | U | | 8.7 | U | |
| ENDRIN | 1.8 | U | | 90 | U | | 940 | U | | 8.7 | U | |
| ENDRIN ALDEHYDE | 1.8 | U | | 90 | U | | 940 | U | | 8.7 | U | |
| ENDRIN KETONE | 1.8 | U | | 90 | U | | 940 | U | | 8.7 | U | |
| GAMMA-BHC (LINDANE) | 0.91 | U | | 45 | U | | 470 | U | | 4.4 | U | |
| HEPTACHLOR | 0.91 | U | | 45 | U | | 470 | U | | 4.4 | U | |
| HEPTACHLOR EPOXIDE | 0.91 | U | | 45 | U | | 470 | U | | 4.4 | U | |
| METHOXYCHLOR | 9.1 | U | | 450 | U | | 4700 | U | | 44 | U | |
| TOXAPHENE | 18 | U | | 900 | U | | 9400 | U | | 87 | U | |

# CTO154 - NWS EARLE
## SOIL DATA
## RECRA LABNET - CHICAGO
## SDG: U04347

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SAMPLE NUMBER: | 186-SB-19-03 | | | 186-SB-20-01 | | | 186-SB-20-03 | | | 186-SB-21-01 | | |
| SAMPLE DATE: | 04/20/98 | | | 04/21/98 | | | 04/21/98 | | | 04/21/98 | | |
| LABORATORY ID: | 9804G347-013 | | | 9804G347-016 | | | 9804G347-017 | | | 9804G347-019 | | |
| QC_TYPE: | NORMAL | | | NORMAL | | | NORMAL | | | NORMAL | | |
| % SOLIDS: | 92.5 % | | | 94.8 % | | | 93.0 % | | | 94.3 % | | |
| UNITS: | UG/KG | | | UG/KG | | | UG/KG | | | UG/KG | | |
| FIELD DUPLICATE OF: | | | | | | | | | | | | |
| | RESULT | QUAL | CODE | RESULT | QUAL | CODE | RESULT | QUAL | CODE | RESULT | QUAL | CODE |
| **PESTICIDES/PCBs** | | | | | | | | | | | | |
| 4,4'-DDD | 1.8 | U | | 1.7 | U | | 1.8 | U | | 1.7 | U | |
| 4,4'-DDE | 1.8 | U | | 1.7 | U | | 1.8 | U | | 1.7 | U | |
| 4,4'-DDT | 1.1 | J | | 1.7 | U | | 1.8 | U | | 1.7 | U | |
| ALDRIN | 0.88 | U | | 0.85 | U | | 0.88 | U | | 0.87 | U | |
| ALPHA-BHC | 0.88 | U | | 0.85 | U | | 0.88 | U | | 0.87 | U | |
| BETA-BHC | 0.88 | U | | 0.85 | U | | 0.88 | U | | 0.87 | U | |
| CHLORDANE | 56 | | | 20 | | | 3.5 | U | | 17 | | |
| DELTA-BHC | 0.88 | U | | 0.85 | U | | 0.88 | U | | 0.87 | U | |
| DIELDRIN | 1.8 | U | | 1.7 | U | | 1.8 | U | | 1.7 | U | |
| ENDOSULFAN I | 0.88 | U | | 0.85 | U | | 0.88 | U | | 0.87 | U | |
| ENDOSULFAN II | 1.8 | U | | 1.7 | U | | 1.8 | U | | 1.7 | U | |
| ENDOSULFAN SULFATE | 1.8 | U | | 1.7 | U | | 1.8 | U | | 1.7 | U | |
| ENDRIN | 1.8 | U | | 1.7 | U | | 1.8 | U | | 1.7 | U | |
| ENDRIN ALDEHYDE | 1.8 | U | | 1.7 | U | | 1.8 | U | | 1.7 | U | |
| ENDRIN KETONE | 1.8 | U | | 1.7 | U | | 1.8 | U | | 1.7 | U | |
| GAMMA-BHC (LINDANE) | 0.88 | U | | 0.85 | U | | 0.88 | U | | 0.87 | U | |
| HEPTACHLOR | 0.88 | U | | 0.85 | U | | 0.88 | U | | 0.87 | U | |
| HEPTACHLOR EPOXIDE | 3.2 | | | 0.85 | U | | 0.88 | U | | 0.87 | U | |
| METHOXYCHLOR | 8.8 | U | | 8.5 | U | | 8.8 | U | | 8.7 | U | |
| TOXAPHENE | 18 | U | | 17 | U | | 18 | U | | 17 | U | |

# CTO154 - NWS EARLE
## SOIL DATA
## RECRA LABNET - CHICAGO
## SDG: U04347



| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SAMPLE NUMBER: | 186-SB-21-03 | | | 186-SS-16 | | | 186-SS-17 | | | 186-SS-18 | | |
| SAMPLE DATE: | 04/21/98 | | | 04/20/98 | | | 04/20/98 | | | 04/20/98 | | |
| LABORATORY ID: | 9804G347-020 | | | 9804G347-001 | | | 9804G347-004 | | | 9804G347-008 | | |
| QC_TYPE: | NORMAL | | | NORMAL | | | NORMAL | | | NORMAL | | |
| % SOLIDS: | 93.1 % | | | 81.1 % | | | 88.4 % | | | 90.7 % | | |
| UNITS: | UG/KG | | | UG/KG | | | UG/KG | | | UG/KG | | |
| FIELD DUPLICATE OF: | | | | | | | | | | | | |
| | RESULT | QUAL | CODE | RESULT | QUAL | CODE | RESULT | QUAL | CODE | RESULT | QUAL | CODE |
| **PESTICIDES/PCBs** | | | | | | | | | | | | |
| 4,4'-DDD | 1.8 | U | | 10 | U | | 18 | U | | 1800 | U | |
| 4,4'-DDE | 1.8 | U | | 90 | | | 160 | | | 1800 | U | |
| 4,4'-DDT | 1.8 | U | | 99 | | | 200 | | | 1800 | U | |
| ALDRIN | 0.88 | U | | 5.1 | U | | 9.3 | U | | 920 | U | |
| ALPHA-BHC | 0.88 | U | | 5.1 | U | | 9.3 | U | | 920 | U | |
| BETA-BHC | 0.88 | U | | 5.1 | U | | 9.3 | U | | 920 | U | |
| CHLORDANE | 3.5 | U | | 20 | U | | 37 | U | | 180000 | | |
| DELTA-BHC | 0.88 | U | | 5.1 | U | | 9.3 | U | | 920 | U | |
| DIELDRIN | 1.8 | U | | 10 | U | | 18 | U | | 1800 | U | |
| ENDOSULFAN I | 0.88 | U | | 5.1 | U | | 9.3 | U | | 920 | U | |
| ENDOSULFAN II | 1.8 | U | | 10 | U | | 18 | U | | 1800 | U | |
| ENDOSULFAN SULFATE | 1.8 | U | | 10 | U | | 18 | U | | 1800 | U | |
| ENDRIN | 1.8 | U | | 10 | U | | 18 | U | | 1800 | U | |
| ENDRIN ALDEHYDE | 1.8 | U | | 10 | U | | 18 | U | | 1800 | U | |
| ENDRIN KETONE | 1.8 | U | | 10 | U | | 18 | U | | 1800 | U | |
| GAMMA-BHC (LINDANE) | 0.88 | U | | 5.1 | U | | 9.3 | U | | 920 | U | |
| HEPTACHLOR | 0.88 | U | | 5.1 | U | | 9.3 | U | | 920 | U | |
| HEPTACHLOR EPOXIDE | 0.88 | U | | 5.1 | U | | 9.3 | U | | 920 | U | |
| METHOXYCHLOR | 8.8 | U | | 51 | U | | 93 | U | | 9200 | U | |
| TOXAPHENE | 18 | U | | 100 | U | | 180 | U | | 18000 | U | |

# CTO154 - NWS EARLE
## SOIL DATA
## RECRA LABNET - CHICAGO
## SDG: U04347

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SAMPLE NUMBER: | 186-SS-19 | | | 186-SS-20 | | | 186-SS-21 | | | / / | | |
| SAMPLE DATE: | 04/20/98 | | | 04/21/98 | | | 04/21/98 | | | | | |
| LABORATORY ID: | 9804G347-011 | | | 9804G347-015 | | | 9804G347-018 | | | | | |
| QC_TYPE: | NORMAL | | | NORMAL | | | NORMAL | | | | | |
| % SOLIDS: | 91.5 % | | | 92.1 % | | | 93.7 % | | | 100.0 % | | |
| UNITS: | UG/KG | | | UG/KG | | | UG/KG | | | | | |
| FIELD DUPLICATE OF: | | | | | | | | | | | | |
| | RESULT | QUAL | CODE | RESULT | QUAL | CODE | RESULT | QUAL | CODE | RESULT | QUAL | CODE |
| **PESTICIDES/PCBs** | | | | | | | | | | | | |
| 4,4'-DDD | 900 | U | | 18 | U | | 17 | U | | | | |
| 4,4'-DDE | 900 | U | | 17 | | | 17 | U | | | | |
| 4,4'-DDT | 900 | U | | 29 | | | 17 | | | | | |
| ALDRIN | 450 | U | | 9.0 | U | | 8.7 | U | | | | |
| ALPHA-BHC | 450 | U | | 9.0 | U | | 8.7 | U | | | | |
| BETA-BHC | 450 | U | | 9.0 | U | | 8.7 | U | | | | |
| CHLORDANE | 6600 | | | 430 | | | 680 | | | | | |
| DELTA-BHC | 450 | U | | 9.0 | U | | 8.7 | U | | | | |
| DIELDRIN | 900 | U | | 18 | U | | 17 | U | | | | |
| ENDOSULFAN I | 450 | U | | 9.0 | U | | 8.7 | U | | | | |
| ENDOSULFAN II | 900 | U | | 18 | U | | 17 | U | | | | |
| ENDOSULFAN SULFATE | 900 | U | | 18 | U | | 17 | U | | | | |
| ENDRIN | 900 | U | | 18 | U | | 17 | U | | | | |
| ENDRIN ALDEHYDE | 900 | U | | 18 | U | | 17 | U | | | | |
| ENDRIN KETONE | 900 | U | | 18 | U | | 17 | U | | | | |
| GAMMA-BHC (LINDANE) | 450 | U | | 9.0 | U | | 8.7 | U | | | | |
| HEPTACHLOR | 450 | U | | 9.0 | U | | 8.7 | U | | | | |
| HEPTACHLOR EPOXIDE | 450 | U | | 6.1 | | | 24 | | | | | |
| METHOXYCHLOR | 4500 | U | | 90 | U | | 87 | U | | | | |
| TOXAPHENE | 9000 | U | | 180 | U | | 170 | U | | | | |

# CTO154 - NWS EARLE
## SOIL DATA
## RECRA LABNET - CHICAGO
## SDG: U04376



| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SAMPLE NUMBER: | 186-DUP-04 | | | 186-DUP-05 | | | 186-DUP-06 | | | 186-SB-22-01 | | |
| SAMPLE DATE: | 04/21/98 | | | 04/21/98 | | | 04/21/98 | | | 04/21/98 | | |
| LABORATORY ID: | 9804G376-001 | | | 9804G376-007 | | | 9804G376-017 | | | 9804G376-003 | | |
| QC_TYPE: | NORMAL | | | NORMAL | | | NORMAL | | | NORMAL | | |
| % SOLIDS: | 92.6 % | | | 90.8 % | | | 92.9 % | | | 93.4 % | | |
| UNITS: | UG/KG | | | UG/KG | | | UG/KG | | | UG/KG | | |
| FIELD DUPLICATE OF: | | | | | | | | | | | | |
| | RESULT | QUAL | CODE | RESULT | QUAL | CODE | RESULT | QUAL | CODE | RESULT | QUAL | CODE |
| **PESTICIDES/PCBs** | | | | | | | | | | | | |
| 4,4'-DDD | 1.8 | U | | 1800 | U | | 18 | U | | 880 | U | |
| 4,4'-DDE | 1.8 | U | | 1800 | U | | 18 | U | | 880 | U | |
| 4,4'-DDT | 1.8 | U | | 1800 | U | | 18 | U | | 880 | U | |
| ALDRIN | 0.88 | U | | 910 | U | | 8.8 | U | | 440 | U | |
| ALPHA-BHC | 0.88 | U | | 910 | U | | 8.8 | U | | 440 | U | |
| BETA-BHC | 0.88 | U | | 910 | U | | 8.8 | U | | 440 | U | |
| CHLORDANE | 14 | | | 32000 | | | 120 | | | 18000 | | |
| DELTA-BHC | 0.88 | U | | 910 | U | | 8.8 | U | | 440 | U | |
| DIELDRIN | 1.8 | U | | 1800 | U | | 18 | U | | 880 | U | |
| ENDOSULFAN I | 0.88 | U | | 910 | U | | 8.8 | U | | 440 | U | |
| ENDOSULFAN II | 1.8 | U | | 1800 | U | | 18 | U | | 880 | U | |
| ENDOSULFAN SULFATE | 1.8 | U | | 1800 | U | | 18 | U | | 880 | U | |
| ENDRIN | 1.8 | U | | 1800 | U | | 18 | U | | 880 | U | |
| ENDRIN ALDEHYDE | 1.8 | U | | 1800 | U | | 18 | U | | 880 | U | |
| ENDRIN KETONE | 1.8 | U | | 1800 | U | | 18 | U | | 880 | U | |
| GAMMA-BHC (LINDANE) | 0.88 | U | | 910 | U | | 8.8 | U | | 440 | U | |
| HEPTACHLOR | 0.88 | U | | 910 | U | | 8.8 | U | | 440 | U | |
| HEPTACHLOR EPOXIDE | 0.88 | U | | 910 | U | | 8.8 | U | | 440 | U | |
| METHOXYCHLOR | 8.8 | U | | 9100 | U | | 88 | U | | 4400 | U | |
| TOXAPHENE | 18 | U | | 18000 | U | | 180 | U | | 8800 | U | |

# CTO154 - NWS EARLE
## SOIL DATA
## RECRA LABNET - CHICAGO
## SDG: U04376

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SAMPLE NUMBER: | 186-SB-22-03 | | | 186-SB-23-01 | | | 186-SB-23-03 | | | 186-SB-24-01 | | |
| SAMPLE DATE: | 04/21/98 | | | 04/21/98 | | | 04/21/98 | | | 04/21/98 | | |
| LABORATORY ID: | 9804G376-004 | | | 9804G376-012 | | | 9804G376-013 | | | 9804G376-014 | | |
| QC_TYPE: | NORMAL | | | NORMAL | | | NORMAL | | | NORMAL | | |
| % SOLIDS: | 93.6 % | | | 94.0 % | | | 91.5 % | | | 93.0 % | | |
| UNITS: | UG/KG | | | UG/KG | | | UG/KG | | | UG/KG | | |
| FIELD DUPLICATE OF: | | | | | | | | | | | | |
| | RESULT | QUAL | CODE | RESULT | QUAL | CODE | RESULT | QUAL | CODE | RESULT | QUAL | CODE |
| **PESTICIDES/PCBs** | | | | | | | | | | | | |
| 4,4'-DDD | 35 | U | | 1.7 | U | | 1.8 | U | | 18 | U | |
| 4,4'-DDE | 35 | U | | 1.7 | U | | 1.8 | U | | 18 | U | |
| 4,4'-DDT | 35 | U | | 1.8 | | | 1.4 | J | | 18 | U | |
| ALDRIN | 17 | U | | 0.87 | U | | 0.90 | U | | 8.8 | U | |
| ALPHA-BHC | 17 | U | | 0.87 | U | | 0.90 | U | | 8.8 | U | |
| BETA-BHC | 17 | U | | 0.87 | U | | 0.90 | U | | 8.8 | U | |
| CHLORDANE | 300 | | | 53 | | | 9.7 | | | 180 | | |
| DELTA-BHC | 17 | U | | 0.87 | U | | 0.90 | U | | 8.8 | U | |
| DIELDRIN | 35 | U | | 1.7 | U | | 1.8 | U | | 18 | U | |
| ENDOSULFAN I | 17 | U | | 0.87 | U | | 0.90 | U | | 8.8 | U | |
| ENDOSULFAN II | 35 | U | | 1.7 | U | | 1.8 | U | | 18 | U | |
| ENDOSULFAN SULFATE | 35 | U | | 1.7 | U | | 1.8 | U | | 18 | U | |
| ENDRIN | 35 | U | | 1.7 | U | | 1.8 | U | | 18 | U | |
| ENDRIN ALDEHYDE | 35 | U | | 1.7 | U | | 1.8 | U | | 18 | U | |
| ENDRIN KETONE | 35 | U | | 1.7 | U | | 1.8 | U | | 18 | U | |
| GAMMA-BHC (LINDANE) | 17 | U | | 0.87 | U | | 0.90 | U | | 8.8 | U | |
| HEPTACHLOR | 17 | U | | 0.87 | U | | 0.90 | U | | 8.8 | U | |
| HEPTACHLOR EPOXIDE | 17 | U | | 0.87 | U | | 0.90 | U | | 8.8 | U | |
| METHOXYCHLOR | 170 | U | | 8.7 | U | | 9.0 | U | | 88 | U | |
| TOXAPHENE | 350 | U | | 17 | U | | 18 | U | | 180 | U | |

# CTO154 - NWS EARLE
## SOIL DATA
## RECRA LABNET - CHICAGO
## SDG: U04376

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SAMPLE NUMBER: | 186-SB-24-03 | | | 186-SB-25-01 | | | 186-SB-25-03 | | | 186-SB-26-01 | | |
| SAMPLE DATE: | 04/21/98 | | | 04/21/98 | | | 04/21/98 | | | 04/21/98 | | |
| LABORATORY ID: | 9804G376-015 | | | 9804G376-016 | | | 9804G376-018 | | | 9804G376-019 | | |
| QC_TYPE: | NORMAL | | | NORMAL | | | NORMAL | | | NORMAL | | |
| % SOLIDS: | 87.3 % | | | 92.2 % | | | 88.7 % | | | 92.1 % | | |
| UNITS: | UG/KG | | | UG/KG | | | UG/KG | | | UG/KG | | |
| FIELD DUPLICATE OF: | | | | | | | | | | | | |
| | RESULT | QUAL | CODE | RESULT | QUAL | CODE | RESULT | QUAL | CODE | RESULT | QUAL | CODE |
| **PESTICIDES/PCBs** | | | | | | | | | | | | |
| 4,4'-DDD | 1.9 | U | | 18 | U | | 19 | U | | 180 | U | |
| 4,4'-DDE | 1.9 | U | | 18 | U | | 19 | U | | 340 | | |
| 4,4'-DDT | 1.9 | U | | 18 | U | | 19 | U | | 6300 | | |
| ALDRIN | 0.95 | U | | 8.9 | U | | 9.3 | U | | 89 | U | |
| ALPHA-BHC | 0.95 | U | | 8.9 | U | | 9.3 | U | | 89 | U | |
| BETA-BHC | 0.95 | U | | 8.9 | U | | 9.3 | U | | 89 | U | |
| CHLORDANE | 28 | | | 180 | | | 180 | | | 360 | U | |
| DELTA-BHC | 0.95 | U | | 8.9 | U | | 9.3 | U | | 89 | U | |
| DIELDRIN | 1.9 | U | | 18 | U | | 19 | U | | 180 | U | |
| ENDOSULFAN I | 0.95 | U | | 8.9 | U | | 9.3 | U | | 89 | U | |
| ENDOSULFAN II | 1.9 | U | | 18 | U | | 19 | U | | 180 | U | |
| ENDOSULFAN SULFATE | 1.9 | U | | 18 | U | | 19 | U | | 180 | U | |
| ENDRIN | 1.9 | U | | 18 | U | | 19 | U | | 180 | U | |
| ENDRIN ALDEHYDE | 1.9 | U | | 18 | U | | 19 | U | | 180 | U | |
| ENDRIN KETONE | 1.9 | U | | 18 | U | | 19 | U | | 180 | U | |
| GAMMA-BHC (LINDANE) | 0.95 | U | | 8.9 | U | | 9.3 | U | | 89 | U | |
| HEPTACHLOR | 0.95 | U | | 8.9 | U | | 9.3 | U | | 89 | U | |
| HEPTACHLOR EPOXIDE | 1.5 | | | 8.9 | U | | 9.3 | U | | 89 | U | |
| METHOXYCHLOR | 9.5 | U | | 89 | U | | 93 | U | | 890 | U | |
| TOXAPHENE | 19 | U | | 180 | U | | 190 | U | | 1800 | U | |

# CTO154 - NWS EARLE
## SOIL DATA
## RECRA LABNET - CHICAGO
## SDG: U04376

| SAMPLE NUMBER: | 186-SB-26-01RE | | | 186-SB-26-03 | | | 186-SB-26-03RE | | | 186-SS-22 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SAMPLE DATE: | 04/21/98 | | | 04/21/98 | | | 04/21/98 | | | 04/21/98 | | |
| LABORATORY ID: | 9804G376-019 | | | 9804G376-020 | | | 9804G376-020 | | | 9804G376-002 | | |
| QC_TYPE: | NORMAL | | | NORMAL | | | NORMAL | | | NORMAL | | |
| % SOLIDS: | 92.1 % | | | 88.8 % | | | 88.8 % | | | 92.2 % | | |
| UNITS: | UG/KG | | | UG/KG | | | UG/KG | | | UG/KG | | |
| FIELD DUPLICATE OF: | | | | | | | | | | | | |
| | RESULT | QUAL | CODE | RESULT | QUAL | CODE | RESULT | QUAL | CODE | RESULT | QUAL | CODE |
| **PESTICIDES/PCBs** | | | | | | | | | | | | |
| 4,4'-DDD | 360 | U | | 18 | U | | 37 | U | | 18000 | U | |
| 4,4'-DDE | 360 | U | | 420 | | | 37 | U | | 18000 | U | |
| 4,4'-DDT | 6500 | | | 590 | | | 570 | | | 18000 | U | |
| ALDRIN | 180 | U | | 9.2 | U | | 18 | U | | 8900 | U | |
| ALPHA-BHC | 180 | U | | 9.2 | U | | 18 | U | | 8900 | U | |
| BETA-BHC | 180 | U | | 9.2 | U | | 18 | U | | 8900 | U | |
| CHLORDANE | 710 | U | | 37 | U | | 73 | U | | 170000 | | |
| DELTA-BHC | 180 | U | | 9.2 | U | | 18 | U | | 8900 | U | |
| DIELDRIN | 360 | U | | 18 | U | | 37 | U | | 18000 | U | |
| ENDOSULFAN I | 180 | U | | 9.2 | U | | 18 | U | | 8900 | U | |
| ENDOSULFAN II | 360 | U | | 18 | U | | 37 | U | | 18000 | U | |
| ENDOSULFAN SULFATE | 360 | U | | 18 | U | | 37 | U | | 18000 | U | |
| ENDRIN | 360 | U | | 18 | U | | 37 | U | | 18000 | U | |
| ENDRIN ALDEHYDE | 360 | U | | 18 | U | | 37 | U | | 18000 | U | |
| ENDRIN KETONE | 360 | U | | 18 | U | | 37 | U | | 18000 | U | |
| GAMMA-BHC (LINDANE) | 180 | U | | 9.2 | U | | 18 | U | | 8900 | U | |
| HEPTACHLOR | 180 | U | | 9.2 | U | | 18 | U | | 8900 | U | |
| HEPTACHLOR EPOXIDE | 180 | U | | 9.2 | U | | 18 | U | | 8900 | U | |
| METHOXYCHLOR | 1800 | U | | 92 | U | | 180 | U | | 89000 | U | |
| TOXAPHENE | 3600 | U | | 180 | U | | 370 | U | | 180000 | U | |

CTC154 NWS EARLE
SOIL DATA
RECRA LABNET - CHICAGO
SDG: U04376

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SAMPLE NUMBER: | 186-SS-23 | | | 186-SS-24 | | | 186-SS-25 | | | 186-SS-26 | | |
| SAMPLE DATE: | 04/21/98 | | | 04/21/98 | | | 04/21/98 | | | 04/21/98 | | |
| LABORATORY ID: | 9804G376-005 | | | 9804G376-006 | | | 9804G376-008 | | | 9804G376-009 | | |
| QC_TYPE: | NORMAL | | | NORMAL | | | NORMAL | | | NORMAL | | |
| % SOLIDS: | 83.2 % | | | 90.5 % | | | 87.4 % | | | 91.0 % | | |
| UNITS: | UG/KG | | | UG/KG | | | UG/KG | | | UG/KG | | |
| FIELD DUPLICATE OF: | | | | | | | | | | | | |
| | RESULT | QUAL | CODE | RESULT | QUAL | CODE | RESULT | QUAL | CODE | RESULT | QUAL | CODE |
| **PESTICIDES/PCBs** | | | | | | | | | | | | |
| 4,4'-DDD | 98 | U | | 1800 | U | | 9500 | U | | 180 | U | |
| 4,4'-DDE | 98 | U | | 1800 | U | | 9500 | U | | 710 | | |
| 4,4'-DDT | 98 | U | | 1800 | U | | 9500 | U | | 19000 | | |
| ALDRIN | 49 | U | | 910 | U | | 4700 | U | | 90 | U | |
| ALPHA-BHC | 49 | U | | 910 | U | | 4700 | U | | 90 | U | |
| BETA-BHC | 49 | U | | 910 | U | | 4700 | U | | 90 | U | |
| CHLORDANE | 1300 | | | 30000 | | | 34000 | | | 360 | U | |
| DELTA-BHC | 49 | U | | 910 | U | | 4700 | U | | 90 | U | |
| DIELDRIN | 98 | U | | 1800 | U | | 9500 | U | | 180 | U | |
| ENDOSULFAN I | 49 | U | | 910 | U | | 4700 | U | | 90 | U | |
| ENDOSULFAN II | 98 | U | | 1800 | U | | 9500 | U | | 180 | U | |
| ENDOSULFAN SULFATE | 98 | U | | 1800 | U | | 9500 | U | | 180 | U | |
| ENDRIN | 98 | U | | 1800 | U | | 9500 | U | | 180 | U | |
| ENDRIN ALDEHYDE | 98 | U | | 1800 | U | | 9500 | U | | 180 | U | |
| ENDRIN KETONE | 98 | U | | 1800 | U | | 9500 | U | | 180 | U | |
| GAMMA-BHC (LINDANE) | 49 | U | | 910 | U | | 4700 | U | | 90 | U | |
| HEPTACHLOR | 49 | U | | 910 | U | | 4700 | U | | 90 | U | |
| HEPTACHLOR EPOXIDE | 49 | U | | 910 | U | | 4700 | U | | 90 | U | |
| METHOXYCHLOR | 490 | U | | 9100 | U | | 47000 | U | | 900 | U | |
| TOXAPHENE | 980 | U | | 18000 | U | | 95000 | U | | 1800 | U | |

# CTO154 - NWS EARLE
## SOIL DATA
## RECRA LABNET - CHICAGO
## SDG: U04376

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SAMPLE NUMBER: | 186-SS-26RE | | | 186-SS-27 | | | 186-SS-28 | | | / / | | |
| SAMPLE DATE: | 04/21/98 | | | 04/21/98 | | | 04/21/98 | | | | | |
| LABORATORY ID: | 9804G376-009 | | | 9804G376-010 | | | 9804G376-011 | | | | | |
| QC_TYPE: | NORMAL | | | NORMAL | | | NORMAL | | | | | |
| % SOLIDS: | 91.0 % | | | 91.9 % | | | 85.0 % | | | 100.0 % | | |
| UNITS: | UG/KG | | | UG/KG | | | UG/KG | | | | | |
| FIELD DUPLICATE OF: | | | | | | | | | | | | |
| | RESULT | QUAL | CODE | RESULT | QUAL | CODE | RESULT | QUAL | CODE | RESULT | QUAL | CODE |
| **PESTICIDES/PCBs** | | | | | | | | | | | | |
| 4,4'-DDD | 900 | U | | 90 | U | | 20000 | U | | | | |
| 4,4'-DDE | 900 | U | | 90 | U | | 20000 | U | | | | |
| 4,4'-DDT | 20000 | | | 90 | U | | 52000 | | | | | |
| ALDRIN | 450 | U | | 45 | U | | 9800 | U | | | | |
| ALPHA-BHC | 450 | U | | 45 | U | | 9800 | U | | | | |
| BETA-BHC | 450 | U | | 45 | U | | 9800 | U | | | | |
| CHLORDANE | 1800 | U | | 650 | | | 140000 | | | | | |
| DELTA-BHC | 450 | U | | 45 | U | | 9800 | U | | | | |
| DIELDRIN | 900 | U | | 90 | U | | 20000 | U | | | | |
| ENDOSULFAN I | 450 | U | | 45 | U | | 9800 | U | | | | |
| ENDOSULFAN II | 900 | U | | 90 | U | | 20000 | U | | | | |
| ENDOSULFAN SULFATE | 900 | U | | 90 | U | | 20000 | U | | | | |
| ENDRIN | 900 | U | | 90 | U | | 20000 | U | | | | |
| ENDRIN ALDEHYDE | 900 | U | | 90 | U | | 20000 | U | | | | |
| ENDRIN KETONE | 900 | U | | 90 | U | | 20000 | U | | | | |
| GAMMA-BHC (LINDANE) | 450 | U | | 45 | U | | 9800 | U | | | | |
| HEPTACHLOR | 450 | U | | 45 | U | | 9800 | U | | | | |
| HEPTACHLOR EPOXIDE | 450 | U | | 45 | U | | 9800 | U | | | | |
| METHOXYCHLOR | 4500 | U | | 450 | U | | 98000 | U | | | | |
| TOXAPHENE | 9000 | U | | 900 | U | | 200000 | U | | | | |

# CTO154 - NWS EARLE
## SOIL DATA
## RECRA LABNET - CHICAGO
## SDG: U04377



| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SAMPLE NUMBER: | 186-DUP-07 | | | 186-SB-27-01 | | | 186-SB-27-03 | | | 186-SB-28-01 | | |
| SAMPLE DATE: | 04/21/98 | | | 04/21/98 | | | 04/21/98 | | | 04/21/98 | | |
| LABORATORY ID: | 9804G377-008 | | | 9804G377-001 | | | 9804G377-002 | | | 9804G377-003 | | |
| QC_TYPE: | NORMAL | | | NORMAL | | | NORMAL | | | NORMAL | | |
| % SOLIDS: | 90.5 % | | | 94.4 % | | | 89.2 % | | | 91.6 % | | |
| UNITS: | % | | | % | | | % | | | % | | |
| FIELD DUPLICATE OF: | | | | | | | | | | | | |
| | RESULT | QUAL | CODE | RESULT | QUAL | CODE | RESULT | QUAL | CODE | RESULT | QUAL | CODE |
| **PESTICIDES/PCBs** | | | | | | | | | | | | |
| 4,4'-DDD | 9.2 | U | | 1.7 | U | | 1.8 | U | | 180 | U | |
| 4,4'-DDE | 15 | | | 1.7 | U | | 1.8 | U | | 180 | U | |
| 4,4'-DDT | 35 | | | 1.7 | U | | 1.8 | U | | 380 | | |
| ALDRIN | 4.6 | U | | 0.86 | U | | 0.93 | U | | 89 | U | |
| ALPHA-BHC | 4.6 | U | | 0.86 | U | | 0.93 | U | | 89 | U | |
| BETA-BHC | 4.6 | U | | 0.86 | U | | 0.93 | U | | 89 | U | |
| CHLORDANE | 77 | | | 28 | | | 5.4 | | | 1900 | | |
| DELTA-BHC | 4.6 | U | | 0.86 | U | | 0.93 | U | | 89 | U | |
| DIELDRIN | 9.2 | U | | 1.7 | U | | 1.8 | U | | 180 | U | |
| ENDOSULFAN I | 4.6 | U | | 0.86 | U | | 0.93 | U | | 89 | U | |
| ENDOSULFAN II | 9.2 | U | | 1.7 | U | | 1.8 | U | | 180 | U | |
| ENDOSULFAN SULFATE | 9.2 | U | | 1.7 | U | | 1.8 | U | | 180 | U | |
| ENDRIN | 9.2 | U | | 1.7 | U | | 1.8 | U | | 180 | U | |
| ENDRIN ALDEHYDE | 9.2 | U | | 1.7 | U | | 1.8 | U | | 180 | U | |
| ENDRIN KETONE | 9.2 | U | | 1.7 | U | | 1.8 | U | | 180 | U | |
| GAMMA-BHC (LINDANE) | 4.6 | U | | 0.86 | U | | 0.93 | U | | 89 | U | |
| HEPTACHLOR | 4.6 | U | | 0.86 | U | | 0.93 | U | | 89 | U | |
| HEPTACHLOR EPOXIDE | 4.6 | U | | 0.86 | U | | 0.93 | U | | 89 | U | |
| METHOXYCHLOR | 46 | U | | 8.6 | U | | 9.3 | U | | 890 | U | |
| TOXAPHENE | 92 | U | | 17 | U | | 18 | U | | 1800 | U | |

# CTO154 - NWS EARLE
## SOIL DATA
## RECRA LABNET - CHICAGO
## SDG: U04377

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SAMPLE NUMBER: | 186-SB-28-03 | | | 186-SB-29-01 | | | 186-SB-29-03 | | | 186-SB-30-01 | | |
| SAMPLE DATE: | 04/21/98 | | | 04/21/98 | | | 04/21/98 | | | 04/21/98 | | |
| LABORATORY ID: | 9804G377-004 | | | 9804G377-006 | | | 9804G377-007 | | | 9804G377-010 | | |
| QC_TYPE: | NORMAL | | | NORMAL | | | NORMAL | | | NORMAL | | |
| % SOLIDS: | 94.5 % | | | 89.7 % | | | 92.3 % | | | 89.7 % | | |
| UNITS: | % | | | % | | | % | | | % | | |
| FIELD DUPLICATE OF: | | | | | | | | | | | | |
| | RESULT | QUAL | CODE | RESULT | QUAL | CODE | RESULT | QUAL | CODE | RESULT | QUAL | CODE |
| **PESTICIDES/PCBs** | | | | | | | | | | | | |
| 4,4'-DDD | 1.8 | U | | 3.6 | U | | 1.8 | U | | 91 | U | |
| 4,4'-DDE | 1.8 | U | | 55 | | | 5.7 | | | 200 | | |
| 4,4'-DDT | 4.9 | | | 77 | | | 8.6 | | | 840 | | |
| ALDRIN | 0.88 | U | | 1.8 | U | | 0.90 | U | | 45 | U | |
| ALPHA-BHC | 0.88 | U | | 1.8 | U | | 0.90 | U | | 45 | U | |
| BETA-BHC | 0.88 | U | | 1.8 | U | | 0.90 | U | | 45 | U | |
| CHLORDANE | 8.9 | | | 200 | | | 19 | | | 210 | | |
| DELTA-BHC | 0.88 | U | | 1.8 | U | | 0.90 | U | | 45 | U | |
| DIELDRIN | 1.8 | U | | 3.6 | U | | 1.8 | U | | 91 | U | |
| ENDOSULFAN I | 0.88 | U | | 1.8 | U | | 0.90 | U | | 45 | U | |
| ENDOSULFAN II | 1.8 | U | | 3.6 | U | | 1.8 | U | | 91 | U | |
| ENDOSULFAN SULFATE | 1.8 | U | | 3.6 | U | | 1.8 | U | | 91 | U | |
| ENDRIN | 1.8 | U | | 3.6 | U | | 1.8 | U | | 91 | U | |
| ENDRIN ALDEHYDE | 1.8 | U | | 3.6 | U | | 1.8 | U | | 91 | U | |
| ENDRIN KETONE | 1.8 | U | | 3.6 | U | | 1.8 | U | | 91 | U | |
| GAMMA-BHC (LINDANE) | 0.88 | U | | 1.8 | U | | 0.90 | U | | 45 | U | |
| HEPTACHLOR | 0.88 | U | | 1.8 | U | | 0.90 | U | | 45 | U | |
| HEPTACHLOR EPOXIDE | 0.88 | U | | 1.8 | U | | 0.90 | U | | 45 | U | |
| METHOXYCHLOR | 8.8 | U | | 18 | U | | 9.0 | U | | 450 | U | |
| TOXAPHENE | 18 | U | | 36 | U | | 18 | U | | 910 | U | |

# CTO154 - NWS EARLE
## SOIL DATA
## RECRA LABNET - CHICAGO
## SDG: U04377

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SAMPLE NUMBER: | 186-SB-30-03 | | | 186-SB-31-01 | | | 186-SB-31-03 | | | 186-SB-32-01 | | |
| SAMPLE DATE: | 04/21/98 | | | 04/21/98 | | | 04/21/98 | | | 04/21/98 | | |
| LABORATORY ID: | 9804G377-011 | | | 9804G377-013 | | | 9804G377-014 | | | 9804G377-016 | | |
| QC_TYPE: | NORMAL | | | NORMAL | | | NORMAL | | | NORMAL | | |
| % SOLIDS: | 93.0 % | | | 56.8 % | | | 91.8 % | | | 88.6 % | | |
| UNITS: | % | | | % | | | % | | | % | | |
| FIELD DUPLICATE OF: | | | | | | | | | | | | |
| | RESULT | QUAL | CODE | RESULT | QUAL | CODE | RESULT | QUAL | CODE | RESULT | QUAL | CODE |
| **PESTICIDES/PCBs** | | | | | | | | | | | | |
| 4,4'-DDD | 1.8 | U | | 2900000 | U | | 36 | U | | 58 | | |
| 4,4'-DDE | 3.9 | | | 2900000 | U | | 38 | | | 59 | | |
| 4,4'-DDT | 8.6 | | | 2900000 | U | | 100 | | | 35 | J | |
| ALDRIN | 0.89 | U | | 1400000 | U | | 18 | U | | 19 | U | |
| ALPHA-BHC | 0.89 | U | | 1400000 | U | | 18 | U | | 19 | U | |
| BETA-BHC | 0.89 | U | | 1400000 | U | | 18 | U | | 19 | U | |
| CHLORDANE | 13 | | | 75000000 | | | 2000 | | | 75 | U | |
| DELTA-BHC | 0.89 | U | | 1400000 | U | | 18 | U | | 19 | U | |
| DIELDRIN | 1.8 | U | | 2900000 | U | | 36 | U | | 37 | U | |
| ENDOSULFAN I | 0.89 | U | | 1400000 | U | | 18 | U | | 19 | U | |
| ENDOSULFAN II | 1.8 | U | | 2900000 | U | | 36 | U | | 37 | U | |
| ENDOSULFAN SULFATE | 1.8 | U | | 2900000 | U | | 36 | U | | 37 | U | |
| ENDRIN | 1.8 | U | | 2900000 | U | | 36 | U | | 37 | U | |
| ENDRIN ALDEHYDE | 1.8 | U | | 2900000 | U | | 36 | U | | 37 | U | |
| ENDRIN KETONE | 1.8 | U | | 2900000 | U | | 36 | U | | 37 | U | |
| GAMMA-BHC (LINDANE) | 0.89 | U | | 1400000 | U | | 18 | U | | 19 | U | |
| HEPTACHLOR | 0.89 | U | | 1400000 | U | | 18 | U | | 19 | U | |
| HEPTACHLOR EPOXIDE | 0.89 | U | | 1400000 | U | | 18 | U | | 19 | U | |
| METHOXYCHLOR | 8.9 | U | | 14000000 | U | | 180 | U | | 190 | U | |
| TOXAPHENE | 18 | U | | 29000000 | U | | 360 | U | | 370 | U | |

GO

| | 186-SB-32-03 | | | 186-SS-29 | | | 186-SS-30 | | | 186-SS-31 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Y ID: | 04/21/98 | | | 04/21/98 | | | 04/21/98 | | | 04/21/98 | | |
| | 9804G377-017 | | | 9804G377-005 | | | 9804G377-009 | | | 9804G377-012 | | |
| YPE: | NORMAL | | | NORMAL | | | NORMAL | | | NORMAL | | |
| % SOLIDS: | 96.5 % | | | 91.3 % | | | 93.1 % | | | 93.9 % | | |
| UNITS: | % | | | % | | | % | | | % | | |
| FIELD DUPLICATE OF: | | | | | | | | | | | | |
| | RESULT | QUAL | CODE | RESULT | QUAL | CODE | RESULT | QUAL | CODE | RESULT | QUAL | CODE |
| **PESTICIDES/PCBs** | | | | | | | | | | | | |
| 4,4'-DDD | 1.7 | U | | 1.8 | U | | 180 | U | | 8.8 | U | |
| 4,4'-DDE | 3.4 | | | 7.8 | | | 150 | J | | 8.8 | U | |
| 4,4'-DDT | 1.7 | U | | 16 | | | 350 | | | 12 | | |
| ALDRIN | 0.85 | U | | 0.88 | U | | 88 | U | | 4.4 | U | |
| ALPHA-BHC | 0.85 | U | | 0.88 | U | | 88 | U | | 4.4 | U | |
| BETA-BHC | 0.85 | U | | 0.88 | U | | 88 | U | | 4.4 | U | |
| CHLORDANE | 20 | | | 73 | | | 2700 | | | 170 | | |
| DELTA-BHC | 0.85 | U | | 0.88 | U | | 88 | U | | 4.4 | U | |
| DIELDRIN | 1.7 | U | | 1.8 | U | | 180 | U | | 8.8 | U | |
| ENDOSULFAN I | 0.85 | U | | 0.88 | U | | 88 | U | | 4.4 | U | |
| ENDOSULFAN II | 1.7 | U | | 1.8 | U | | 180 | U | | 8.8 | U | |
| ENDOSULFAN SULFATE | 1.7 | U | | 1.8 | U | | 180 | U | | 8.8 | U | |
| ENDRIN | 1.7 | U | | 1.8 | U | | 180 | U | | 8.8 | U | |
| ENDRIN ALDEHYDE | 1.7 | U | | 1.8 | U | | 180 | U | | 8.8 | U | |
| ENDRIN KETONE | 1.7 | U | | 1.8 | U | | 180 | U | | 8.8 | U | |
| GAMMA-BHC (LINDANE) | 0.85 | U | | 0.88 | U | | 88 | U | | 4.4 | U | |
| HEPTACHLOR | 0.85 | U | | 0.88 | U | | 88 | U | | 4.4 | U | |
| HEPTACHLOR EPOXIDE | 0.85 | U | | 0.88 | U | | 88 | U | | 4.4 | U | |
| METHOXYCHLOR | 8.5 | U | | 8.8 | U | | 880 | U | | 44 | U | |
| TOXAPHENE | 17 | U | | 18 | U | | 1800 | U | | 88 | U | |

# CTO154 - NWS EARLE
## SOIL DATA
## RECRA LABNET - CHICAGO
## SDG: U04377

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SAMPLE NUMBER: | 186-SS-32 | | | / / | | | / / | | | / / | | |
| SAMPLE DATE: | 04/21/98 | | | | | | | | | | | |
| LABORATORY ID: | 9804G377-015 | | | | | | | | | | | |
| QC_TYPE: | NORMAL | | | | | | | | | | | |
| % SOLIDS: | 94.4 % | | | 100.0 % | | | 100.0 % | | | 100.0 % | | |
| UNITS: | % | | | | | | | | | | | |
| FIELD DUPLICATE OF: | | | | | | | | | | | | |
| | RESULT | QUAL | CODE | RESULT | QUAL | CODE | RESULT | QUAL | CODE | RESULT | QUAL | CODE |
| **PESTICIDES/PCBs** | | | | | | | | | | | | |
| 4,4'-DDD | 17 | U | | | | | | | | | | |
| 4,4'-DDE | 17 | U | | | | | | | | | | |
| 4,4'-DDT | 17 | U | | | | | | | | | | |
| ALDRIN | 8.7 | U | | | | | | | | | | |
| ALPHA-BHC | 8.7 | U | | | | | | | | | | |
| BETA-BHC | 8.7 | U | | | | | | | | | | |
| CHLORDANE | 580 | | | | | | | | | | | |
| DELTA-BHC | 8.7 | U | | | | | | | | | | |
| DIELDRIN | 17 | U | | | | | | | | | | |
| ENDOSULFAN I | 8.7 | U | | | | | | | | | | |
| ENDOSULFAN II | 17 | U | | | | | | | | | | |
| ENDOSULFAN SULFATE | 17 | U | | | | | | | | | | |
| ENDRIN | 17 | U | | | | | | | | | | |
| ENDRIN ALDEHYDE | 17 | U | | | | | | | | | | |
| ENDRIN KETONE | 17 | U | | | | | | | | | | |
| GAMMA-BHC (LINDANE) | 8.7 | U | | | | | | | | | | |
| HEPTACHLOR | 8.7 | U | | | | | | | | | | |
| HEPTACHLOR EPOXIDE | 8.7 | U | | | | | | | | | | |
| METHOXYCHLOR | 87 | U | | | | | | | | | | |
| TOXAPHENE | 170 | U | | | | | | | | | | |

# REPORT
# FOR
# PESTICIDE INVESTIGATION
# AT
# NAVAL WEAPONS STATION - EARLE
# COLTS NECK, NEW JERSEY

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DELIVERY ORDER NO. 0034

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**REPORT**
**FOR**
**PESTICIDE INVESTIGATION**
**AT**
**NAVAL WEAPONS STATION - EARLE**
**COLTS NECK, NEW JERSEY**

TABLE OF CONTENTS


Section Page

**1.0 INTRODUCTION** 1

**2.0 PROJECT LOCATION AND DESCRIPTION** 1
- 2.1 Previous Investigations 1
- 2.2 Site Conditions 3
  - 2.2.1 Groundwater/Soil 3

**3.0 SCOPE OF WORK** 3
- 3.1 TASK 1 - Project Planning/Management 3
  - 3.1.1 Subtask 1A - Pre-Construction Submittals 3
  - 3.1.2 Subtask 1B - Mobilization 4
  - 3.1.3 Subtask 1C - Home Office Support 5
- 3.2 TASK 2 -Permit Preparation/Submission 5
- 3.3 TASK 3 -Collection of Subsurface Soil Samples 5
- 3.4 TASK 4 -Collection of Groundwater Samples Using a Hydropunch 5

**4.0 FIELD SAMPLING ACTIVITIES** 6
- 4.1 Sample Tracking System 6
- 4.2 Sample Analytical Requirements/Sample Collection Frequency 6
- 4.3 Sampling Equipment and Procedures 6
  - 4.3.1 Surface Soil Sample Collection 6
  - 4.3.2 Subsurface Soil Sample Collection 6
  - 4.3.3 Groundwater Sample Collection 7
  - 4.3.4 Septic Tank Sludge Sample Collection 7
- 4.4 Waste Removal/Regulatory Compliance 7

**5.0 ANALYTICAL RESULTS** 7
- 5.1 Surface Soil Samples 7
- 5.2 Subsurface Soil Samples 8
- 5.3 Groundwater Samples 8
- 5.4 Septic Tank Sludge Sample 14

**6.0 CONCLUSION/RECOMMENDATIONS** 14

## TABLE OF CONTENTS
**(Continued)**

LIST OF FIGURES

Figure 1 Site Layout Map----------2

LIST OF TABLES

5-1 Pesticide Results - Soil Boring PS-SB01----------9, 10

5-2 Pesticide Results - Soil Boring PS-SB02----------11, 12

5-3 Pesticide Results - Groundwater----------13

APPENDICES

Appendix A: Soil Boring Logs, PS-SB01, PS-SB02

Appendix B: Laboratory Data Packages

## 1.0 INTRODUCTION/ PROJECT OBJECTIVES

Foster Wheeler Environmental Corporation (Foster Wheeler Environmental) was contracted by the Northern Division, Naval Facilities Engineering Command (NORDIV) to further delineate pesticide contamination at the former pesticide shop at the Naval Weapons Station (NWS) Earle located in Colts Neck, NJ. This Investigative Report is being submitted to satisfy the pre-construction submittal requirements included in paragraph 1.2.1, Pre- and Post-Construction Documentation of the Statement of Services for Delivery Order No. 0017, under Remedial Action Contract No. N62472-94-D-0398.

The project objectives included utilizing direct-push methods to collect soil samples and groundwater samples for the laboratory analyses of pesticides. The purpose of the sample collection was twofold. Soil samples were collected to further delineate the vertical extent of pesticide contamination in the soils at the previously identified "hotspots". Groundwater samples were collected at the site to determine if the groundwater was impacted by pesticides. This work was performed under Delivery Order No. 0034 to Navy Contract N62472-94-D-0398

## 2.0 PROJECT LOCATION AND DESCRIPTION

NWS-Earle is located in east-central Monmouth County in the town of Colts Neck, New Jersey. Building S-186 (Old Pesticide Shop) is located on the Mainside portion of the base, north of the intersection of Esperance and Macassar Roads. The building served as the former base pesticide shop, but is no longer in service. Apparently, containers and spraying containers were periodically rinsed out and some of the waste waters were dumped outside the building. Figure 1 depicts the site layout.

### 2.1 Previous Investigations

Surface and subsurface soil samples were collected during investigation efforts in January and April 1998. The soil samples were analyzed for chlorinated organic pesticides by SW-846 Method 8081A. Chlordane and 4,4'-DDT were the most frequently detected pesticides found in the soil samples. Chlordane was found in 20 out of 23 surface soil samples; 4,4' DDT was found in 13 of 23 surface soil samples. The laboratory analyses of soil samples collected in the area around the pesticide shop revealed chlordane (up to 200 ppm); 4,4' DDD (up to 1.5 ppm); 4,4' DDE (up to 1 ppm); and 4,4' DDT (up to 12 ppm).

The previous soil sample locations are shown on Figure 1 of this report, and the Delineation Sampling and Analysis Report from the Old Pesticide Shop is contained in the Work Plan for Pesticide Investigation at Naval Weapons Station - Earle Colts Neck, New Jersey issued November 30, 1998.

## 2.2 Site Conditions

The Former Pesticide Shop is located in a grassy wooded area between Building C-54 and Building C-23. The shop consists of a small brick building (25 ft. x 12 ft.) with a 15 ft. x 8 ft. concrete pad on the northwest side of the building. The Former Pesticide Shop sits atop a small knoll, which slopes to the northwest and north. An in-ground former septic leach tank is located to the north of the building. The site is bounded to the east by a paved parking area, to the northwest by Building C-54, to the south by the ROICC Office, and to the north by a fenced storage yard associated with Building C-54

### 2.2.1 Groundwater/Soil

There are no monitoring wells in the immediate area to determine depth to groundwater and groundwater flow direction. Based on topography, and monitoring wells located approximately 0.25 miles down gradient of the pesticide shop, the shallow groundwater was expected to be encountered at a depth of 10 to 15 feet below grade and flow toward the north. During investigation activities it was determined that groundwater ranged from 18 to 35 based on elevations at the sample locations.

Soils at the site are fine grained sands with some silt and minor pebbles.

## 3.0 SCOPE OF WORK

The objectives of this investigation were completed by utilizing a Geoprobe rig and the necessary equipment to collect soil samples and groundwater samples. A hydropunch attachment on the geoprobe was used to obtain groundwater samples for the laboratory analysis of pesticides.

## 3.1 TASK 1 - Project Planning/Management

Project Planning/Management activities included the preparation of pre-construction submittals, coordination of utility requirements, mobilization to the site, and Home Office support functions during the period of performance. The subtasks involved in Project Planning/Management are described below.

### 3.1.1 Subtask 1A - Pre-Construction Submittals

Foster Wheeler Environmental prepared and submitted the following pre-construction documents to the Navy:

***Work Plan***
The Work Plan for Pesticide Investigation at Naval Weapons Station - Earle Colts Neck, New Jersey (Work Plan) presented Foster Wheeler Environmental's approach to executing the project, including the site description, statement of work, procurement

approach, field procedures, materials, transportation and disposal data, and sampling and analytical requirements. The Work Plan was issued November 30, 1998.

***Health and Safety Plan (HASP)***
An existing HASP for previous drilling work at NWS-Earle was used for this effort. Foster Wheeler Environmental prepared an Activity Hazard Analysis (AHA) for this specific task included in the Work Plan.

The Activity Hazard Analysis (AHA) in Appendix B of the Work Plan was used for the specific hazards associated with this sampling task at the pesticide shop.

***Sampling and Analysis Plan (SAP)***
Foster Wheeler Environmental submitted the SAP for this investigation in the Work Plan for Pesticide Investigation at Naval Weapons Station - Earle Colts Neck, New Jersey.

The SAP presented the procedures for sampling and analysis for the Geoprobe and temporary well installation activities. The SAP specifically addressed the following areas:

- Analytical Requirements/Sample Collection Frequency
- Responsibilities of Site Personnel
  Sample Analytical Program
- Sample Packing and Shipping
- Documentation
- Field Sampling Program
- Quality Assurance/Quality Control
- Procedures for Field Changes and Corrective Actions
- Waste Removal/Regulatory Compliance

Site-specific Standard Operating Procedures were included (Section 5 of the Work Plan) to describe the sampling procedures. Any modifications to these SOPs due to field conditions or other unforeseen situations were recorded in the site logbook, documented on the appropriate Field Change Request (FCR) forms by site personnel, and approved by the Project Manager.

### 3.1.2 Subtask 1B - Mobilization

Mobilization consisted of contacting appropriate Navy personnel at NWS Earle to arrange for contractor passes, and to coordinate support requirements for the geoprobe work. A utility survey was conducted to determine all utility lines in the area. Any subsurface utilities were located by NWS-Earle Public Works personnel. A dig permit was obtained prior to any geoprobe work.

### 3.1.3 Subtask 1C - Home Office Support

Foster Wheeler Environmental's Langhorne, Pennsylvania office provided home office support for the project duration. Home office support includes the preparation of the required monthly progress, financial and technical reports.

## 3.2 TASK 2 - Permit Preparation/Submission

In accordance with the NJDEP, drilling permits were required because some Geoprobe borings were greater than 25 feet in depth. Well permits were not required because the hydropunch casing remained in the ground for less than 48 hours.

## 3.3 TASK 3 - Collection of Subsurface Soil Samples

The previous investigation at the site collected soil samples to a maximum depth of three feet below grade. Analytical results for two of the soil samples collected at the maximum depth revealed pesticide concentrations exceeding the EPA Region III Soil Clean-Up Standards for pesticides. The analyses of a soil sample from boring SB-18 revealed an exceedance of the EPA Industrial Standard for chlordane (SB-18-03 at 42,000 ug/kg). SB-18 was collected on the western side of the concrete pad adjacent the former pesticide shop. The analyses of a soil sample from boring SB-31 revealed an exceedance of the EPA Residential Standard for chlordane (SB-31-03 at 2,000 ug/kg). SB-31 was collected on the northern edge of the paved area, located east of the former pesticide shop.

Based on these two hot spots found during the previous investigation, additional subsurface soil samples were collected on December 4, 1998 at the former SB-18 and SB-31 locations. Samples were collected to a depth of 24 feet below grade and analyzed for pesticides to determine the maximum depth of contamination. Soil boring PS-SB-01 was adjacent to the original location of SB-18 and PS-SB02 was adjacent to the original location of SB-31 (Figure 1). The Geoprobe was used to advance a macro-core sampler to a starting depth of 4 feet below grade at the PS-SB-01 and 6 feet below grade at PS-SB-02. At each location, continuous subsurface samples were collected from 2' intervals down to 24 feet below grade. The soils were logged by a geologist to record the subsurface soil conditions. See Appendix A for the boring logs.

Groundwater was not found at either location within 24 feet below grade during the initial geoprobe work. Hydropunch samples were obtained at PS-SB01 and PS-SB-02 during the re-mobilization of the geoprobe on January 7, 1999 because a NJDEP permit was necessary to probe greater than 25 feet below grade.

## 3.4 TASK 4 - Collection of Groundwater Samples Using a Hydropunch

A hydropunch was used install temporary groundwater monitoring wells to collect groundwater samples for the laboratory analyses of pesticides. Nine soil borings surrounding the former Pesticide Shop were completed on December 4, 1998 and January

7, 1999. A groundwater sample was collected from each of the nine temporary well locations (Figure 1). Section 5.0 of the Work Plan details the collection methodology for using the hydropunch for groundwater sampling. No soil samples were obtained from these nine soil borings.

The collection depth of the groundwater samples was determined by water table depth and input from the Site Geologist. The depths of the water table ranged from 18 feet to approximately 35 feet depending on the elevation at the sample locations.

## 4.0 FIELD SAMPLING ACTIVITIES

Modifications to the existing SAP will be documented herein.

### 4.1 Sample Tracking System

A QA/QC duplicate sample was collected at PS-GW03 and designated PS-GW02.

### 4.2 Sample Analytical Requirements/Sample Collection Frequency

Analyses for Chlorinated Organic Pesticides was performed on both soil and aqueous samples collected around the Former Pesticide Shop.. One liter aqueous was collected for each aqueous sample.

Four surface soil samples were collected adjacent to Building C-23 and analyzed for Nitroamines.

Sample collection frequency was modified as described in Section 3.3 - Collection of Subsurface Soil Samples and Section 3.4 - Collection of Groundwater Samples using a Hydropunch.

### 4.3 Sampling Equipment and Procedures

#### 4.3.1 Surface Soil Sample Collection

Surface soil samples were collected at 0 to 6 inches below grade using a decontaminated stainless steel hand trowel. The soil was placed directly into sample jars for laboratory analysis. Locations for sample collection were selected by Navy personnel and are located on Figure 1.

#### 4.3.2 Subsurface Soil Sample Collection

Subsurface soil samples were collected using a dedicated sampling core on the Geoprobe as indicated in the Work Plan. Sample collection frequency was modified as described in Section 3.3 - Collection of Subsurface Soil Samples.

### 4.3.3 Groundwater Sample Collection

Groundwater samples were collected utilizing a Hydropunch following the procedures detailed in the Work Plan. Sample collection frequency was modified as described in Section 3.4 - Collection of Groundwater Samples.

### 4.3.4 Septic Tank Sludge Sample Collection

An underground septic tank exists to the north of the former Pesticide Shop. A stainless steel auger was used to access the sludge at the bottom of the tank. The sample was collected from a six inch interval of sludge near the bottom of the tank. The six inch interval was field composited and placed into the sample jars for laboratory analysis.

## 4.4 Waste Removal/Regulatory Compliance

As part of the Geoprobe work at the former pesticide shop, several investigation derived waste streams were generated. These included decontamination fluids, PPE, and other miscellaneous debris. These wastes were collected, stored separately, and will be disposed off site at a proper disposal facility. In accordance with NJDEP solid waste and/or Hazardous Waste Regulations, the investigative derived wastes (IDW) were disposed of as hazardous. In accordance to the Code of Federal Regulations, any wastes generated from this pesticide shop investigation was classified, transported, and disposed of as a hazardous waste, **U036** (chlordane), **U060 (DDD)**, and **U061** (DDT). One drum of solid waste and one drum of decontamination water were disposed off-site.

# 5.0 ANALYTICAL RESULTS

All samples from the December 1998 and January 1999 investigations were sent to Toxicon Corporation's Beford, Massachusetts, laboratory. Both the soil and groundwater samples were analyzed for Chlorinated Organic Pesticides, SW846 Method 608/8081A. Some samples were analyzed for Nitroamines, SW846 Method 8332. The laboratory data packages are found in Appendix B. Refer to Figure I for sample locations. Refer to the Pesticide Analytical Results, Table 5-1 - Soil Boring PS-SB01, Table 5-2 - Soil Boring PS-SB02, and Table 5-3 - Groundwater, following this discussion.

## 5.1 Surface Soil Samples

Four surface soil samples and one QA/QC duplicate sample were collected on December 11, 1998 to evaluate the presence of propellant residuals in the area near the RIOCC building (Building C-23). The sample points were located along the north and west side of the building. Refer to Figure 1 for approximate sample locations. Sample PS-SS01, PS-SS02, PS-SS03, PS-SS03D (duplicate of PS-SS03), and PS-SS04 were analyzed for Nitroamines-Nitroglycerin, Nitroguanidine, and Nitrocellulose. Analytical results indicate that all samples were non-detect (below the quantitation limit) for the parameters of concern. The analytical results are located in Appendix B.

## 5.2 Subsurface Soil Samples

Twenty one soil samples were collected from soil borings PS-SB01 and PS-SB02 on December 4, 1998. The analytical results were compared to the NJDEP Residential Direct Contact and Impact to Groundwater Soil Cleanup Criterion. Several samples (up to 22 feet below grade) indicated the presence of Chlordane, ranging from 0.026 to 40 mg/Kg. As there are no NJDEP Standards for Chlordane, the results were compared to EPA Region III Soil Cleanup Standards as in the previous investigation. Several samples exceeded both the Residential Standard (1.8 mg/kg) and the Industrial Standard (16 mg/kg).

One sample PS-SB01-06, collected at a depth of 4 to 6 feet below grade from soil boring PS-SB01 indicated a slight exceedance of the NJDEP Residential Direct Contact Soil Cleanup Criteria for Heptachlor. The NJDEP limit for Heptachlor is 0.15 mg/Kg and the sample result was 0.16 mg/Kg. The same sample indicated the presence of Heptachlor Epoxide at the same 4 to 6 foot interval. As there is no regulatory guidance on Heptachlor Epoxide, this result will not be compared to a regulatory limit. However, this depth interval at PS-SB01 will be addressed because of the slight Heptachlor exceedance. No other soil samples indicated concentrations above non-detect, or exceeded either the NJDEP Residential Direct Contact or the Impact to Groundwater Soil Cleanup Criterion.

Note that some laboratory detection limits for certain samples are above the NJDEP Cleanup Criteria for specific compounds. A careful review was made of past data and it was determined that the compounds in question were not detected at the site in the previous investigation. Based on this information, the current results are considered non-detect for those specific compounds.

## 5.3 Groundwater Samples

Three groundwater samples and one QA/QC duplicate sample (PS-GW03, PS-GW04, PS-GW05, and duplicate PS-GW02) were collected on December 4, 1998. Six groundwater samples (PS-GW1, PS-GW2, PS-GW6, PS-GW7, PS-GW8, and PS-GW09) were collected on January 7, 1999. Comparison of the analytical results to the Groundwater Quality Criteria indicate that two locations, PS-GW03 and PS-GW04, exceed the criteria of 0.4 ug/l for Endosulfan I. The concentration of Endosulfan I in PS-GW03 was 0.41 ug/l. Groundwater sample, PS-GW02, the duplicate of PS-GW03, was just below the criteria at 0.38 ug/l. The concentration of Endosulfan I in PS-GW04 was 0.61 ug/l. All other sample results are below the laboratory detection limits and do not indicate the presence of pesticides. The analytical results are summarized in Table 5-3, and the laboratory data package is located in Appendix B.

Note that the laboratory detection limits for some samples actually exceed the Groundwater Quality Criteria. However, comparison to the Practical Quantitation Limits (PQLs) set forth in Table 1 indicates that the laboratory detection limits are less than the

TABLE 5-1
NAVAL WEAPONS STATION-EARLE
DELIVERY ORDER 0034
PESTICIDE ANALYTICAL RESULTS
Soil Boring PS-SB01

| Sample ID | Residential Direct Contact Soil Cleanup Criteria | Impact to Ground Water Soil Cleanup Criteria | PS-SB01-04 | PS-SB01-06 | PS-SB01-08 | PS-SB01-10 | PS-SB01-12 | PS-SB01-14 |
|---|---|---|---|---|---|---|---|---|
| Date Collected | | | 12/4/98 | 12/4/98 | 12/4/98 | 12/4/98 | 12/4/98 | 12/4/98 |
| Matrix | | | SOIL | SOIL | SOIL | SOIL | SOIL | SOIL |
| Depth (feet) | | | 2 to 4 | 4 to 6 | 6 to 8 | 8 to 10 | 10 to 12 | 12 to 14 |
| Comment | (NJDEP) | (NJDEP) | | | | | | |
| units | mg/Kg | mg/Kg | mg/Kg | mg/Kg | mg/Kg | mg/Kg | mg/Kg | mg/Kg |
| a-BHC | na | na | <0.10 | <0.10 | <0.050 | <1.0 | <0.010 | <0.050 |
| g-BHC (Lindane) | 0.52 | 50 | <0.10 | <0.10 | <0.050 | **<1.0** | <0.010 | <0.050 |
| b-BHC | na | na | <0.10 | <0.10 | <0.050 | <1.0 | <0.010 | <0.050 |
| Heptachlor | 0.15 | 50 | <0.10 | 0.16 | <0.050 | **<1.0** | <0.010 | <0.050 |
| d-BHC | na | na | <0.10 | <0.10 | <0.050 | <1.0 | <0.010 | <0.050 |
| Aldrin | 0.04 | 50 | **<0.10** | **<0.10** | <0.050 | **<1.0** | <0.010 | **<0.050** |
| Heptachlor Epoxide | na | na | <0.10 | 0.12 | <0.050 | <1.0 | <0.010 | <0.050 |
| Endosulfan I | 340 | 50 | <0.10 | <0.10 | <0.050 | <1.0 | <0.010 | <0.050 |
| 4,4'-DDE | 2 | 50 | <0.10 | <0.10 | <0.050 | <1.0 | <0.010 | <0.050 |
| Dieldrin | 0.042 | 50 | **<0.10** | **<0.10** | <0.050 | **<1.0** | <0.010 | **<0.050** |
| Endrin | 17 | 50 | <0.10 | <0.10 | <0.050 | <1.0 | <0.010 | <0.050 |
| 4,4'-DDT | 2 | 500 | <0.10 | <0.10 | <0.050 | <1.0 | <0.010 | <0.050 |
| Endrin Aldehyde | na | na | <0.10 | <0.10 | <0.050 | <1.0 | <0.010 | <0.050 |
| Endosulfan Sulfate | na | na | <0.10 | <0.10 | <0.050 | <1.0 | <0.010 | <0.050 |
| Chlordane | na | na | <0.10 | 3.8 | 1.1 | 40 | <0.010 | 1.4 |
| Toxaphene | 0.10 | 50 | <0.10 | <0.10 | <0.050 | **<1.0** | <0.010 | <0.050 |
| Methoxychlor | 280 | 50 | <0.10 | <0.10 | <0.050 | <1.0 | <0.010 | <0.050 |

< Less than detection limit given
na not applicable
Shaded results indicate an exceedance of the Soil Cleanup Criteria.
Bold results indicate that the laboratory detection limit is greater than the Soil Cleanup Critieria.

Pest Shop Data
PS-SB01

TABLE 5-1
NAVAL WEAPONS STATION-EARLE
DELIVERY ORDER 0034
PESTICIDE ANALYTICAL RESULTS
Soil Boring PS-SB01

| Sample ID | Residential Direct Contact Soil Cleanup Criteria | Impact to Ground Water Soil Cleanup Criteria | PS-SB01-16 | PS-SB01-18 | PS-SB01-20 | PS-SB01-22 | PS-SB01-24 |
|---|---|---|---|---|---|---|---|
| Date Collected | | | 12/4/98 | 12/4/98 | 12/4/98 | 12/4/98 | 12/4/98 |
| Matrix | | | SOIL | SOIL | SOIL | SOIL | SOIL |
| Depth (feet) | | | 14 to 16 | 16 to 18 | 18 to 20 | 20 to 22 | 22 to 24 |
| Comment | (NJDEP) | (NJDEP) | | | | | |
| units | mg/Kg | mg/Kg | mg/Kg | mg/Kg | mg/Kg | mg/Kg | mg/Kg |
| a-BHC | na | na | <0.010 | <0.010 | <0.010 | <0.50 | <0.010 |
| g-BHC (Lindane) | 0.52 | 50 | <0.010 | <0.010 | <0.010 | <0.50 | <0.010 |
| b-BHC | na | na | <0.010 | <0.010 | <0.010 | <0.50 | <0.010 |
| Heptachlor | 0.15 | 50 | <0.010 | <0.010 | <0.010 | **<0.50** | <0.010 |
| d-BHC | na | na | <0.010 | <0.010 | <0.010 | <0.50 | <0.010 |
| Aldrin | 0.04 | 50 | <0.010 | <0.010 | <0.010 | **<0.50** | <0.010 |
| Heptachlor Epoxide | na | na | <0.010 | <0.010 | <0.010 | <0.50 | <0.010 |
| Endosulfan I | 340 | 50 | <0.010 | <0.010 | <0.010 | <0.50 | <0.010 |
| 4,4'-DDE | 2 | 50 | <0.010 | <0.010 | <0.010 | <0.50 | <0.010 |
| Dieldrin | 0.042 | 50 | <0.010 | <0.010 | <0.010 | **<0.50** | <0.010 |
| Endrin | 17 | 50 | <0.010 | <0.010 | <0.010 | <0.50 | <0.010 |
| 4,4'-DDT | 2 | 500 | <0.010 | <0.010 | <0.010 | <0.50 | <0.010 |
| Endrin Aldehyde | na | na | <0.010 | <0.010 | <0.010 | <0.50 | <0.010 |
| Endosulfan Sulfate | na | na | <0.010 | <0.010 | <0.010 | <0.50 | <0.010 |
| Chlordane | na | na | <0.010 | 0.026 | <0.010 | 18 | <0.010 |
| Toxaphene | 0.10 | 50 | <0.010 | <0.010 | <0.010 | **<0.50** | <0.010 |
| Methoxychlor | 280 | 50 | <0.010 | <0.010 | <0.010 | <0.50 | <0.010 |

< Less than detection limit given
na not applicable
Shaded results indicate an exceedance of the Soil Cleanup Criteria.
Bold results indicate that the laboratory detection limit is greater than the Soil Cleanup Critieria.

Pest Shop Data
PS-SB01

TABLE 5-2
NAVAL WEAPONS STATION-EARLE
DELIVERY ORDER 0034
PESTICIDE ANALYTICAL RESULTS
Soil Boring PS-SB02

| Sample ID | Residential Direct Contact Soil Cleanup Criteria (NJDEP) | Impact to Ground Water Soil Cleanup Criteria (NJDEP) | PS-SB02-06 | PS-SB02-08 | PS-SB02-10 | PS-SB02-12 | PS-SB02-14 |
|---|---|---|---|---|---|---|---|
| Date Collected | | | 12/4/98 | 12/4/98 | 12/4/98 | 12/4/98 | 12/4/98 |
| Matrix | | | SOIL | SOIL | SOIL | SOIL | SOIL |
| Depth (feet) | | | 4 to 6 | 6 to 8 | 8 to 10 | 10 to 12 | 12 to 14 |
| Comment | | | | | | | |
| units | mg/Kg | mg/Kg | mg/Kg | mg/Kg | mg/Kg | mg/Kg | mg/Kg |
| a-BHC | na | na | <0.10 | <0.010 | <0.20 | <0.010 | <0.10 |
| g-BHC (Lindane) | 0.52 | 50 | <0.10 | <0.010 | <0.20 | <0.010 | <0.10 |
| b-BHC | na | na | <0.10 | <0.010 | <0.20 | <0.010 | <0.10 |
| Heptachlor | 0.15 | 50 | <0.10 | <0.010 | **<0.20** | <0.010 | <0.10 |
| d-BHC | na | na | <0.10 | <0.010 | <0.20 | <0.010 | <0.10 |
| Aldrin | 0.04 | 50 | **<0.10** | <0.010 | **<0.20** | <0.010 | **<0.10** |
| Heptachlor Epoxide | na | na | <0.10 | <0.010 | <0.20 | <0.010 | <0.10 |
| Endosulfan I | 340 | 50 | <0.10 | <0.010 | <0.20 | <0.010 | <0.10 |
| 4,4'-DDE | 2 | 50 | <0.10 | <0.010 | <0.20 | <0.010 | <0.10 |
| Dieldrin | 0.042 | 50 | **<0.10** | <0.010 | **<0.20** | <0.010 | **<0.10** |
| Endrin | 17 | 50 | <0.10 | <0.010 | <0.20 | <0.010 | <0.10 |
| 4,4'-DDT | 2 | 500 | <0.10 | <0.010 | <0.20 | <0.010 | <0.10 |
| Endrin Aldehyde | na | na | <0.10 | <0.010 | <0.20 | <0.010 | <0.10 |
| Endosulfan Sulfate | na | na | <0.10 | <0.010 | <0.20 | <0.010 | <0.10 |
| Chlordane | na | na | 2.9 | 0.032 | 4.9 | 0.018 | 2.2 |
| Toxaphene | 0.10 | 50 | <0.10 | <0.010 | **<0.20** | <0.010 | <0.10 |
| Methoxychlor | 280 | 50 | <0.10 | <0.010 | <0.20 | <0.010 | <0.10 |

< Less than detection limit given
na not applicable
Shaded results indicate an exceedance of the Soil Cleanup Criteria.
Bold results indicate that the laboratory detection limit is greater than the Soil Cleanup Critieria.

TABLE 5-2
NAVAL WEAPONS STATION-EARLE
DELIVERY ORDER 0034
PESTICIDE ANALYTICAL RESULTS
Soil Boring PS-SB02

| Sample ID | Residential Direct Contact Soil Cleanup Criteria (NJDEP) | Impact to Ground Water Soil Cleanup Criteria (NJDEP) | PS-SB02-16 | PS-SB02-18 | PS-SB02-20 | PS-SB02-22 | PS-SB02-24 |
|---|---|---|---|---|---|---|---|
| Date Collected | | | 12/4/98 | 12/4/98 | 12/4/98 | 12/4/98 | 12/4/98 |
| Matrix | | | SOIL | SOIL | SOIL | SOIL | SOIL |
| Depth (feet) | | | 14 to 16 | 16 to 18 | 18 to 20 | 20 to 22 | 22 to 24 |
| Comment | | | | | | | |
| units | mg/Kg | mg/Kg | mg/Kg | mg/Kg | mg/Kg | mg/Kg | mg/Kg |
| a-BHC | na | na | <0.010 | <0.20 | <0.010 | <0.020 | <0.010 |
| g-BHC (Lindane) | 0.52 | 50 | <0.010 | <0.20 | <0.010 | <0.020 | <0.010 |
| b-BHC | na | na | <0.010 | <0.20 | <0.010 | <0.020 | <0.010 |
| Heptachlor | 0.15 | 50 | <0.010 | **<0.20** | <0.010 | <0.020 | <0.010 |
| d-BHC | na | na | <0.010 | <0.20 | <0.010 | <0.020 | <0.010 |
| Aldrin | 0.04 | 50 | <0.010 | **<0.20** | <0.010 | <0.020 | <0.010 |
| Heptachlor Epoxide | na | na | <0.010 | <0.20 | <0.010 | <0.020 | <0.010 |
| Endosulfan I | 340 | 50 | <0.010 | <0.20 | <0.010 | <0.020 | <0.010 |
| 4,4'-DDE | 2 | 50 | <0.010 | <0.20 | <0.010 | <0.020 | <0.010 |
| Dieldrin | 0.042 | 50 | <0.010 | **<0.20** | <0.010 | <0.020 | <0.010 |
| Endrin | 17 | 50 | <0.010 | <0.20 | <0.010 | <0.020 | <0.010 |
| 4,4'-DDT | 2 | 500 | <0.010 | <0.20 | <0.010 | <0.020 | <0.010 |
| Endrin Aldehyde | na | na | <0.010 | <0.20 | <0.010 | <0.020 | <0.010 |
| Endosulfan Sulfate | na | na | <0.010 | <0.20 | <0.010 | <0.020 | <0.010 |
| Chlordane | na | na | <0.010 | 6.8 | <0.010 | 0.28 | <0.010 |
| Toxaphene | 0.10 | 50 | <0.010 | **<0.20** | <0.010 | <0.020 | <0.010 |
| Methoxychlor | 280 | 50 | <0.010 | <0.20 | <0.010 | <0.020 | <0.010 |

< Less than detection limit given
na not applicable
Shaded results indicate an exceedance of the Soil Cleanup Criteria.
Bold results indicate that the laboratory detection limit is greater than the Soil Cleanup Critieria.

Pest Shop Data
PS-SB02

TABLE 5-3
NAVAL WEAPONS STATION-EARLE
DELIVERY ORDER 0034
PESTICIDE ANALYTICAL RESULTS
Groundwater

| Sample ID | GROUNDWATER | PRACTICAL | PS-GW02 | PS-GW03 | PS-GW04 | PS-GW05 | PS-GW1 | PS-GW2 | PS-GW6 | PS-GW7 | PS-GW8 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Date Collected | QUALITY | QUANTITATION | 12/4/98 | 12/4/98 | 12/4/98 | 12/4/98 | 1/7/99 | 1/7/99 | 1/7/99 | 1/7/99 | 1/7/99 |
| Matrix | CRITERIA | LIMIT (PQL) | WATER | WATER | WATER | WATER | WATER | WATER | WATER | WATER | WATER |
| Comment | NJAC 7:9-6.11, Table 1 | NJAC 7:9-6.11, Table 1 | duplicate of PS-GW03 | | | | | | | | |
| units | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L |
| a-BHC | 0.006 | 0.02 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 |
| g-BHC (Lindane) | 0.2 | 0.2 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 |
| b-BHC | 0.2 | 0.04 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 |
| Heptachlor | 0.008 | 0.4 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 |
| d-BHC | NA | NA | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 |
| Aldrin | 0.002 | 0.04 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 |
| Heptachlor Epoxide | 0.004 | 0.2 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 |
| Endosulfan I | 0.4 | 0.02 | 0.38 | **0.41** | **0.61** | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 |
| 4,4'-DDE | 0.1 | 0.04 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 |
| Dieldrin | 0.002 | 0.03 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 |
| Endrin | 2 | 0.04 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 |
| 4,4'-DDT | 0.1 | 0.06 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 |
| Endrin Aldehyde | NA | NA | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 |
| Endosulfan Sulfate | 0.4 | 0.08 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 |
| Chlordane | 0.01 | 0.5 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 |
| Toxaphene | 0.03 | 3 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 |
| Methoxychlor | 40 | 10 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 |

< Less than lab detection limit
NA not available
Bold results indicate an exceedance
Some results exceed Quality Criteria. Comparison to PQL indicate lab detection is less than PQL. Results less than PQL are considered non-detect.

Pest Shop Data

PQLs. Analytical results that fall below the Table 1 PQLs are considered non-detect. Also, PS-GW09 was not analyzed because the laboratory did not have sufficient volume to perform analysis. Refer to the case narrative in the laboratory data package.

### 5.4 Septic Tank Sludge Sample

One sample was collected from the sludge within the septic tank on December 4, 1998. Sample PS-SL01 was analyzed for Chlorinated Organic Pesticides. The analytical results indicated elevated concentrations of Chlordane at 9.5 grams/kg.

## 6.0 CONCLUSIONS/RECOMMENDATIONS

Based on the previous and current analytical findings, Foster Wheeler Environmental recommends detailing an excavation plan to excavate and dispose of the pesticide contaminated soils. As discussed in this report, no soils have been impacted by Nitroamines. During the previous investigation, depth of pesticide contamination did not extend to greater than 3 feet below grade, except in soil borings SS-18 and SS-31. It is believed that during the December 1998 investigation, some of the more contaminated upper soils may have contaminated the samples collected at greater depths by smearing on the sample equipment or by falling into the boring hole. Special attention will be given to excavation activities at PS-SB01 (SS-18) and PS-SB02 (SS-31) to determine vertical and horizontal extent of the contamination. Once the area is excavated to an appropriate depth, confirmatory samples will be collected and analyzed to ensure that the contaminated soils have been removed, and the depth of excavation is sufficient to meet clean-up standards.

Analysis of groundwater indicates that the ground water at two locations, PS-GW03 and PS-GW04, has been slightly impacted by pesticides. Additional monitoring of the groundwater at these locations is recommended when the excavation of contaminated soil has been completed.

# Borehole Log



**PROJECT:** NWS-EARLE
**BORING NO.:** PS-SB01
**PROJECT LOCATION:** PESTICIDE SHOP (PS)
**SURFACE ELEVATION:**
**SUBCONTRACTOR/DRILLER:** GES, MARK BATES
**DATE STARTED:** 12-04-98
**FIELD GEOLOGIST:** T. FOWLER
**DATE COMPLETED:** 12-04-98
**DRILLING METHOD:** GEOPROBE

**REMARKS:** N/A - NOT AVAILABLE NAB - NOT ABOVE BACKGROUND
MRAM - MINIRAM (HNu 0-10 PPM), (MINIRAM 0-0.6PPM)

| Depth | Blows /6" | % Recovery | Color | Material Description | USCS Classification | Remarks | Profile |
|---|---|---|---|---|---|---|---|
| 0 | | | | NO CORE | | | |
| 2' | | | | NO CORE | | | |
| 4' | | 100 | | 4-6'<br>DK GRAY TO LIGHT GRAY (@6') TO YELLOWISH F TO VF SAND, DRY | | PS-SB01-06 | |
| 6' | | 95 | | 6-8'<br>LT GRAY SAND @ TOP, THEN BWN SILT W/SOME SAND, DRY | | PS-SB01-08<br>HNu - NAB<br>MRAM - NAB | |
| 8' | | N/A | | 8-10'<br>GRAY TO LT BRN VF TO M SAND, TR GRAVEL, SL MOIST | | PS-SB01-10<br>HNu - NAB<br>MRAM - NAB<br>(IN HOLE:<br>HNu - NAB<br>MRAM - NAB) | |
| 10' | | | | | | | |

# Borehole Log



**PROJECT:** NWS-EARLE
**BORING NO.:** PS-SB01 (CONT)
**PROJECT LOCATION:** PESTICIDE SHOP (PS)
**SURFACE ELEVATION:**
**SUBCONTRACTOR/DRILLER:**
**DATE STARTED:**
**FIELD GEOLOGIST:**
**DATE COMPLETED:**
**DRILLING METHOD:**

**REMARKS:**

| Depth | Blows /6" | % Recovery | Color | Material Description | USCS Classification | Remarks | Profile |
|---|---|---|---|---|---|---|---|
| 10' | | 95 | | 10-12' GRAY BRN VF TO M SAND, DRY | | PS-SB01-12 HNu - NAB MRAM - NAB | |
| 12' | | N/A | | 12-14' YELLOW BRN F TO M SAND, SL MOIST | | PS-SB01-14 HNu - NAB MRAM - NAB | |
| 14' | | 95 | | 14-16' GRAY BRN TO YELLOW BRN F TO M SAND, DRY | | PS-SB01-16 HNu - NAB MRAM - NAB | |
| 16' | | N/A | | 16-18' GRAY BRN TO YELLOW BRN F TO M SAND, DRY | | PS-SB01-18 HNu - NAB MRAM - NAB | |
| 18' | | 95 | | 18-20' GRAY BRN TO YELLOW BRN F TO M SAND, DRY | | PS-SB01-20 HNu - NAB MRAM - NAB | |
| 20' | | | | | | | |

# Borehole Log



**PROJECT:** NWS-EARLE
**BORING NO.:** PS-SB01 (CONT)
**PROJECT LOCATION:** PESTICIDE SHOP (PS)
**SURFACE ELEVATION:**
**SUBCONTRACTOR/DRILLER:**
**DATE STARTED:**
**FIELD GEOLOGIST:**
**DATE COMPLETED:**
**DRILLING METHOD:**

**REMARKS:**

| Depth | Blows /6" | % Recovery | Color | Material Description | USCS Classification | Remarks | Profile |
|---|---|---|---|---|---|---|---|
| 20' | | 95 | | 20-22'<br>BRN SILT AND SAND @ TOP, THEN YELLOW BRN F TO M SAND, DRY | | PS-SB01-22 | |
| 22' | | | | 22-24'<br>LT GRAY F TO M SAND, DRY | | PS-SB01-24<br>HNu - NAB<br>MRAM - NAB | |
| 24' | | | | | | | |
| 26' | | | | | | | |
| 28' | | | | | | | |
| 30' | | | | | | | |

# Borehole Log



**PROJECT:** NWS-EARLE
**BORING NO.:** PS-SB02
**PROJECT LOCATION:** PESTICIDE SHOP (PS)
**SURFACE ELEVATION:**
**SUBCONTRACTOR/DRILLER:** GES, MARK BATES
**DATE STARTED:** 12-04-98
**FIELD GEOLOGIST:** T. FOWLER
**DATE COMPLETED:** 12-04-98
**DRILLING METHOD:** GEOPROBE

**REMARKS:** N/A - NOT AVAILABLE NAB - NOT ABOVE BACKGROUND
MRAM - MINIRAM (HNu 0-10 PPM), (MINIRAM 0-0.6PPM)

| Depth | Blows /6" | % Recovery | Color | Material Description | USCS Classification | Remarks | Profile |
|---|---|---|---|---|---|---|---|
| 0 | | | | NO CORE | | | |
| 2' | | | | NO CORE | | | |
| 4' | | 98 | | 4-6' GRAY F TO M SAND W/TR DK BRN ORGANICS @ TOP, THEN YELLOW BRN F SAND, DRY | | PS-SB02-06 HNu - NAB MRAM - NAB (IN HOLE: HNu - NAB MRAM - NAB) | |
| 6' | | N/A | | 6-8' YELLOW BRN F SAND @ TOP TO BRN SILT, SOME SAND @ BOTTOM, DRY | | PS-SB02-08 HNu - NAB MRAM - NAB | |
| 8' | | 80 | | 8-10' DK GRAY TO YELLOW BRN F TO M SAND | | PS-SB01-10 HNu - NAB MRAM - NAB | |
| 10' | | | | | | | |

# Borehole Log



**PROJECT:** NWS-EARLE
**BORING NO.:** PS-SB02 (CONT)
**PROJECT LOCATION:** PESTICIDE SHOP (PS)
**SURFACE ELEVATION:**
**SUBCONTRACTOR/DRILLER:**
**DATE STARTED:**
**FIELD GEOLOGIST:**
**DATE COMPLETED:**
**DRILLING METHOD:**

**REMARKS:**

| Depth | Blows /6" | % Recovery | Color | Material Description | USCS Classification | Remarks | Profile |
|---|---|---|---|---|---|---|---|
| 10' | | N/A | | 10-12'<br>YELLOW BRN F TO M SAND, TR SILT | | PS-SB02-12<br>HNu - NAB<br>MRAM - NAB | |
| 12' | | N/A | | 12-14'<br>YELLOW BRN F TO M SAND, DRY | | PS-SB02-14<br>HNu - NAB<br>MRAM - NAB | |
| 14' | | 98 | | 14-16'<br>YELLOW BRN F TO M SAND, SL MOIST | | PS-SB02-16<br>HNu - NAB<br>MRAM - NAB | |
| 16' | | N/A | | 16-18'<br>GRAY TO YELLOW BRN F TO M SAND, TR GRAVEL, DRY | | PS-SB02-18<br>HNu - NAB<br>MRAM - NAB | |
| 18' | | N/A | | 18-20'<br>ORANGEISH F TO M SAND | | PS-SB02-20<br>HNu - NAB<br>MRAM - NAB | |
| 20' | | | | | | | |

# Borehole Log



**PROJECT:** NWS-EARLE
**BORING NO.:** PS-SB02 (CONT)
**PROJECT LOCATION:** PESTICIDE SHOP (PS)
**SURFACE ELEVATION:**
**SUBCONTRACTOR/DRILLER:**
**DATE STARTED:**
**FIELD GEOLOGIST:**
**DATE COMPLETED:**
**DRILLING METHOD:**

**REMARKS:**

| Depth | Blows /6" | % Recovery | Color | Material Description | USCS Classification | Remarks | Profile |
|---|---|---|---|---|---|---|---|
| 20' | | N/A | | 20-22'<br>BRN SILT, SOME SAND @ TOP, TO YELLOW BRN F TO M SAND, DRY | | PS-SB02-22<br>HNu - NAB<br>MRAM - NAB | |
| 22' | | N/A | | 22-24'<br>YELLOW BRN F TO M SAND, SL MOIST | | PS-SB02-24<br>HNu - NAB<br>MRAM - NAB | |
| 24' | | | | | | | |
| 26' | | | | | | | |
| 28' | | | | | | | |
| 30' | | | | | | | |

 TOXIKON CORP. REPORT Work Order # 98-12-129

Received: 12/05/98 12/10/98 08:35:32

REPORT TO: FOSTER & WHEELER
1 OXFORD VALLEY, SUITE 200
LANGHORNE, PA. 19047
215-702-4007 FAX: 4045
ATTEN MICHAEL HEFFRON

PREPARED BY: TOXIKON CORPORATION
15 WIGGINS AVE
BEDFORD, MA 01730
ATTEN PAUL LEZBERG
PHONE (781)275-3330

CERTIFIED BY

CONTACT JAYSON

CLIENT FOSTER SAMPLES 27
COMPANY FOSTER & WHEELER
FACILITY 1 OXFORD VALLEY, SUITE 200
LANGHORNE, PA. 19047

MA CERT # M-MA064: TRACE METALS, SULFATE,CYANIDE,RES. FREE CHLORINE, Ca, TOTAL ALK., TDS, pH, THMs, VOC, PEST.,NUTRIENTS. DEMAND. O&G, PHENOLICS, PCBs . CT DHS #PH-0563, NY #10778 FL HRS E87143, NJ DEP 59538, NC DNR286, SC 88002, NH 204091-C.

WORK ID NWS EARLE
TAKEN 12/4/98
TRANS
TYPE SOIL/WATER/SLUDGE
P.O. # 34-000491
INVOICE under separate cover

VERIFIED BY:

**SAMPLE IDENTIFICATION**

01 PS-SB01-06
02 PS-SB01-08
03 PS-SB01-10
04 PS-SB01-12
05 PS-SB01-14
06 PS-SB01-16
07 PS-SB01-18
08 PS-SB01-20
09 PS-SB01-22
10 PS-SB01-24
11 PS-SB01-04
12 PS-SB02-06
13 PS-SB02-08
14 PS-SB02-10
15 PS-SB02-12
16 PS-SB02-14
17 PS-SB02-16
18 PS-SB02-18
19 PS-SB02-20
20 PS-SB02-22
21 PS-SB02-24
22 PS-GW03
23 PS-GW04
24 PS-GW05
25 PS-GW02
26 PS-SL01

**TEST CODES and NAMES used on this workorder**

PEST S PESTICIDES - SOIL
PEST W PESTICIDES - WATER

Received: 12/05/98 12/10/98 08:35:32

SAMPLE IDENTIFICATION

27 PS-FB01

Received: 12/05/98 Results by Sample

SAMPLE ID PS-SB01-06 FRACTION 01A TEST CODE PEST S NAME PESTICIDES - SOIL
Date & Time Collected 12/04/98 09:10:00 Category SOIL

# PESTICIDES in SOIL

| | RESULT | LIMIT |
|---|---|---|
| a-BHC | ND | 0.10 |
| g-BHC (Lindane) | ND | 0.10 |
| b-BHC | ND | 0.10 |
| Heptachlor | 0.16 | 0.10 |
| d-BHC | ND | 0.10 |
| Aldrin | ND | 0.10 |
| Heptachlor Epoxide | 0.12 | 0.10 |
| Endosulfan I | ND | 0.10 |
| 4,4'-DDE | ND | 0.10 |
| Dieldrin | ND | 0.10 |
| Endrin | ND | 0.10 |
| 4,4'-DDD | ND | 0.10 |
| Endosulfan II | ND | 0.10 |
| 4,4'-DDT | ND | 0.10 |
| Endrin Aldehyde | ND | 0.10 |
| Endosulfan Sulfate | ND | 0.10 |
| Chlordane | 3.8 | 0.10 |
| Toxaphene | ND | 0.10 |
| Methoxychlor | ND | 0.10 |

Notes and Definitions for this Report:

UNITS: mg/Kg
EXTRACTED: 12/07/98
DATE RUN: 12/09/98
ANALYST: CK
INSTRUMENT: HP2
DIL. FACTOR: 10

ND = not detected at detection limit

 TOXIKON CORP. REPORT Work Order # 98-12-129

Received: 12/05/98 Results by Sample

SAMPLE ID PS-SB01-08 FRACTION 02A TEST CODE PEST S NAME PESTICIDES - SOIL

Date & Time Collected 12/04/98 09:11:00 Category SOIL

# PESTICIDES in SOIL

| | RESULT | LIMIT |
|---|---|---|
| a-BHC | ND | 0.050 |
| g-BHC (Lindane) | ND | 0.050 |
| b-BHC | ND | 0.050 |
| Heptachlor | ND | 0.050 |
| d-BHC | ND | 0.050 |
| Aldrin | ND | 0.050 |
| Heptachlor Epoxide | ND | 0.050 |
| Endosulfan I | ND | 0.050 |
| 4,4'-DDE | ND | 0.050 |
| Dieldrin | ND | 0.050 |
| Endrin | ND | 0.050 |
| 4,4'-DDD | ND | 0.050 |
| Endosulfan II | ND | 0.050 |
| 4,4'-DDT | ND | 0.050 |
| Endrin Aldehyde | ND | 0.050 |
| Endosulfan Sulfate | ND | 0.050 |
| Chlordane | 1.1 | 0.050 |
| Toxaphene | ND | 0.050 |
| Methoxychlor | ND | 0.050 |

Notes and Definitions for this Report:

UNITS: mg/Kg
EXTRACTED: 12/07/98
DATE RUN: 12/09/98
ANALYST: CK
INSTRUMENT: HP2
DIL. FACTOR: 5

ND = not detected at detection limit

Received: 12/05/98 Results by Sample

SAMPLE ID PS-SB01-10 FRACTION 03A TEST CODE PEST S NAME PESTICIDES - SOIL
Date & Time Collected 12/04/98 09:20:00 Category SOIL

# PESTICIDES in SOIL

| | RESULT | LIMIT |
|---|---|---|
| a-BHC | ND | 1.0 |
| g-BHC (Lindane) | ND | 1.0 |
| b-BHC | ND | 1.0 |
| Heptachlor | ND | 1.0 |
| d-BHC | ND | 1.0 |
| Aldrin | ND | 1.0 |
| Heptachlor Epoxide | ND | 1.0 |
| Endosulfan I | ND | 1.0 |
| 4,4'-DDE | ND | 1.0 |
| Dieldrin | ND | 1.0 |
| Endrin | ND | 1.0 |
| 4,4'-DDD | ND | 1.0 |
| Endosulfan II | ND | 1.0 |
| 4,4'-DDT | ND | 1.0 |
| Endrin Aldehyde | ND | 1.0 |
| Endosulfan Sulfate | ND | 1.0 |
| Chlordane | 40 | 1.0 |
| Toxaphene | ND | 1.0 |
| Methoxychlor | ND | 1.0 |

Notes and Definitions for this Report:

UNITS: mg/Kg
EXTRACTED: 12/07/98
DATE RUN: 12/09/98
ANALYST: CK
INSTRUMENT: HP2
DIL. FACTOR: 100

ND = not detected at detection limit

TOXIKON CORP. REPORT

Work Order # 98-12-129

Received: 12/05/98

Results by Sample

SAMPLE ID PS-SB01-12

FRACTION 04A TEST CODE PEST S NAME PESTICIDES - SOIL

Date & Time Collected 12/04/98 09:21:00 Category SOIL

# PESTICIDES in SOIL

| | RESULT | LIMIT |
|---|---|---|
| a-BHC | ND | 0.010 |
| g-BHC (Lindane) | ND | 0.010 |
| b-BHC | ND | 0.010 |
| Heptachlor | ND | 0.010 |
| d-BHC | ND | 0.010 |
| Aldrin | ND | 0.010 |
| Heptachlor Epoxide | ND | 0.010 |
| Endosulfan I | ND | 0.010 |
| 4,4'-DDE | ND | 0.010 |
| Dieldrin | ND | 0.010 |
| Endrin | ND | 0.010 |
| 4,4'-DDD | ND | 0.010 |
| Endosulfan II | ND | 0.010 |
| 4,4'-DDT | ND | 0.010 |
| Endrin Aldehyde | ND | 0.010 |
| Endosulfan Sulfate | ND | 0.010 |
| Chlordane | ND | 0.010 |
| Toxaphene | ND | 0.010 |
| Methoxychlor | ND | 0.010 |

Notes and Definitions for this Report:

UNITS: mg/Kg
EXTRACTED: 12/07/98
DATE RUN: 12/08/98
ANALYST: CK
INSTRUMENT: HP2
DIL. FACTOR: 1

ND = not detected at detection limit

 TOXIKON CORP. REPORT Work Order # 98-12-129

Received: 12/05/98 Results by Sample

SAMPLE ID PS-SB01-14 FRACTION 05A TEST CODE PEST S NAME PESTICIDES - SOIL

Date & Time Collected 12/04/98 09:30:00 Category SOIL

# PESTICIDES in SOIL

| | RESULT | LIMIT |
|---|---|---|
| a-BHC | ND | 0.050 |
| g-BHC (Lindane) | ND | 0.050 |
| b-BHC | ND | 0.050 |
| Heptachlor | ND | 0.050 |
| d-BHC | ND | 0.050 |
| Aldrin | ND | 0.050 |
| Heptachlor Epoxide | ND | 0.050 |
| Endosulfan I | ND | 0.050 |
| 4,4'-DDE | ND | 0.050 |
| Dieldrin | ND | 0.050 |
| Endrin | ND | 0.050 |
| 4,4'-DDD | ND | 0.050 |
| Endosulfan II | ND | 0.050 |
| 4,4'-DDT | ND | 0.050 |
| Endrin Aldehyde | ND | 0.050 |
| Endosulfan Sulfate | ND | 0.050 |
| Chlordane | 1.4 | 0.050 |
| Toxaphene | ND | 0.050 |
| Methoxychlor | ND | 0.050 |

Notes and Definitions for this Report:

UNITS: mg/Kg
EXTRACTED: 12/07/98
DATE RUN: 12/09/98
ANALYST: CK
INSTRUMENT: HP2
DIL. FACTOR: 5

ND = not detected at detection limit

Received: 12/05/98 Results by Sample

SAMPLE ID PS-SB01-16 FRACTION 06A TEST CODE PEST S NAME PESTICIDES - SOIL
Date & Time Collected 12/04/98 09:31:00 Category SOIL

# PESTICIDES in SOIL

| | RESULT | LIMIT |
|---|---|---|
| a-BHC | ND | 0.010 |
| g-BHC (Lindane) | ND | 0.010 |
| b-BHC | ND | 0.010 |
| Heptachlor | ND | 0.010 |
| d-BHC | ND | 0.010 |
| Aldrin | ND | 0.010 |
| Heptachlor Epoxide | ND | 0.010 |
| Endosulfan I | ND | 0.010 |
| 4,4'-DDE | ND | 0.010 |
| Dieldrin | ND | 0.010 |
| Endrin | ND | 0.010 |
| 4,4'-DDD | ND | 0.010 |
| Endosulfan II | ND | 0.010 |
| 4,4'-DDT | ND | 0.010 |
| Endrin Aldehyde | ND | 0.010 |
| Endosulfan Sulfate | ND | 0.010 |
| Chlordane | ND | 0.010 |
| Toxaphene | ND | 0.010 |
| Methoxychlor | ND | 0.010 |

Notes and Definitions for this Report:

UNITS: mg/Kg
EXTRACTED: 12/07/98
DATE RUN: 12/08/98
ANALYST: CK
INSTRUMENT: HP2
DIL. FACTOR: 1

ND = not detected at detection limit

Received: 12/05/98 Results by Sample

SAMPLE ID PS-SB01-18 FRACTION 07A TEST CODE PEST S NAME PESTICIDES - SOIL
Date & Time Collected 12/04/98 09:40:00 Category SOIL

# PESTICIDES in SOIL

| | RESULT | LIMIT |
|---|---|---|
| a-BHC | ND | 0.010 |
| g-BHC (Lindane) | ND | 0.010 |
| b-BHC | ND | 0.010 |
| Heptachlor | ND | 0.010 |
| d-BHC | ND | 0.010 |
| Aldrin | ND | 0.010 |
| Heptachlor Epoxide | ND | 0.010 |
| Endosulfan I | ND | 0.010 |
| 4,4'-DDE | ND | 0.010 |
| Dieldrin | ND | 0.010 |
| Endrin | ND | 0.010 |
| 4,4'-DDD | ND | 0.010 |
| Endosulfan II | ND | 0.010 |
| 4,4'-DDT | ND | 0.010 |
| Endrin Aldehyde | ND | 0.010 |
| Endosulfan Sulfate | ND | 0.010 |
| Chlordane | 0.026 | 0.010 |
| Toxaphene | ND | 0.010 |
| Methoxychlor | ND | 0.010 |

Notes and Definitions for this Report:

UNITS: mg/Kg
EXTRACTED: 12/07/98
DATE RUN: 12/08/98
ANALYST: CK
INSTRUMENT: HP2
DIL. FACTOR: 1

ND = not detected at detection limit

Received: 12/05/98 Results by Sample

SAMPLE ID PS-SB01-20 FRACTION 08A TEST CODE PEST S NAME PESTICIDES - SOIL
Date & Time Collected 12/04/98 09:41:00 Category SOIL

# PESTICIDES in SOIL

| | RESULT | LIMIT |
|---|---|---|
| a-BHC | ND | 0.010 |
| g-BHC (Lindane) | ND | 0.010 |
| b-BHC | ND | 0.010 |
| Heptachlor | ND | 0.010 |
| d-BHC | ND | 0.010 |
| Aldrin | ND | 0.010 |
| Heptachlor Epoxide | ND | 0.010 |
| Endosulfan I | ND | 0.010 |
| 4,4'-DDE | ND | 0.010 |
| Dieldrin | ND | 0.010 |
| Endrin | ND | 0.010 |
| 4,4'-DDD | ND | 0.010 |
| Endosulfan II | ND | 0.010 |
| 4,4'-DDT | ND | 0.010 |
| Endrin Aldehyde | ND | 0.010 |
| Endosulfan Sulfate | ND | 0.010 |
| Chlordane | ND | 0.010 |
| Toxaphene | ND | 0.010 |
| Methoxychlor | ND | 0.010 |

Notes and Definitions for this Report:

UNITS: mg/Kg
EXTRACTED: 12/07/98
DATE RUN: 12/08/98
ANALYST: CK
INSTRUMENT: HP2
DIL. FACTOR: 1

ND = not detected at detection limit

Received: 12/05/98 Results by Sample

SAMPLE ID PS-SB01-22 FRACTION 09A TEST CODE PEST_S NAME PESTICIDES - SOIL
Date & Time Collected 12/04/98 09:49:00 Category SOIL

# PESTICIDES in SOIL

| | RESULT | LIMIT |
|---|---|---|
| a-BHC | ND | 0.50 |
| g-BHC (Lindane) | ND | 0.50 |
| b-BHC | ND | 0.50 |
| Heptachlor | ND | 0.50 |
| d-BHC | ND | 0.50 |
| Aldrin | ND | 0.50 |
| Heptachlor Epoxide | ND | 0.50 |
| Endosulfan I | ND | 0.50 |
| 4,4'-DDE | ND | 0.50 |
| Dieldrin | ND | 0.50 |
| Endrin | ND | 0.50 |
| 4,4'-DDD | ND | 0.50 |
| Endosulfan II | ND | 0.50 |
| 4,4'-DDT | ND | 0.50 |
| Endrin Aldehyde | ND | 0.50 |
| Endosulfan Sulfate | ND | 0.50 |
| Chlordane | 18 | 0.50 |
| Toxaphene | ND | 0.50 |
| Methoxychlor | ND | 0.50 |

Notes and Definitions for this Report:

UNITS: mg/Kg
EXTRACTED: 12/07/98
DATE RUN: 12/09/98
ANALYST: CK
INSTRUMENT: HP2
DIL. FACTOR: 50

ND = not detected at detection limit

Received: 12/05/98 Results by Sample

SAMPLE ID PS-SB01-24 FRACTION 10A TEST CODE PEST S NAME PESTICIDES - SOIL
Date & Time Collected 12/04/98 09:50:00 Category SOIL

# PESTICIDES in SOIL

| | RESULT | LIMIT |
|---|---|---|
| a-BHC | ND | 0.010 |
| g-BHC (Lindane) | ND | 0.010 |
| b-BHC | ND | 0.010 |
| Heptachlor | ND | 0.010 |
| d-BHC | ND | 0.010 |
| Aldrin | ND | 0.010 |
| Heptachlor Epoxide | ND | 0.010 |
| Endosulfan I | ND | 0.010 |
| 4,4'-DDE | ND | 0.010 |
| Dieldrin | ND | 0.010 |
| Endrin | ND | 0.010 |
| 4,4'-DDD | ND | 0.010 |
| Endosulfan II | ND | 0.010 |
| 4,4'-DDT | ND | 0.010 |
| Endrin Aldehyde | ND | 0.010 |
| Endosulfan Sulfate | ND | 0.010 |
| Chlordane | ND | 0.010 |
| Toxaphene | ND | 0.010 |
| Methoxychlor | ND | 0.010 |

Notes and Definitions for this Report:

UNITS: mg/Kg
EXTRACTED: 12/07/98
DATE RUN: 12/08/98
ANALYST: CK
INSTRUMENT: HP2
DIL. FACTOR: 1

ND = not detected at detection limit

Received: 12/05/98 Results by Sample

SAMPLE ID PS-SB01-04 FRACTION 11A TEST CODE PEST S NAME PESTICIDES - SOIL
Date & Time Collected 12/04/98 09:00:00 Category SOIL

# PESTICIDES in SOIL

| | RESULT | LIMIT |
|---|---|---|
| a-BHC | ND | 0.50 |
| g-BHC (Lindane) | ND | 0.50 |
| b-BHC | ND | 0.50 |
| Heptachlor | ND | 0.50 |
| d-BHC | ND | 0.50 |
| Aldrin | ND | 0.50 |
| Heptachlor Epoxide | ND | 0.50 |
| Endosulfan I | ND | 0.50 |
| 4,4'-DDE | ND | 0.50 |
| Dieldrin | ND | 0.50 |
| Endrin | ND | 0.50 |
| 4,4'-DDD | ND | 0.50 |
| Endosulfan II | ND | 0.50 |
| 4,4'-DDT | ND | 0.50 |
| Endrin Aldehyde | ND | 0.50 |
| Endosulfan Sulfate | ND | 0.50 |
| Chlordane | 6.4 | 0.50 |
| Toxaphene | ND | 0.50 |
| Methoxychlor | ND | 0.50 |

Notes and Definitions for this Report:

UNITS: mg/Kg
EXTRACTED: 12/07/98
DATE RUN: 12/09/98
ANALYST: CK
INSTRUMENT: HP2
DIL. FACTOR: 50

ND = not detected at detection limit

Received: 12/05/98 Results by Sample

SAMPLE ID PS-SB02-06 FRACTION 12A TEST CODE PEST S NAME PESTICIDES - SOIL
Date & Time Collected 12/04/98 10:02:00 Category SOIL

# PESTICIDES in SOIL

| | RESULT | LIMIT |
|---|---|---|
| a-BHC | ND | 0.10 |
| g-BHC (Lindane) | ND | 0.10 |
| b-BHC | ND | 0.10 |
| Heptachlor | ND | 0.10 |
| d-BHC | ND | 0.10 |
| Aldrin | ND | 0.10 |
| Heptachlor Epoxide | ND | 0.10 |
| Endosulfan I | ND | 0.10 |
| 4,4'-DDE | ND | 0.10 |
| Dieldrin | ND | 0.10 |
| Endrin | ND | 0.10 |
| 4,4'-DDD | ND | 0.10 |
| Endosulfan II | ND | 0.10 |
| 4,4'-DDT | ND | 0.10 |
| Endrin Aldehyde | ND | 0.10 |
| Endosulfan Sulfate | ND | 0.10 |
| Chlordane | 2.9 | 0.10 |
| Toxaphene | ND | 0.10 |
| Methoxychlor | ND | 0.10 |

Notes and Definitions for this Report:

UNITS: mg/Kg
EXTRACTED: 12/07/98
DATE RUN: 12/09/98
ANALYST: CK
INSTRUMENT: HP2
DIL. FACTOR: 10

ND = not detected at detection limit

Received: 12/05/98 Results by Sample

SAMPLE ID PS-SB02-08 FRACTION 13A TEST CODE PEST S NAME PESTICIDES - SOIL
Date & Time Collected 12/04/98 10:03:00 Category SOIL

# PESTICIDES in SOIL

| | RESULT | LIMIT |
|---|---|---|
| a-BHC | ND | 0.010 |
| g-BHC (Lindane) | ND | 0.010 |
| b-BHC | ND | 0.010 |
| Heptachlor | ND | 0.010 |
| d-BHC | ND | 0.010 |
| Aldrin | ND | 0.010 |
| Heptachlor Epoxide | ND | 0.010 |
| Endosulfan I | ND | 0.010 |
| 4,4'-DDE | ND | 0.010 |
| Dieldrin | ND | 0.010 |
| Endrin | ND | 0.010 |
| 4,4'-DDD | ND | 0.010 |
| Endosulfan II | ND | 0.010 |
| 4,4'-DDT | ND | 0.010 |
| Endrin Aldehyde | ND | 0.010 |
| Endosulfan Sulfate | ND | 0.010 |
| Chlordane | 0.032 | 0.010 |
| Toxaphene | ND | 0.010 |
| Methoxychlor | ND | 0.010 |

Notes and Definitions for this Report:

UNITS: mg/Kg
EXTRACTED: 12/07/98
DATE RUN: 12/08/98
ANALYST: CK
INSTRUMENT: HP2
DIL. FACTOR: 1

ND = not detected at detection limit

Received: 12/05/98 Results by Sample

SAMPLE ID PS-SB02-10 FRACTION 14A TEST CODE PEST S NAME PESTICIDES - SOIL
Date & Time Collected 12/04/98 10:11:00 Category SOIL

# PESTICIDES in SOIL

| | RESULT | LIMIT |
|---|---|---|
| a-BHC | ND | 0.20 |
| g-BHC (Lindane) | ND | 0.20 |
| b-BHC | ND | 0.20 |
| Heptachlor | ND | 0.20 |
| d-BHC | ND | 0.20 |
| Aldrin | ND | 0.20 |
| Heptachlor Epoxide | ND | 0.20 |
| Endosulfan I | ND | 0.20 |
| 4,4'-DDE | ND | 0.20 |
| Dieldrin | ND | 0.20 |
| Endrin | ND | 0.20 |
| 4,4'-DDD | ND | 0.20 |
| Endosulfan II | ND | 0.20 |
| 4,4'-DDT | ND | 0.20 |
| Endrin Aldehyde | ND | 0.20 |
| Endosulfan Sulfate | ND | 0.20 |
| Chlordane | 4.9 | 0.20 |
| Toxaphene | ND | 0.20 |
| Methoxychlor | ND | 0.20 |

Notes and Definitions for this Report:

UNITS: mg/Kg
EXTRACTED: 12/07/98
DATE RUN: 12/09/98
ANALYST: CK
INSTRUMENT: HP2
DIL. FACTOR: 20

ND = not detected at detection limit

Received: 12/05/98 Results by Sample

SAMPLE ID PS-SB02-12 FRACTION 15A TEST CODE PEST S NAME PESTICIDES - SOIL
Date & Time Collected 12/04/98 10:12:00 Category SOIL

# PESTICIDES in SOIL

| | RESULT | LIMIT |
|---|---|---|
| a-BHC | ND | 0.010 |
| g-BHC (Lindane) | ND | 0.010 |
| b-BHC | ND | 0.010 |
| Heptachlor | ND | 0.010 |
| d-BHC | ND | 0.010 |
| Aldrin | ND | 0.010 |
| Heptachlor Epoxide | ND | 0.010 |
| Endosulfan I | ND | 0.010 |
| 4,4'-DDE | ND | 0.010 |
| Dieldrin | ND | 0.010 |
| Endrin | ND | 0.010 |
| 4,4'-DDD | ND | 0.010 |
| Endosulfan II | ND | 0.010 |
| 4,4'-DDT | ND | 0.010 |
| Endrin Aldehyde | ND | 0.010 |
| Endosulfan Sulfate | ND | 0.010 |
| Chlordane | 0.018 | 0.010 |
| Toxaphene | ND | 0.010 |
| Methoxychlor | ND | 0.010 |

Notes and Definitions for this Report:

UNITS: mg/Kg
EXTRACTED: 12/07/98
DATE RUN: 12/09/98
ANALYST: CK
INSTRUMENT: HP2
DIL. FACTOR: 1

ND = not detected at detection limit

Received: 12/05/98 Results by Sample

SAMPLE ID PS-SB02-14 FRACTION 16A TEST CODE PEST S NAME PESTICIDES - SOIL
Date & Time Collected 12/04/98 10:26:00 Category SOIL

# PESTICIDES in SOIL

| | RESULT | LIMIT |
|---|---|---|
| a-BHC | ND | 0.10 |
| g-BHC (Lindane) | ND | 0.10 |
| b-BHC | ND | 0.10 |
| Heptachlor | ND | 0.10 |
| d-BHC | ND | 0.10 |
| Aldrin | ND | 0.10 |
| Heptachlor Epoxide | ND | 0.10 |
| Endosulfan I | ND | 0.10 |
| 4,4'-DDE | ND | 0.10 |
| Dieldrin | ND | 0.10 |
| Endrin | ND | 0.10 |
| 4,4'-DDD | ND | 0.10 |
| Endosulfan II | ND | 0.10 |
| 4,4'-DDT | ND | 0.10 |
| Endrin Aldehyde | ND | 0.10 |
| Endosulfan Sulfate | ND | 0.10 |
| Chlordane | 2.2 | 0.10 |
| Toxaphene | ND | 0.10 |
| Methoxychlor | ND | 0.10 |

Notes and Definitions for this Report:

UNITS: mg/Kg
EXTRACTED: 12/07/98
DATE RUN: 12/09/98
ANALYST: CK
INSTRUMENT: HP2
DIL. FACTOR: 10

ND = not detected at detection limit

Received: 12/05/98 Results by Sample

SAMPLE ID PS-SB02-16 FRACTION 17A TEST CODE PEST S NAME PESTICIDES - SOIL
Date & Time Collected 12/04/98 10:27:00 Category SOIL

# PESTICIDES in SOIL

| | RESULT | LIMIT |
|---|---|---|
| a-BHC | ND | 0.010 |
| g-BHC (Lindane) | ND | 0.010 |
| b-BHC | ND | 0.010 |
| Heptachlor | ND | 0.010 |
| d-BHC | ND | 0.010 |
| Aldrin | ND | 0.010 |
| Heptachlor Epoxide | ND | 0.010 |
| Endosulfan I | ND | 0.010 |
| 4,4'-DDE | ND | 0.010 |
| Dieldrin | ND | 0.010 |
| Endrin | ND | 0.010 |
| 4,4'-DDD | ND | 0.010 |
| Endosulfan II | ND | 0.010 |
| 4,4'-DDT | ND | 0.010 |
| Endrin Aldehyde | ND | 0.010 |
| Endosulfan Sulfate | ND | 0.010 |
| Chlordane | ND | 0.010 |
| Toxaphene | ND | 0.010 |
| Methoxychlor | ND | 0.010 |

Notes and Definitions for this Report:

UNITS: mg/Kg
EXTRACTED: 12/07/98
DATE RUN: 12/09/98
ANALYST: CK
INSTRUMENT: HP2
DIL. FACTOR: 1

ND = not detected at detection limit

Received: 12/05/98 Results by Sample

SAMPLE ID PS-SB02-18 FRACTION 18A TEST CODE PEST S NAME PESTICIDES - SOIL
Date & Time Collected 12/04/98 10:38:00 Category SOIL

# PESTICIDES in SOIL

| | RESULT | LIMIT |
|---|---|---|
| a-BHC | ND | 0.20 |
| g-BHC (Lindane) | ND | 0.20 |
| b-BHC | ND | 0.20 |
| Heptachlor | ND | 0.20 |
| d-BHC | ND | 0.20 |
| Aldrin | ND | 0.20 |
| Heptachlor Epoxide | ND | 0.20 |
| Endosulfan I | ND | 0.20 |
| 4,4'-DDE | ND | 0.20 |
| Dieldrin | ND | 0.20 |
| Endrin | ND | 0.20 |
| 4,4'-DDD | ND | 0.20 |
| Endosulfan II | ND | 0.20 |
| 4,4'-DDT | ND | 0.20 |
| Endrin Aldehyde | ND | 0.20 |
| Endosulfan Sulfate | ND | 0.20 |
| Chlordane | 6.8 | 0.20 |
| Toxaphene | ND | 0.20 |
| Methoxychlor | ND | 0.20 |

Notes and Definitions for this Report:

UNITS: mg/Kg
EXTRACTED: 12/07/98
DATE RUN: 12/09/98
ANALYST: CK
INSTRUMENT: HP2
DIL. FACTOR: 20

ND = not detected at detection limit

Received: 12/05/98 Results by Sample

SAMPLE ID PS-SB02-20 FRACTION 19A TEST CODE PEST S NAME PESTICIDES - SOIL
Date & Time Collected 12/04/98 10:39:00 Category SOIL

# PESTICIDES in SOIL

| | RESULT | LIMIT |
|---|---|---|
| a-BHC | ND | 0.010 |
| g-BHC (Lindane) | ND | 0.010 |
| b-BHC | ND | 0.010 |
| Heptachlor | ND | 0.010 |
| d-BHC | ND | 0.010 |
| Aldrin | ND | 0.010 |
| Heptachlor Epoxide | ND | 0.010 |
| Endosulfan I | ND | 0.010 |
| 4,4'-DDE | ND | 0.010 |
| Dieldrin | ND | 0.010 |
| Endrin | ND | 0.010 |
| 4,4'-DDD | ND | 0.010 |
| Endosulfan II | ND | 0.010 |
| 4,4'-DDT | ND | 0.010 |
| Endrin Aldehyde | ND | 0.010 |
| Endosulfan Sulfate | ND | 0.010 |
| Chlordane | ND | 0.010 |
| Toxaphene | ND | 0.010 |
| Methoxychlor | ND | 0.010 |

Notes and Definitions for this Report:

UNITS: mg/Kg
EXTRACTED: 12/07/98
DATE RUN: 12/09/98
ANALYST: CK
INSTRUMENT: HP2
DIL. FACTOR: 1

ND = not detected at detection limit

Received: 12/05/98 Results by Sample

SAMPLE ID PS-SB02-22 FRACTION 20A TEST CODE PEST S NAME PESTICIDES - SOIL
Date & Time Collected 12/04/98 10:50:00 Category SOIL

# PESTICIDES in SOIL

| | RESULT | LIMIT |
|---|---|---|
| a-BHC | ND | 0.020 |
| g-BHC (Lindane) | ND | 0.020 |
| b-BHC | ND | 0.020 |
| Heptachlor | ND | 0.020 |
| d-BHC | ND | 0.020 |
| Aldrin | ND | 0.020 |
| Heptachlor Epoxide | ND | 0.020 |
| Endosulfan I | ND | 0.020 |
| 4,4'-DDE | ND | 0.020 |
| Dieldrin | ND | 0.020 |
| Endrin | ND | 0.020 |
| 4,4'-DDD | ND | 0.020 |
| Endosulfan II | ND | 0.020 |
| 4,4'-DDT | ND | 0.020 |
| Endrin Aldehyde | ND | 0.020 |
| Endosulfan Sulfate | ND | 0.020 |
| Chlordane | 0.28 | 0.020 |
| Toxaphene | ND | 0.020 |
| Methoxychlor | ND | 0.020 |

Notes and Definitions for this Report:

UNITS: mg/Kg
EXTRACTED: 12/07/98
DATE RUN: 12/09/98
ANALYST: CK
INSTRUMENT: HP2
DIL. FACTOR: 2

ND = not detected at detection limit

Received: 12/05/98 Results by Sample

SAMPLE ID PS-SB02-24 FRACTION 21A TEST CODE PEST S NAME PESTICIDES - SOIL
Date & Time Collected 12/04/98 10:51:00 Category SOIL

# PESTICIDES in SOIL

| | RESULT | LIMIT |
|---|---|---|
| a-BHC | ND | 0.010 |
| g-BHC (Lindane) | ND | 0.010 |
| b-BHC | ND | 0.010 |
| Heptachlor | ND | 0.010 |
| d-BHC | ND | 0.010 |
| Aldrin | ND | 0.010 |
| Heptachlor Epoxide | ND | 0.010 |
| Endosulfan I | ND | 0.010 |
| 4,4'-DDE | ND | 0.010 |
| Dieldrin | ND | 0.010 |
| Endrin | ND | 0.010 |
| 4,4'-DDD | ND | 0.010 |
| Endosulfan II | ND | 0.010 |
| 4,4'-DDT | ND | 0.010 |
| Endrin Aldehyde | ND | 0.010 |
| Endosulfan Sulfate | ND | 0.010 |
| Chlordane | ND | 0.010 |
| Toxaphene | ND | 0.010 |
| Methoxychlor | ND | 0.010 |

Notes and Definitions for this Report:

UNITS: mg/Kg
EXTRACTED: 12/07/98
DATE RUN: 12/09/98
ANALYST: CK
INSTRUMENT: HP2
DIL. FACTOR: 1

ND = not detected at detection limit

Received: 12/05/98 Results by Sample

SAMPLE ID PS-GW03 FRACTION 22A TEST CODE PEST W NAME PESTICIDES - WATER
Date & Time Collected 12/04/98 12:10:00 Category WATER

# PESTICIDES in WATER

| | RESULT | LIMIT |
|---|---|---|
| a-BHC | ND | 0.010 |
| g-BHC (Lindane) | ND | 0.010 |
| b-BHC | ND | 0.010 |
| Heptachlor | ND | 0.010 |
| d-BHC | ND | 0.010 |
| Aldrin | ND | 0.010 |
| Heptachlor Epoxide | ND | 0.010 |
| Endosulfan I | 0.41 | 0.010 |
| 4,4'-DDE | ND | 0.010 |
| Dieldrin | ND | 0.010 |
| Endrin | ND | 0.010 |
| 4,4'-DDD | ND | 0.010 |
| Endosulfan II | ND | 0.010 |
| 4,4'-DDT | ND | 0.010 |
| Endrin Aldehyde | ND | 0.010 |
| Endosulfan Sulfate | ND | 0.010 |
| Chlordane | ND | 0.010 |
| Toxaphene | ND | 0.010 |
| Methoxychlor | ND | 0.010 |

Notes and Definitions for this Report:

EXTRACTED: 12/07/98
DATE RUN: 12/08/98
ANALYST: CK
INSTRUMENT: HP2
DIL. FACTOR: 1
UNITS: ug/L

ND = not detected at detection limit

Received: 12/05/98 Results by Sample

SAMPLE ID PS-GW04 FRACTION 23A TEST CODE PEST W NAME PESTICIDES - WATER
Date & Time Collected 12/04/98 13:10:00 Category WATER

# PESTICIDES in WATER

| | RESULT | LIMIT |
|---|---|---|
| a-BHC | ND | 0.010 |
| g-BHC (Lindane) | ND | 0.010 |
| b-BHC | ND | 0.010 |
| Heptachlor | ND | 0.010 |
| d-BHC | ND | 0.010 |
| Aldrin | ND | 0.010 |
| Heptachlor Epoxide | ND | 0.010 |
| Endosulfan I | 0.61 | 0.010 |
| 4,4'-DDE | ND | 0.010 |
| Dieldrin | ND | 0.010 |
| Endrin | ND | 0.010 |
| 4,4'-DDD | ND | 0.010 |
| Endosulfan II | ND | 0.010 |
| 4,4'-DDT | ND | 0.010 |
| Endrin Aldehyde | ND | 0.010 |
| Endosulfan Sulfate | ND | 0.010 |
| Chlordane | ND | 0.010 |
| Toxaphene | ND | 0.010 |
| Methoxychlor | ND | 0.010 |

Notes and Definitions for this Report:

EXTRACTED: 12/07/98
DATE RUN: 12/08/98
ANALYST: CK
INSTRUMENT: HP2
DIL. FACTOR: 1
UNITS: ug/L

ND = not detected at detection limit

Received: 12/05/98 Results by Sample

SAMPLE ID PS-GW05 FRACTION 24A TEST CODE PEST W NAME PESTICIDES - WATER
Date & Time Collected 12/04/98 14:40:00 Category WATER

# PESTICIDES in WATER

| | RESULT | LIMIT |
|---|---|---|
| a-BHC | ND | 0.010 |
| g-BHC (Lindane) | ND | 0.010 |
| b-BHC | ND | 0.010 |
| Heptachlor | ND | 0.010 |
| d-BHC | ND | 0.010 |
| Aldrin | ND | 0.010 |
| Heptachlor Epoxide | ND | 0.010 |
| Endosulfan I | ND | 0.010 |
| 4,4'-DDE | ND | 0.010 |
| Dieldrin | ND | 0.010 |
| Endrin | ND | 0.010 |
| 4,4'-DDD | ND | 0.010 |
| Endosulfan II | ND | 0.010 |
| 4,4'-DDT | ND | 0.010 |
| Endrin Aldehyde | ND | 0.010 |
| Endosulfan Sulfate | ND | 0.010 |
| Chlordane | ND | 0.010 |
| Toxaphene | ND | 0.010 |
| Methoxychlor | ND | 0.010 |

Notes and Definitions for this Report:

EXTRACTED: 12/07/98
DATE RUN: 12/08/98
ANALYST: CK
INSTRUMENT: HP2
DIL. FACTOR: 1
UNITS: ug/L

ND = not detected at detection limit

Received: 12/05/98 Results by Sample

SAMPLE ID PS-GW02 FRACTION 25A TEST CODE PEST W NAME PESTICIDES - WATER
Date & Time Collected 12/04/98 11:50:00 Category WATER

# PESTICIDES in WATER

| | RESULT | LIMIT |
|---|---|---|
| a-BHC | ND | 0.010 |
| g-BHC (Lindane) | ND | 0.010 |
| b-BHC | ND | 0.010 |
| Heptachlor | ND | 0.010 |
| d-BHC | ND | 0.010 |
| Aldrin | ND | 0.010 |
| Heptachlor Epoxide | ND | 0.010 |
| Endosulfan I | 0.38 | 0.010 |
| 4,4'-DDE | ND | 0.010 |
| Dieldrin | ND | 0.010 |
| Endrin | ND | 0.010 |
| 4,4'-DDD | ND | 0.010 |
| Endosulfan II | ND | 0.010 |
| 4,4'-DDT | ND | 0.010 |
| Endrin Aldehyde | ND | 0.010 |
| Endosulfan Sulfate | ND | 0.010 |
| Chlordane | ND | 0.010 |
| Toxaphene | ND | 0.010 |
| Methoxychlor | ND | 0.010 |

Notes and Definitions for this Report:

EXTRACTED: 12/07/98
DATE RUN: 12/08/98
ANALYST: CK
INSTRUMENT: HP2
DIL. FACTOR: 1
UNITS: ug/L

ND = not detected at detection limit

Received: 12/05/98 Results by Sample

SAMPLE ID PS-SL01 FRACTION 26A TEST CODE PEST S NAME PESTICIDES - SOIL
Date & Time Collected 12/04/98 15:00:00 Category SLUDGE

## PESTICIDES in SOIL

| | RESULT | LIMIT |
|---|---|---|
| a-BHC | ND | 0.10 |
| g-BHC (Lindane) | ND | 0.10 |
| b-BHC | ND | 0.10 |
| Heptachlor | ND | 0.10 |
| d-BHC | ND | 0.10 |
| Aldrin | ND | 0.10 |
| Heptachlor Epoxide | ND | 0.10 |
| Endosulfan I | ND | 0.10 |
| 4,4'-DDE | ND | 0.10 |
| Dieldrin | ND | 0.10 |
| Endrin | ND | 0.10 |
| 4,4'-DDD | ND | 0.10 |
| Endosulfan II | ND | 0.10 |
| 4,4'-DDT | ND | 0.10 |
| Endrin Aldehyde | ND | 0.10 |
| Endosulfan Sulfate | ND | 0.10 |
| Chlordane | 9.5 | 0.10 |
| Toxaphene | ND | 0.10 |
| Methoxychlor | ND | 0.10 |

Notes and Definitions for this Report:

UNITS: g/Kg
EXTRACTED: 12/07/98
DATE RUN: 12/09/98
ANALYST: CK
INSTRUMENT: HP2
DIL. FACTOR: 10000

ND = not detected at detection limit

Received: 12/05/98 Results by Sample

SAMPLE ID PS-FB01 FRACTION 27A TEST CODE PEST W NAME PESTICIDES - WATER
Date & Time Collected 12/04/98 15:00:00 Category WATER

# PESTICIDES in WATER

| | RESULT | LIMIT |
|---|---|---|
| a-BHC | ND | 0.010 |
| g-BHC (Lindane) | ND | 0.010 |
| b-BHC | ND | 0.010 |
| Heptachlor | ND | 0.010 |
| d-BHC | ND | 0.010 |
| Aldrin | ND | 0.010 |
| Heptachlor Epoxide | ND | 0.010 |
| Endosulfan I | ND | 0.010 |
| 4,4'-DDE | ND | 0.010 |
| Dieldrin | ND | 0.010 |
| Endrin | ND | 0.010 |
| 4,4'-DDD | ND | 0.010 |
| Endosulfan II | ND | 0.010 |
| 4,4'-DDT | ND | 0.010 |
| Endrin Aldehyde | ND | 0.010 |
| Endosulfan Sulfate | ND | 0.010 |
| Chlordane | ND | 0.010 |
| Toxaphene | ND | 0.010 |
| Methoxychlor | ND | 0.010 |

Notes and Definitions for this Report:

EXTRACTED: 12/07/98
DATE RUN: 12/08/98
ANALYST: CK
INSTRUMENT: HP2
DIL. FACTOR: 1
UNITS: ug/L

ND = not detected at detection limit

TEST CODE PEST S NAME PESTICIDES - SOIL

EPA Method: 8081. Organochlorine Pesticides & Polchlorinated Biphenyls by Gas Chromatography

Reference: Test Methods for Evaluating Solid Waste: Physical/Chemical Methods. EPA SW-846 FINAL UPDATE 111, 1996. Office of Solid Waste, USEPA.

TEST CODE PEST W NAME PESTICIDES - WATER

EPA METHOD: 608 for water sample

Reference: Methods for Organic Chemical Analysis of Municipal and Industrial Wastewater. Appendix A. 40 CFR Part 136. Federal Register Vol. 49, No. 209, 1984.

TOXIKON
15 Wiggins Ave., Bedford, MA 01730
Telephon : (781) 275-3330
Fax: (781) 275-7478

1 of 2

# CHAIN OF CUSTODY RECORD

WORK ORDER #: 98-12-129

DUE DATE : 12-09-98

COMPANY: Foster Wheeler Enviro.
ADDRESS: one Oxford Valley, Suite 200
Langhorne, PA 19047
PHONE #: (215) 702-4015 FAX #: (215) 702-4045
P.O. #: 34-000491
PROJECT MANAGER: M. G. Hoffman
PROJECT ID/LOCATION: NWS - Earle.

SAMPLE TYPE
1. WASTEWATER
2. SOIL
3. SLUDGE
4. OIL
5. DRINKING WATER
6. WATER (GW/MW/SW)
7. OTHER (SPECIFY

CONTAINER TYPE
P - PLASTIC
G - GLASS
V - VOA

ANALYSES

| TOXIKON # | SAMPLE IDENTIFICATION | SAMPLE TYPE | CONTAINER SIZE | CONTAINER TYPE | CONTAINER # | SAMPLING DATE | SAMPLING TIME | PRESERVATIVE | chlorinated organic pest. | SPECIAL INSTRUCTIONS/ COMMENTS |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | PS-SB01-06 | 2 | 8oz | G | 1 | 12/4/98 | 0910 | cool | ✓ | |
| 2 | PS-SB01-08 | | | | | 12/4/98 | 0911 | | ✓ | |
| 3 | PS-SB01-10 | | | | | | 0920 | | ✓ | |
| 4 | PS-SB01-12 | | | | | | 0921 | | ✓ | |
| 5 | PS-SB01-14 | | | | | | 0930 | | ✓ | |
| 6 | PS-SB01-16 | | | | | | 0931 | | ✓ | |
| 7 | PS-SB01-18 | | | | | | 0940 | | ✓ | |
| 8 | PS-SB01-20 | | | | | | 0941 | | ✓ | |
| 9 | PS-SB01-22 | | | | | | 0949 | | ✓ | |
| 10 | PS-SB01-24 | | | | | | 0950 | | ✓ | |
| 11 | PS-SB01-04 | | | | | | 0900 | | ✓ | |
| 12 | PS-SB02-06 | | | | | | 1002 | | ✓ | |
| 13 | PS-SB02-08 | 2 | 8oz | G | 1 | 12/4/98 | 1003 | cool | ✓ | |

SAMPLED BY: Tom Fowler
DATE: 12-4-98
TIME: 18-30

RELINQUISHED BY: Tom Fowler
DATE: 12-4-98
TIME: 17-00

RELINQUISHED BY:
DATE: -
TIME: -

METHOD OF SHIPMENT: Fed Ex

QUOTATION #:

RECEIVED BY:
DATE: -
TIME: -

RECEIVED FOR LAB BY: T. Nicastro
DATE: 12-5-98
TIME: 12-10

COOLER TEMPERATURE: 2°C

72 hr TAT

☑ RUSH ..... BUSINESS DAY TURN AROUND
☐ ROUTINE

*Sample disposal information*
Are there any other known or suspected contaminants in these samples other than those listed above?
Yes ____ No ____ If Yes, 1st Known ____

TOXIKON
15 Wiggins Ave., Bedford, MA 01730
Telephone: (781) 275-3330
Fax: (781) 275-7478

JJJ

# CHAIN OF CUSTODY RECORD

WORK ORDER #: 98-12-129

DUE DATE : 12-09-98

COMPANY: Foster Wheeler Env Corp
ADDRESS: One Oxford Valley Suite 200 Langhorne PA 19047
PHONE #: (215) 702-4015 FAX #: (215) 702-4045
P.O. #: 34-000491
PROJECT MANAGER: Mike Heffron
PROJECT ID/LOCATION: NW Seattle

SAMPLE TYPE: 1. WASTEWATER 2. SOIL 3. SLUDGE 4. OIL 5. DRINKING WATER 6. WATER (GW/MW/SW) 7. OTHER (SPECIFY

CONTAINER TYPE: P - PLASTIC G - GLASS V - VOA

ANALYSES: Unsaturated organic pak

| TOXIKON # | SAMPLE IDENTIFICATION | SAMPLE TYPE | CONTAINER SIZE | CONTAINER TYPE | CONTAINER # | SAMPLING DATE | SAMPLING TIME | PRESERVATIVE | Unsaturated organic pak | SPECIAL INSTRUCTIONS/ COMMENTS |
|---|---|---|---|---|---|---|---|---|---|---|
| 14 | PS-SB02-10 | 2 | 8oz | G | 1 | 12/4/98 | 1011 | cool | ✓ | |
| 15 | PS-SB02-12 | 2 | | | | | 1022 | | ✓ | |
| 16 | PS-SB02-14 | 2 | | | | | 1026 | | ✓ | |
| 17 | PS-SB02-16 | 2 | | | | | 1027 | | ✓ | |
| 18 | PS-SB02-18 | 2 | | | | | 1038 | | ✓ | |
| 19 | PS-SB02-20 | 2 | | | | | 1039 | | ✓ | |
| 20 | PS-SB02-22 | 2 | | | | | 1050 | | ✓ | |
| 21 | PS-SB02-24 | 2 | 8oz | | | | 1051 | | ✓ | |
| 22 | PS-GW03 | GW | 1L | | | | 1210 | | ✓ | PH5 |
| 23 | PS-GW04 | GW | | | | | 1310 | | ✓ | PH5 |
| 24 | PS-GW05 | GW | | | | | 1440 | | ✓ | PH5 |
| 25 | PS-GW02 | GW | 1L | G | 1 | 12/4/98 | 1150 | cool | ✓ | PH5 |
| 26 | PS-SZ01 | 3 | 8oz | G | 1 | 12/4/98 | 1500 | cool | ✓ | |
| 27 | PS-FB01 | Field Bl. | 1L | G | 1 | 12/4/98 | 1500 | cool | ✓ | PH6 |

SAMPLED BY: [signature] DATE: 12-4-98 TIME: 15-30

RELINQUISHED BY: [signature] DATE: 12-4-98 TIME: 17-00

RELINQUISHED BY: DATE: - - TIME: - -

METHOD OF SHIPMENT: Other

QUOTATION #:

RECEIVED BY: DATE: - - TIME: - -

RECEIVED FOR LAB BY: [signature] DATE: 12-5-98 TIME: 12-10

COOLER TEMPERATURE: 2°C

72hr TAT

☑ RUSH ..... BUSINESS DAY TURN AROUND
☐ ROUTINE

*Sample disposal information*
Are there any other known r suspected c ntaminants in these samples other than those listed abov ?
Yes ____ No ____ If Yes, 1st Known _____

# CASE NARRATIVE

Work Order: 9812129

All samples were analyzed within the method holding times.

No target compounds were detected in the method blanks.

# TOXIKON

## GC PESTICIDES/PCB ANALYSIS MS/MSD RECOVERIES
## (METHOD 608/8080)

PROJECT : 9812129
MATRIX : SOLIDS

**LABORATORY CONTROL SPIKE** LCS9812013

| COMPOUND | SPIKE ADDED (ug) | CONTROL SPIKE (ug) | CONTROL % RECOVERY | QC LIMITS |
|---|---|---|---|---|
| gamma-BHC (Lindane) | 0.2 | 0.174 | 87.0 | 25-111 |
| Heptachlor | 0.2 | 0.208 | 104.0 | 28-122 |
| Aldrin | 0.2 | 0.154 | 77.0 | 16-124 |
| Dieldrin | 0.8 | 0.872 | 109.0 | 28-128 |
| Endrin | 0.8 | 0.778 | 97.3 | 17-158 |
| 4,4'-DDT | 0.8 | 0.836 | 104.5 | 27-132 |
| *** AROCHLOR 1260 | 5.0 | NA | NA | 38-144 |

**MATRIX SPIKE SAMPLE : MS9812129.1**
**DILUTION : 1X**

| COMPOUND | SPIKE ADDED (ug) | SAMPLE CONC. (ug) | MS CONC. (ug) | MS % RECOVERY |
|---|---|---|---|---|
| gamma-BHC (Lindane) | 0.2 | ND | 0.151 | 75.5 |
| Heptachlor | 0.2 | 3.74 | 7.86 | NC |
| Aldrin | 0.2 | ND | 0.229 | 114.5 |
| Dieldrin | 0.8 | ND | 1.07 | 133.8 |
| Endrin | 0.8 | ND | 0.671 | 83.9 |
| 4,4'-DDT | 0.8 | ND | 0.996 | 124.5 |
| *** AROCHLOR 1260 | 5.0 | NA | NA | NA |

**MATRIX SPIKE DUPLICATE : MSD9812129.1**
**DILUTION : 1X**

| COMPOUND | SPIKE ADDED (ug) | MSD CONC. (ug) | MSD % RECOVERY | % RPD | QC LIMITS %RPD | QC LIMITS RECOVERY |
|---|---|---|---|---|---|---|
| gamma-BHC (Lindane) | 0.2 | 0.173 | 86.5 | 13.58 | < 15 | 25-111 |
| Heptachlor | 0.2 | 7 | NC | 11.60 | < 15 | 28-122 |
| Aldrin | 0.2 | 0.241 | 120.5 | 5.11 | < 15 | 16-124 |
| Dieldrin | 0.8 | 1.1 | 137.5 | 2.76 | < 15 | 28-128 |
| Endrin | 0.8 | 0.621 | 77.6 | 7.74 | < 15 | 17-158 |
| 4,4'-DDT | 0.8 | 0.887 | 110.9 | 11.58 | <15 | 27-132 |
| *** AROCHLOR 1260 | 5.0 | NA | NA | NA | <15 | 38-144 |

*** Arochlor units in ppm (mg/L) (for "PCB ONLY" analysis)
NC = Not calculated when native concentration exceeds matrix spike amount.
D - Indicates Diluted Out
INT - Indicates Interference

# TOXIKON

## GC PESTICIDES/PCB ANALYSIS SURROGATE RECOVERIES (METHOD 608/8080)

PROJECT # : 9812129
MATRIX : SOLIDS

| SAMPLE ID | 2,4,5,6-Tetrachloro-M-Xylene | Decachlorobiphenyl |
|---|---|---|
| METHOD BLANK | 69.5 | 80 |
| LCS | 82.8 | 79 |
| MS9812129.1 | 70 | 68 |
| MSD9812129.1 | 67 | 79.3 |
| 9812129.1 | 53 | 59.3 |
| 9812129.2 | 56.5 | 61 |
| 9812129.3 | DILUTED OUT | DILUTED OUT |
| 9812129.4 | 68 | 101 |
| 9812129.5 | 58 | 80 |
| 9812129.6 | 40.8 | 53 |
| 9812129.7 | 50 | 64.3 |
| 9812129.8 | 66.8 | 75.3 |
| 9812129.9 | 59 | 110.5 |
| 9812129.10 | 54.5 | 80 |
| 9812129.11 | 62.5 | 86.5 |
| 9812129.12 | 74.8 | 79.5 |
| 9812129.13 | 56.3 | 80 |
| 9812129.14 | 94.8 | 103.3 |
| 9812129.15 | 64.8 | 76 |
| 9812129.16 | 79.8 | 88 |
| 9812129.17 | 50 | 80 |
| 9812129.18 | 77.8 | 79.5 |
| 9812129.19 | 68 | 75.5 |
| 9812129.20 | 67 | 82.5 |
| | | |

D - Indicates Diluted Out
INT - Indicates Interference

# TOXIKON

## GC PESTICIDES/PCB ANALYSIS MS/MSD RECOVERIES
## (METHOD 608/8080)

PROJECT : 9812129
MATRIX : SOLIDS

**LABORATORY CONTROL SPIKE** LCS9812014

| COMPOUND | SPIKE ADDED (ug) | CONTROL SPIKE (ug) | CONTROL % RECOVERY | QC LIMITS |
|---|---|---|---|---|
| gamma-BHC (Lindane) | 0.2 | 0.135 | 67.5 | 25-111 |
| Heptachlor | 0.2 | 0.154 | 77.0 | 28-122 |
| Aldrin | 0.2 | 0.199 | 99.5 | 16-124 |
| Dieldrin | 0.8 | 0.629 | 78.6 | 28-128 |
| Endrin | 0.8 | 0.683 | 85.4 | 17-158 |
| 4,4'-DDT | 0.8 | 0.766 | 95.8 | 27-132 |
| *** AROCHLOR 1260 | 5.0 | NA | NA | 38-144 |

**MATRIX SPIKE SAMPLE :** MS9812129.21
**DILUTION :** 1X

| COMPOUND | SPIKE ADDED (ug) | SAMPLE CONC. (ug) | MS CONC. (ug) | MS % RECOVERY |
|---|---|---|---|---|
| gamma-BHC (Lindane) | 0.2 | ND | 0.14 | 70.0 |
| Heptachlor | 0.2 | ND | 0.18 | 90.0 |
| Aldrin | 0.2 | ND | 0.244 | 122.0 |
| Dieldrin | 0.8 | ND | 0.69 | 86.3 |
| Endrin | 0.8 | ND | 0.733 | 91.6 |
| 4,4'-DDT | 0.8 | ND | 0.803 | 100.4 |
| *** AROCHLOR 1260 | 5.0 | NA | NA | NA |

**MATRIX SPIKE DUPLICATE :** MSD9812129.21
**DILUTION :** 1X

| COMPOUND | SPIKE ADDED (ug) | MSD CONC. (ug) | MSD % RECOVERY | % RPD | QC LIMITS %RPD | QC LIMITS RECOVERY |
|---|---|---|---|---|---|---|
| gamma-BHC (Lindane) | 0.2 | 0.133 | 66.5 | 5.13 | < 15 | 25-111 |
| Heptachlor | 0.2 | 0.165 | 82.5 | 8.70 | < 15 | 28-122 |
| Aldrin | 0.2 | 0.23 | 115.0 | 5.91 | < 15 | 16-124 |
| Dieldrin | 0.8 | 0.675 | 84.4 | 2.20 | < 15 | 28-128 |
| Endrin | 0.8 | 0.726 | 90.8 | 0.96 | < 15 | 17-158 |
| 4,4'-DDT | 0.8 | 0.791 | 98.9 | 1.51 | <15 | 27-132 |
| *** AROCHLOR 1260 | 5.0 | NA | NA | NA | <15 | 38-144 |

*** Arochlor units in ppm (mg/L) (for "PCB ONLY" analysis)

D - Indicates Diluted Out
INT - Indicates Interference

# TOXIKON

## GC PESTICIDES/PCB ANALYSIS SURROGATE RECOVERIES
## (METHOD 608/8080)

PROJECT # : 9812129
MATRIX : SOLIDS

| SAMPLE ID | 2,4,5,6-Tetrachloro-M-Xylene | Decachlorobiphenyl |
|---|---|---|
| METHOD BLANK | 67.2 | 88.8 |
| LCS | 63.8 | 81.2 |
| MS9812129.21 | 64.8 | 85 |
| MSD9811129.21 | 61.8 | 82.5 |
| 9812129.21 | 61.8 | 82.5 |
| 9812129.26 | DILUTED OUT | DILUTED OUT |
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D - Indicates Diluted Out
INT - Indicates Interference

# TOXIKON

## GC PESTICIDES/PCB ANALYSIS LCS/LCSD RECOVERIES (METHOD 608/8080)

PROJECT : 9812129
MATRIX : WATER

**LABORATORY CONTROL SPIKE:** LCS9811076

| COMPOUND | SPIKE ADDED (ug/L) | LCS CONC. (ug/L) | LCS % RECOVERY | QC LIMITS |
|---|---|---|---|---|
| gamma-BHC (Lindane) | 0.2 | 0.246 | 123.0 | 25-111 |
| Heptachlor | 0.2 | 0.185 | 92.5 | 28-122 |
| Aldrin | 0.2 | 0.201 | 100.5 | 16-124 |
| Dieldrin | 0.8 | 1.05 | 131.3 | 28-128 |
| Endrin | 0.8 | 1.25 | 156.3 | 17-158 |
| 4,4'-DDT | 0.8 | 0.981 | 122.6 | 27-132 |
| *** AROCHLOR 1260 | 5.0 | NA | NA | 38-144 |

**LABORATORY CONTROL SPIKE DUPLICATE:** LCSD9811076

| COMPOUND | SPIKE ADDED (ug/L) | LCSD CONC. (ug/L) | LCSD % RECOVERY | % RPD | QC LIMITS %RPD | QC LIMITS RECOVERY |
|---|---|---|---|---|---|---|
| gamma-BHC (Lindane) | 0.2 | 0.235 | 117.5 | 4.6 | < 15 | 25-111 |
| Heptachlor | 0.2 | 0.165 | 82.5 | 11.4 | < 15 | 28-122 |
| Aldrin | 0.2 | 0.174 | 87.0 | 14.4 | < 15 | 16-124 |
| Dieldrin | 0.8 | 0.948 | 118.5 | 10.2 | < 15 | 28-128 |
| Endrin | 0.8 | 1.12 | 140.0 | 11.0 | < 15 | 17-158 |
| 4,4'-DDT | 0.8 | 0.925 | 115.6 | 5.9 | <15 | 27-132 |
| *** AROCHLOR 1260 | 5.0 | NA | NA | NA | <15 | 38-144 |

*** Arochlor units in ppm (mg/L) (for "PCB ONLY" analysis)
D - Indicates Diluted Out
INT - Indicates Interference

# TOXIKON

## GC PESTICIDES/PCB ANALYSIS SURROGATE RECOVERIES
## (METHOD 608/8080)

PROJECT # : 9812129
MATRIX : WATER

| SAMPLE ID | 2,4,5,6-Tetrachloro-M-Xylene | Decachlorobiphenyl |
|---|---|---|
| METHOD BLANK | 88.8 | 104 |
| LCS | 91.2 | 105 |
| LCSD | 79.5 | 95.5 |
| 9812129.22 | 77 | 62.5 |
| 9812129.23 | 74 | 84.5 |
| 9812129.24 | 70.5 | 51.3 |
| 9812129.25 | 70.3 | 55.5 |
| 9812129.27 | 70.8 | 91.3 |
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D - Indicates Diluted Out
INT - Indicates Interference

# CASE NARRATIVE

Work Order: 9812129

All samples were analyzed within the method holding times.

No target compounds were detected in the method blanks.

# TOXIKON

## GC PESTICIDES/PCB ANALYSIS SURROGATE RECOVERIES
## (METHOD 608/8080)

PROJECT # : 9812129
MATRIX : WATER

| SAMPLE ID | 2,4,5,6-Tetrachloro-M-Xylene | Decachlorobiphenyl |
|---|---|---|
| METHOD BLANK | 88.8 | 104 |
| LCS | 91.2 | 105 |
| LCSD | 79.5 | 95.5 |
| 9812129.22 | 77 | 62.5 |
| 9812129.23 | 74 | 84.5 |
| 9812129.24 | 70.5 | 51.3 |
| 9812129.25 | 70.3 | 55.5 |
| 9812129.27 | 70.8 | 91.3 |
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D - Indicates Diluted Out
INT - Indicates Interference

# TOXIKON

## GC PESTICIDES/PCB ANALYSIS LCS/LCSD RECOVERIES
## (METHOD 608/8080)

PROJECT : 9812129
MATRIX : WATER

**LABORATORY CONTROL SPIKE: LCS9811076**

| COMPOUND | SPIKE ADDED (ug/L) | LCS CONC. (ug/L) | LCS % RECOVERY | QC LIMITS |
|---|---|---|---|---|
| gamma-BHC (Lindane) | 0.2 | 0.246 | 123.0 | 25-111 |
| Heptachlor | 0.2 | 0.185 | 92.5 | 28-122 |
| Aldrin | 0.2 | 0.201 | 100.5 | 16-124 |
| Dieldrin | 0.8 | 1.05 | 131.3 | 28-128 |
| Endrin | 0.8 | 1.25 | 156.3 | 17-158 |
| 4,4'-DDT | 0.8 | 0.981 | 122.6 | 27-132 |
| *** AROCHLOR 1260 | 5.0 | NA | NA | 38-144 |

**LABORATORY CONTROL SPIKE DUPLICATE: LCSD9811076**

| COMPOUND | SPIKE ADDED (ug/L) | LCSD CONC. (ug/L) | LCSD % RECOVERY | % RPD | QC LIMITS %RPD | QC LIMITS RECOVERY |
|---|---|---|---|---|---|---|
| gamma-BHC (Lindane) | 0.2 | 0.235 | 117.5 | 4.6 | < 15 | 25-111 |
| Heptachlor | 0.2 | 0.165 | 82.5 | 11.4 | < 15 | 28-122 |
| Aldrin | 0.2 | 0.174 | 87.0 | 14.4 | < 15 | 16-124 |
| Dieldrin | 0.8 | 0.948 | 118.5 | 10.2 | < 15 | 28-128 |
| Endrin | 0.8 | 1.12 | 140.0 | 11.0 | < 15 | 17-158 |
| 4,4'-DDT | 0.8 | 0.925 | 115.6 | 5.9 | <15 | 27-132 |
| *** AROCHLOR 1260 | 5.0 | NA | NA | NA | <15 | 38-144 |

*** Arochlor units in ppm (mg/L) (for "PCB ONLY" analysis)
D - Indicates Diluted Out
INT - Indicates Interference

# TOXIKON

## GC PESTICIDES/PCB ANALYSIS SURROGATE RECOVERIES
## (METHOD 608/8080)

PROJECT # : 9812129
MATRIX : SOLIDS

| SAMPLE ID | 2,4,5,6-Tetrachloro-M-Xylene | Decachlorobiphenyl |
|---|---|---|
| METHOD BLANK | 67.2 | 88.8 |
| LCS | 63.8 | 81.2 |
| MS9812129.21 | 64.8 | 85 |
| MSD9811129.21 | 61.8 | 82.5 |
| 9812129.21 | 61.8 | 82.5 |
| 9812129.26 | DILUTED OUT | DILUTED OUT |
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D - Indicates Diluted Out
INT - Indicates Interference

# TOXIKON

## GC PESTICIDES/PCB ANALYSIS MS/MSD RECOVERIES
## (METHOD 608/8080)

PROJECT : 9812129
MATRIX : SOLIDS

**LABORATORY CONTROL SPIKE** LCS9812014

| COMPOUND | SPIKE ADDED (ug) | CONTROL SPIKE (ug) | CONTROL % RECOVERY | QC LIMITS |
|---|---|---|---|---|
| gamma-BHC (Lindane) | 0.2 | 0.135 | 67.5 | 25-111 |
| Heptachlor | 0.2 | 0.154 | 77.0 | 28-122 |
| Aldrin | 0.2 | 0.199 | 99.5 | 16-124 |
| Dieldrin | 0.8 | 0.629 | 78.6 | 28-128 |
| Endrin | 0.8 | 0.683 | 85.4 | 17-158 |
| 4,4'-DDT | 0.8 | 0.766 | 95.8 | 27-132 |
| *** AROCHLOR 1260 | 5.0 | NA | NA | 38-144 |

**MATRIX SPIKE SAMPLE :** MS9812129.21
**DILUTION :** 1X

| COMPOUND | SPIKE ADDED (ug) | SAMPLE CONC. (ug) | MS CONC. (ug) | MS % RECOVERY |
|---|---|---|---|---|
| gamma-BHC (Lindane) | 0.2 | ND | 0.14 | 70.0 |
| Heptachlor | 0.2 | ND | 0.18 | 90.0 |
| Aldrin | 0.2 | ND | 0.244 | 122.0 |
| Dieldrin | 0.8 | ND | 0.69 | 86.3 |
| Endrin | 0.8 | ND | 0.733 | 91.6 |
| 4,4'-DDT | 0.8 | ND | 0.803 | 100.4 |
| *** AROCHLOR 1260 | 5.0 | NA | NA | NA |

**MATRIX SPIKE DUPLICATE :** MSD9812129.21
**DILUTION :** 1X

| COMPOUND | SPIKE ADDED (ug) | MSD CONC. (ug) | MSD % RECOVERY | % RPD | QC LIMITS %RPD | QC LIMITS RECOVERY |
|---|---|---|---|---|---|---|
| gamma-BHC (Lindane) | 0.2 | 0.133 | 66.5 | 5.13 | < 15 | 25-111 |
| Heptachlor | 0.2 | 0.165 | 82.5 | 8.70 | < 15 | 28-122 |
| Aldrin | 0.2 | 0.23 | 115.0 | 5.91 | < 15 | 16-124 |
| Dieldrin | 0.8 | 0.675 | 84.4 | 2.20 | < 15 | 28-128 |
| Endrin | 0.8 | 0.726 | 90.8 | 0.96 | < 15 | 17-158 |
| 4,4'-DDT | 0.8 | 0.791 | 98.9 | 1.51 | <15 | 27-132 |
| *** AROCHLOR 1260 | 5.0 | NA | NA | NA | <15 | 38-144 |

*** Arochlor units in ppm (mg/L) (for "PCB ONLY" analysis)

D - Indicates Diluted Out
INT - Indicates Interference

# TOXIKON

## GC PESTICIDES/PCB ANALYSIS SURROGATE RECOVERIES
## (METHOD 608/8080)

PROJECT # : 9812129
MATRIX : SOLIDS

| SAMPLE ID | 2,4,5,6-Tetrachloro-M-Xylene | Decachlorobiphenyl |
|---|---|---|
| METHOD BLANK | 69.5 | 80 |
| LCS | 82.8 | 79 |
| MS9812129.1 | 70 | 68 |
| MSD9812129.1 | 67 | 79.3 |
| 9812129.1 | 53 | 59.3 |
| 9812129.2 | 56.5 | 61 |
| 9812129.3 | DILUTED OUT | DILUTED OUT |
| 9812129.4 | 68 | 101 |
| 9812129.5 | 58 | 80 |
| 9812129.6 | 40.8 | 53 |
| 9812129.7 | 50 | 64.3 |
| 9812129.8 | 66.8 | 75.3 |
| 9812129.9 | 59 | 110.5 |
| 9812129.10 | 54.5 | 80 |
| 9812129.11 | 62.5 | 86.5 |
| 9812129.12 | 74.8 | 79.5 |
| 9812129.13 | 56.3 | 80 |
| 9812129.14 | 94.8 | 103.3 |
| 9812129.15 | 64.8 | 76 |
| 9812129.16 | 79.8 | 88 |
| 9812129.17 | 50 | 80 |
| 9812129.18 | 77.8 | 79.5 |
| 9812129.19 | 68 | 75.5 |
| 9812129.20 | 67 | 82.5 |
| | | |

D - Indicates Diluted Out
INT - Indicates Interference

# TOXIKON

## GC PESTICIDES/PCB ANALYSIS MS/MSD RECOVERIES (METHOD 608/8080)

PROJECT : 9812129
MATRIX : SOLIDS

LABORATORY CONTROL SPIKE LCS9812013

| COMPOUND | SPIKE ADDED (ug) | CONTROL SPIKE (ug) | CONTROL % RECOVERY | QC LIMITS |
|---|---|---|---|---|
| gamma-BHC (Lindane) | 0.2 | 0.174 | 87.0 | 25-111 |
| Heptachlor | 0.2 | 0.208 | 104.0 | 28-122 |
| Aldrin | 0.2 | 0.154 | 77.0 | 16-124 |
| Dieldrin | 0.8 | 0.872 | 109.0 | 28-128 |
| Endrin | 0.8 | 0.778 | 97.3 | 17-158 |
| 4,4'-DDT | 0.8 | 0.836 | 104.5 | 27-132 |
| *** AROCHLOR 1260 | 5.0 | NA | NA | 38-144 |

MATRIX SPIKE SAMPLE : MS9812129.1
DILUTION : 1X

| COMPOUND | SPIKE ADDED (ug) | SAMPLE CONC. (ug) | MS CONC. (ug) | MS % RECOVERY |
|---|---|---|---|---|
| gamma-BHC (Lindane) | 0.2 | ND | 0.151 | 75.5 |
| Heptachlor | 0.2 | 3.74 | 7.86 | NC |
| Aldrin | 0.2 | ND | 0.229 | 114.5 |
| Dieldrin | 0.8 | ND | 1.07 | 133.8 |
| Endrin | 0.8 | ND | 0.671 | 83.9 |
| 4,4'-DDT | 0.8 | ND | 0.996 | 124.5 |
| *** AROCHLOR 1260 | 5.0 | NA | NA | NA |

MATRIX SPIKE DUPLICATE : MSD9812129.1
DILUTION : 1X

| COMPOUND | SPIKE ADDED (ug) | MSD CONC. (ug) | MSD % RECOVERY | % RPD | QC LIMITS %RPD | QC LIMITS RECOVERY |
|---|---|---|---|---|---|---|
| gamma-BHC (Lindane) | 0.2 | 0.173 | 86.5 | 13.58 | < 15 | 25-111 |
| Heptachlor | 0.2 | 7 | NC | 11.60 | < 15 | 28-122 |
| Aldrin | 0.2 | 0.241 | 120.5 | 5.11 | < 15 | 16-124 |
| Dieldrin | 0.8 | 1.1 | 137.5 | 2.76 | < 15 | 28-128 |
| Endrin | 0.8 | 0.621 | 77.6 | 7.74 | < 15 | 17-158 |
| 4,4'-DDT | 0.8 | 0.887 | 110.9 | 11.58 | <15 | 27-132 |
| *** AROCHLOR 1260 | 5.0 | NA | NA | NA | <15 | 38-144 |

*** Arochlor units in ppm (mg/L) (for "PCB ONLY" analysis)
NC = Not calculated when native concentration exceeds matrix spike amount.
D - Indicates Diluted Out
INT - Indicates Interference

Page 1 TOXIKON CORP. REPORT Work Order # 99-01-119

Received: 01/08/99 01/14/99 14:51:17

REPORT TO
FOSTER & WHEELER
1 OXFORD VALLEY, SUITE 200
LANGHORNE, PA. 19047
215-702-4007 FAX: 4045
ATTEN MICHAEL HEFFRON

PREPARED BY
TOXIKON CORPORATION
15 WIGGINS AVE
BEDFORD, MA 01730
ATTEN PAUL LEZBERG
PHONE (781)275-3330

CERTIFIED BY
CONTACT JAYSON

CLIENT FOSTER SAMPLES 7
COMPANY FOSTER & WHEELER
FACILITY 1 OXFORD VALLEY, SUITE 200
LANGHORNE, PA. 19047

MA CERT # M-MA064: TRACE METALS, SULFATE, CYANIDE, RES. FREE CHLORINE, Cs, TOTAL ALK., TDS, pH, THMs, VOC, PEST., NUTRIENTS. DEMAND. O&G, PHENOLICS, PCBs . CT DHS #PH-0563, NY #10778 FL HRS E87143, NJ DEP 59538, NC DWR286, SC 88002, NH 204091-C.

WORK ID NWS EARLE PESTICIDES
TAKEN 1/7/99
TRANS
TYPE WATER
P.O. #
INVOICE under separate cover

VERIFIED BY:

SAMPLE IDENTIFICATION

01 PS-GW1
02 PS-GW2
03 PS-GW6
04 PS-GW7
05 PS-GW8
06 PS-GW-09 — NOT ENOUGH VOLUME TO RUN SAMPLE. CJ 1-29-99
07 PS-TB01

TEST CODES and NAMES used on this workorder

PEST W PESTICIDES - WATER

Page 2 TOXIKON CORP. REPORT Work Order # 99-01-119

Received: 01/08/99 Results by Sample

SAMPLE ID PS-GW1 FRACTION 01A TEST CODE PEST W NAME PESTICIDES - WATER

Date & Time Collected 01/07/99 15:30:00 Category WATER

# PESTICIDES in WATER

| | RESULT | LIMIT |
|---|---|---|
| a-BHC | ND | 0.010 |
| g-BHC (Lindane) | ND | 0.010 |
| b-BHC | ND | 0.010 |
| Heptachlor | ND | 0.010 |
| d-BHC | ND | 0.010 |
| Aldrin | ND | 0.010 |
| Heptachlor Epoxide | ND | 0.010 |
| Endosulfan I | ND | 0.010 |
| 4,4'-DDE | ND | 0.010 |
| Dieldrin | ND | 0.010 |
| Endrin | ND | 0.010 |
| 4,4'-DDD | ND | 0.010 |
| Endosulfan II | ND | 0.010 |
| 4,4'-DDT | ND | 0.010 |
| Endrin Aldehyde | ND | 0.010 |
| Endosulfan Sulfate | ND | 0.010 |
| Chlordane | ND | 0.010 |
| Toxaphene | ND | 0.010 |
| Methoxychlor | ND | 0.010 |

Notes and Definitions for this Report:

EXTRACTED: 01/09/99
DATE RUN: 01/13/99
ANALYST: CK
INSTRUMENT: HP2
DIL. FACTOR: 1
UNITS: ug/L

ND = not detected at detection limit

Page 3 TOXIKON CORP. REPORT Work Order # 99-01-119
Received: 01/08/99 Results by Sample

SAMPLE ID PS-GW2 FRACTION 02A TEST CODE PEST W NAME PESTICIDES - WATER
Date & Time Collected 01/07/99 14:45:00 Category WATER

# PESTICIDES in WATER

| | RESULT | LIMIT |
|---|---|---|
| a-BHC | ND | 0.010 |
| g-BHC (Lindane) | ND | 0.010 |
| b-BHC | ND | 0.010 |
| Heptachlor | ND | 0.010 |
| d-BHC | ND | 0.010 |
| Aldrin | ND | 0.010 |
| Heptachlor Epoxide | ND | 0.010 |
| Endosulfan I | ND | 0.010 |
| 4,4'-DDE | ND | 0.010 |
| Dieldrin | ND | 0.010 |
| Endrin | ND | 0.010 |
| 4,4'-DDD | ND | 0.010 |
| Endosulfan II | ND | 0.010 |
| 4,4'-DDT | ND | 0.010 |
| Endrin Aldehyde | ND | 0.010 |
| Endosulfan Sulfate | ND | 0.010 |
| Chlordane | ND | 0.010 |
| Toxaphene | ND | 0.010 |
| Methoxychlor | ND | 0.010 |

Notes and Definitions for this Report:

EXTRACTED: 01/09/99
DATE RUN: 01/13/99
ANALYST: CK
INSTRUMENT: HP2
DIL. FACTOR: 1
UNITS: ug/L

ND = not detected at detection limit

Page 4 TOXIKON CORP. REPORT Work Order # 99-01-119

Received: 01/08/99 Results by Sample

SAMPLE ID PS-GW6 FRACTION 03A TEST CODE PEST W NAME PESTICIDES - WATER

Date & Time Collected 01/07/99 10:05:00 Category WATER

# PESTICIDES in WATER

| | RESULT | LIMIT |
|---|---|---|
| a-BHC | ND | 0.010 |
| g-BHC (Lindane) | ND | 0.010 |
| b-BHC | ND | 0.010 |
| Heptachlor | ND | 0.010 |
| d-BHC | ND | 0.010 |
| Aldrin | ND | 0.010 |
| Heptachlor Epoxide | ND | 0.010 |
| Endosulfan I | ND | 0.010 |
| 4,4'-DDE | ND | 0.010 |
| Dieldrin | ND | 0.010 |
| Endrin | ND | 0.010 |
| 4,4'-DDD | ND | 0.010 |
| Endosulfan II | ND | 0.010 |
| 4,4'-DDT | ND | 0.010 |
| Endrin Aldehyde | ND | 0.010 |
| Endosulfan Sulfate | ND | 0.010 |
| Chlordane | ND | 0.010 |
| Toxaphene | ND | 0.010 |
| Methoxychlor | ND | 0.010 |

Notes and Definitions for this Report:

EXTRACTED: 01/09/99
DATE RUN: 01/13/99
ANALYST: CK
INSTRUMENT: HP2
DIL. FACTOR: 1
UNITS: ug/L

ND = not detected at detection limit

Page 5 TOXIKON CORP. REPORT Work Order # 99-01-119
Received: 01/08/99 Results by Sample

SAMPLE ID PS-GW7 FRACTION 04A TEST CODE PEST W NAME PESTICIDES - WATER
Date & Time Collected 01/07/99 11:30:00 Category WATER

## PESTICIDES in WATER

| | RESULT | LIMIT |
|---|---|---|
| a-BHC | ND | 0.010 |
| g-BHC (Lindane) | ND | 0.010 |
| b-BHC | ND | 0.010 |
| Heptachlor | ND | 0.010 |
| d-BHC | ND | 0.010 |
| Aldrin | ND | 0.010 |
| Heptachlor Epoxide | ND | 0.010 |
| Endosulfan I | ND | 0.010 |
| 4,4'-DDE | ND | 0.010 |
| Dieldrin | ND | 0.010 |
| Endrin | ND | 0.010 |
| 4,4'-DDD | ND | 0.010 |
| Endosulfan II | ND | 0.010 |
| 4,4'-DDT | ND | 0.010 |
| Endrin Aldehyde | ND | 0.010 |
| Endosulfan Sulfate | ND | 0.010 |
| Chlordane | ND | 0.010 |
| Toxaphene | ND | 0.010 |
| Methoxychlor | ND | 0.010 |

Notes and Definitions for this Report:

EXTRACTED: 01/09/99
DATE RUN: 01/13/99
ANALYST: CK
INSTRUMENT: HP2
DIL. FACTOR: 1
UNITS: ug/L

ND = not detected at detection limit

Page 6 TOXIKON CORP. REPORT Work Order # 99-01-119
Received: 01/08/99 Results by Sample

SAMPLE ID PS-GW8 FRACTION 05A TEST CODE PEST W NAME PESTICIDES - WATER
Date & Time Collected 01/07/99 12:35:00 Category WATER

# PESTICIDES in WATER

| | RESULT | LIMIT |
|---|---|---|
| a-BHC | ND | 0.010 |
| g-BHC (Lindane) | ND | 0.010 |
| b-BHC | ND | 0.010 |
| Heptachlor | ND | 0.010 |
| d-BHC | ND | 0.010 |
| Aldrin | ND | 0.010 |
| Heptachlor Epoxide | ND | 0.010 |
| Endosulfan I | ND | 0.010 |
| 4,4'-DDE | ND | 0.010 |
| Dieldrin | ND | 0.010 |
| Endrin | ND | 0.010 |
| 4,4'-DDD | ND | 0.010 |
| Endosulfan II | ND | 0.010 |
| 4,4'-DDT | ND | 0.010 |
| Endrin Aldehyde | ND | 0.010 |
| Endosulfan Sulfate | ND | 0.010 |
| Chlordane | ND | 0.010 |
| Toxaphene | ND | 0.010 |
| Methoxychlor | ND | 0.010 |

Notes and Definitions for this Report:

EXTRACTED: 01/09/99
DATE RUN: 01/13/99
ANALYST: CK
INSTRUMENT: HP2
DIL. FACTOR: 1
UNITS: ug/L

ND = not detected at detection limit

Received: 01/08/99 Test Methodology

TEST CODE PEST W NAME PESTICIDES - WATER

EPA METHOD: 608 for water sample

Reference: Methods for Organic Chemical Analysis of Municipal and Industrial Wastewater. Appendix A. 40 CFR Part 136. Federal Register Vol. 49, No. 209, 1984.

TOXIKON
15 Wiggins Ave., Bedford, MA 01730
Telephone: (781) 275-3330
Fax: (781) 275-7478

# CHAIN OF CUSTODY RECORD

WORK ORDER #: 99-01-119
DUE DATE : 01-13-99

01/14/99 15:21 FAX

COMPANY: Foster Wheeler Enviro
ADDRESS: One Oxford Valley Suite 200
Langhorne, PA 19047
PHONE #: (215) 702 4015 FAX #: (215) 702-4045
P.O. #:
PROJECT MANAGER: Mike Heffron
PROJECT ID/LOCATION: NWS - Earle Pesticides

SAMPLE TYPE · CONTAINER TYPE
1. WASTEWATER · P - PLASTIC
2. SOIL · G - GLASS
3. SLUDGE · V - VOA
4. OIL
5. DRINKING WATER
6. WATER (GW/MW/SW)
7. OTHER (SPECIFY

ANALYSES

| TOXIKON # | SAMPLE IDENTIFICATION | SAMPLE TYPE | CONTAINER SIZE | CONTAINER TYPE | CONTAINER # | SAMPLING DATE | SAMPLING TIME | PRESERVATIVE | Pesticides (8081A) | | | | | | | | | | | SPECIAL INSTRUCTIONS/ COMMENTS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | PS-GW1 | GW | 1L | G | 1 | 1/7/99 | 1530 | n/a | X | | | | | | | | | | | PH=6 |
| 2 | PS-GW2 | | | | | | 1445 | | X | | | | | | | | | | | PH=6 |
| 3 | PS-GW6 | | | | | | 1005 | | X | | | | | | | | | | | PH=6 |
| 4 | PS-GW7 | | | | | | 1130 | | X | | | | | | | | | | | PH=6 |
| 5 | PS-GW8 | | | | | | 1235 | | X | | | | | | | | | | | PH=6 |
| 6 | PS-GW09 | | | | | | 1545 | | X | | | PH | =6 | | | (TWO 5ml VOAS) | | | | Do MS/MSD |
| ~~7~~ | ~~PS-GW10~~ | | | | 2 | | | | ~~X~~ | | | | NO | | PS GW 10 | | | | | ~~Do MS/MSD~~ |
| 7 | PS-TB01 | W | small | P | 1 | 1/7/99 | / | n/a | X | | | | | | | | | | | PH=6 |

| | | | | | |
|---|---|---|---|---|---|
| SAMPLED BY: CJOBION | DATE: 1-7-99 TIME: 16-00 | QUOTATION #: | | | |
| RELINQUISHED BY: CJOBION | DATE: 1-7-99 TIME: 16-30-00 | RECEIVED BY: | DATE: - - TIME: - - | | |
| RELINQUISHED BY: | DATE: - - TIME: - - | RECEIVED FOR LAB BY: T. Morlar | DATE: 01-08-99 TIME: 13-52- | | |
| METHOD OF SHIPMENT: [redacted] | | COOLER TEMPERATURE: [redacted] | | | |

72 hr
☒ RUSH ..... BUSINESS DAY TURN AROUND
☐ ROUTINE

*Sample disposal information*
Are there any other known or suspected contaminants in these samples other than those listed above? [redacted]

010

TOXIKON

ISO-9001 Certified
Celebrating 20 Years of Excellence

# FACSIMILE INSTRUCTION SHEET

Date: 1/14

Name: Michael Heffron

Company: Foster + Wheeler

Fax #: 215-702-4045

From: Michael Heffron

Total No. of Pages Including Cover Sheet: _____

If you do not receive all of the pages, please call (781) 275-3330. Thank you. Notes:


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15 Wiggins Avenue • Bedford, Massachusetts 01730
(781) 275-3330

TOXKON

Project#9901119

Case Narrative

Fraction 6, sample ID PS-GW-09, was not run due to insufficient quantity of sample. Two 1-L jars were provided. One was labeled MS by the client and the other labeled MSD by the client. The two jars were spiked by the lab and extracted. No third jar was provided for a sample run.

GP Work Order # 9812122

# SAMPLE ANALYSIS REPORT

Prepared For:

FOSTER WHEELER ENVIRONMENTAL
2300 LINCOLN HWY EAST
LANGHORNE, PA 19047

NAVAL WEAPONS STATION-EARLE

Prepared By:

GPL Laboratories, LLLP
202 Perry Parkway
Gaithersburg, MD 20877

January 6, 1999

Cathy Blose for
Yemane Yohannes, Laboratory Director

Project: NAVAL WEAPONS STATION-EARLE

# GPL LABORATORIES, LLLP
## ORGANIC ANALYSIS RESULTS



GP ID: 9812122-01
Client ID: PS-SS01

Matrix: SOIL
Collected: 12/11/98

| Parameter | Method | Result | | Rep.Lim. | Units | Dil. | Prepared | Analyzed By |
|---|---|---|---|---|---|---|---|---|
| Nitroglycerin | 8330M | | BQL | 5000.0 | ug/Kg | 1 | 12/19/98 | 12/27/98 LF |
| Nitroguanidine | HPLC | | BQL | 510.0 | ug/Kg | 1 | 12/19/98 | 12/28/98 LF |

GP ID: 9812122-02
Client ID: PS-SS02

Matrix: SOIL
Collected: 12/11/98

| Parameter | Method | Result | | Rep.Lim. | Units | Dil. | Prepared | Analyzed By |
|---|---|---|---|---|---|---|---|---|
| Nitroglycerin | 8330M | | BQL | 5000.0 | ug/Kg | 1 | 12/19/98 | 12/28/98 LF |
| Nitroguanidine | HPLC | | BQL | 510.0 | ug/Kg | 1 | 12/19/98 | 12/28/98 LF |

GP ID: 9812122-03
Client ID: PS-SS03

Matrix: SOIL
Collected: 12/11/98

| Parameter | Method | Result | | Rep.Lim. | Units | Dil. | Prepared | Analyzed By |
|---|---|---|---|---|---|---|---|---|
| Nitroglycerin | 8330M | | BQL | 5000.0 | ug/Kg | 1 | 12/19/98 | 12/28/98 LF |
| Nitroguanidine | HPLC | | BQL | 510.0 | ug/Kg | 1 | 12/19/98 | 12/28/98 LF |

GP ID: 9812122-04
Client ID: PS-SS03D

Matrix: SOIL
Collected: 12/11/98

| Parameter | Method | Result | | Rep.Lim. | Units | Dil. | Prepared | Analyzed By |
|---|---|---|---|---|---|---|---|---|
| Nitroglycerin | 8330M | | BQL | 5000.0 | ug/Kg | 1 | 12/19/98 | 12/28/98 LF |
| Nitroguanidine | HPLC | | BQL | 510.0 | ug/Kg | 1 | 12/19/98 | 12/28/98 LF |

GP ID: 9812122-05
Client ID: PS-SS04

Matrix: SOIL
Collected: 12/11/98

| Parameter | Method | Result | | Rep.Lim. | Units | Dil. | Prepared | Analyzed By |
|---|---|---|---|---|---|---|---|---|
| Nitroglycerin | 8330M | | BQL | 5000.0 | ug/Kg | 1 | 12/19/98 | 12/28/98 LF |
| Nitroguanidine | HPLC | | BQL | 510.0 | ug/Kg | 1 | 12/19/98 | 12/28/98 LF |

Project: NAVAL WEAPONS STATION-EARLE

# GPL LABORATORIES, LLLP
## WET CHEMISTRY ANALYSIS RESULTS

GP ID: 9812122-01
Client ID: PS-SS01

Matrix: SOIL
Collected: 12/11/98

| Parameter | Method | Result | Rep.Lim. | Units | Dil. | Prepared | Analyzed By |
|---|---|---|---|---|---|---|---|
| Nitrocellulose | IAAP | BQL | 37.6 | mg/Kg | 1 | 12/30/98 | 12/31/98 DCB |
| Percent Solids | MCAWW 160.3 | 91.1 | | % | | | 01/06/99 DCB |

GP ID: 9812122-02
Client ID: PS-SS02

Matrix: SOIL
Collected: 12/11/98

| Parameter | Method | Result | Rep.Lim. | Units | Dil. | Prepared | Analyzed By |
|---|---|---|---|---|---|---|---|
| Nitrocellulose | IAAP | BQL | 32.9 | mg/Kg | 1 | 12/30/98 | 12/31/98 DCB |
| Percent Solids | MCAWW 160.3 | 94.4 | | % | | | 01/06/99 DCB |

GP ID: 9812122-03
Client ID: PS-SS03

Matrix: SOIL
Collected: 12/11/98

| Parameter | Method | Result | Rep.Lim. | Units | Dil. | Prepared | Analyzed By |
|---|---|---|---|---|---|---|---|
| Nitrocellulose | IAAP | BQL | 32.2 | mg/Kg | 1 | 12/30/98 | 12/31/98 DCB |
| Percent Solids | MCAWW 160.3 | 93.1 | | % | | | 01/06/99 DCB |

GP ID: 9812122-04
Client ID: PS-SS03D

Matrix: SOIL
Collected: 12/11/98

| Parameter | Method | Result | Rep.Lim. | Units | Dil. | Prepared | Analyzed By |
|---|---|---|---|---|---|---|---|
| Nitrocellulose | IAAP | BQL | 30.7 | mg/Kg | 1 | 12/30/98 | 12/31/98 DCB |
| Percent Solids | MCAWW 160.3 | 92.3 | | % | | | 01/06/99 DCB |

GP ID: 9812122-05
Client ID: PS-SS04

Matrix: SOIL
Collected: 12/11/98

| Parameter | Method | Result | Rep.Lim. | Units | Dil. | Prepared | Analyzed By |
|---|---|---|---|---|---|---|---|
| Nitrocellulose | IAAP | BQL | 28.7 | mg/Kg | 1 | 12/30/98 | 12/31/98 DCB |
| Percent Solids | MCAWW 160.3 | 94.3 | | % | | | 01/06/99 DCB |

# GPL LABORATORIES, LLLP

**Possible notes and definitions for this report:**

BQL = Below Quantitation Limit

J = Value is less than the reporting limits but greater than zero

P = Indicates that there is greater than 25% difference for detected pesticide/Aroclor results between the two GC columns

B = Indicates that the compound was found in the associated blank

E = Indicates that the concentration exceeded the calibration range of the instrument

U = Indicates that the compound was analyzed for but not detected. number indicates the detection limit

D = Indicates that the compound was found in an analysis at a secondary dilution factor

* = Value obtained from a 1:5 dilution

+ = Value obtained from a 1:10 dilution

# = Value obtained from a 1:20 dilution

= = Value obtained from a 1:25 dilution

^ = Value obtained from a 1:50 dilution

~ = Value obtained from a 1:100 dilution

! = Value obtained from a 1:250 dilution

@ = Value obtained from a 1:125 dilution (medium level)

$ = Value obtained from a 1:500 dilution

& = Value obtained from a 1:1000 dilution

N = Flashpoint not observed; heated to specified limit

R = Flammable at room temperature

TNTC = Too numerous to count

B.P. = Detection limit taken from boiling point

F.F. = Sample gave off flammable fumes

# GPL LABORATORIES, LLLP

202 Perry Parkway
Gaithersburg, MD 20877
(301) 926-6802
Fax (301) 840-1209

Contract #/Billing Reference: P.O# 015185

1 of 1 Pgs.

Project: Naval Weapons Station - Earle
Client: Foster Wheeler Environ.
Send Results To: Foster Wheeler Environ. Attn: Hoffman
Address: One Oxford Valley Suite 200, Langhorne, PA 19047
Phone: (215) 700-4015

| Sample ID# | Date Sampled | Time Sampled | Sample Matrix | Sampler's Initials | Nitro glycerine | Nitro cellulose | Nitro guanidine | | | | | | | | | Lab Cooler No. / CLIENT COMMENTS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Turnaround Time | | | | | | | | | | | | | | | | |
| # of Containers | | | | | 1 | 1 | 1 | | | | | | | | | |
| Container Type | | | | | Glass Jar | Glass Jar | Glass Jar | | | | | | | | | |
| Preservative Used | | | | | N/A | N/A | N/A | | | | | | | | | |
| PS-SS01 | 12/1/98 | | Soil | MH | X | X | X | | | | | | | | | |
| PS-SS02 | ↓ | | ↓ | MH | X | X | X | | | | | | | | | |
| PS-SS03 | ↓ | | ↓ | MH | X | X | X | | | | | | | | | |
| PS-SS03D | ↓ | | ↓ | MH | X | X | X | | | | | | | | | |
| PS-SS04 | ↓ | | ↓ | MH | X | X | X | | | | | | | | | Do MS/MSD |

| Relinquished By: | Date/Time | Received By: | Relinquished By: | Received for Laboratory By: | Date/Time |
|---|---|---|---|---|---|
| [signature] | 12/1/98 | | | [signature] | 12/1/98 10:05 |

| Relinquished By: | Date/Time | Received By: | Date/Time | Shipper: | Airbill No.: |
|---|---|---|---|---|---|
| | | | | | |

| Relinquished By: | Date/Time | Received By: | Lab Comments: | Temp: |
|---|---|---|---|---|
| | | | | 4.6 |

G.P. W.O. 98-12-122

GP ENVIRONMENTAL SERVICES

# SAMPLE RECEIPT CHECKLIST

| | | | |
|---|---|---|---|
| W.O. No. | [illegible] | Carrier Name | FEDEX |
| Client Name | Foster Wheeler | Prepared (Logged In) By | [illegible] / [illegible] (Initials / Date) |
| Date Received | 12/4/98 | Project | [illegible] |
| Time Received | 1:05A | Site | [illegible] |
| Received By | [illegible] | VOA Holding Blank I.D. No. | |

| | YES | NO |
|---|---|---|
| Airbill/Manifest Present? No. [illegible] | ✓ | |
| Shipping Container in Good Condition? | ✓ | |
| Custody Seals Present on Shipping Container? Condition: Good ____ Broken ____ | | ✓ |
| Chain-of-Custody Present? | ✓ | |
| Chain-of-Custody Agrees with Sample Labels? | ✓ | |
| Chain-of-Custody Signed? | ✓ | |
| Packing Present in Shipping Container? Type of Packing [illegible] | ✓ | |
| Custody Seals on Sample Bottles? Condition: Good ____ Broken ____ | | ✓ |
| Total Number of Sample Bottles 6 | | |
| Total Number of Samples 5 | | |
| Samples Intact? | ✓ | |
| Sufficient Sample Volume for Indicated Test? | ✓ | |

| | YES | NO |
|---|---|---|
| Trip Blanks Received? No. of Sets ____ | | ✓ |
| VOA Vials Have Zero Headspace? | | ✓ |
| Preservatives Added to Sample? | ✓ | ✓ |
| pH Check Required? Performed By? ____ | | ✓ |
| Ice Present in Shipping Container? | ✓ | (Blue) |

| Container# | Temperature |
|---|---|
| 41 | 4.6 |
| | |
| | |
| | |
| | |

Project Manager Contacted?
Name: [illegible]
Date Contacted: 12/4/98

Any NO response must be detailed in the comments section below. If items are not applicable to particular samples or contracts, they should be marked N/A.

COMMENTS: ____

Checklist Completed by [illegible]

Date 12/4/98

# TCLP SOIL SAMPLE RESULTS
# FOR
# PESTICIDE INVESTIGATION
# AT
# NAVAL WEAPONS STATION - EARLE
# COLTS NECK, NEW JERSEY

*Issued:*

April 15, 1998

*Prepared for:*

Naval Facilities Engineering Command
10 Industrial Highway
Lester, PA 19113

*Prepared by:*

Foster Wheeler Environmental Corporation
2300 Lincoln Highway
One Oxford Valley - Suite 200
Langhorne, PA 19047 - 1829

REMEDIAL ACTION CONTRACT N62472-94-D-0398
DELIVERY ORDER NO. 0034

CD97#1497555

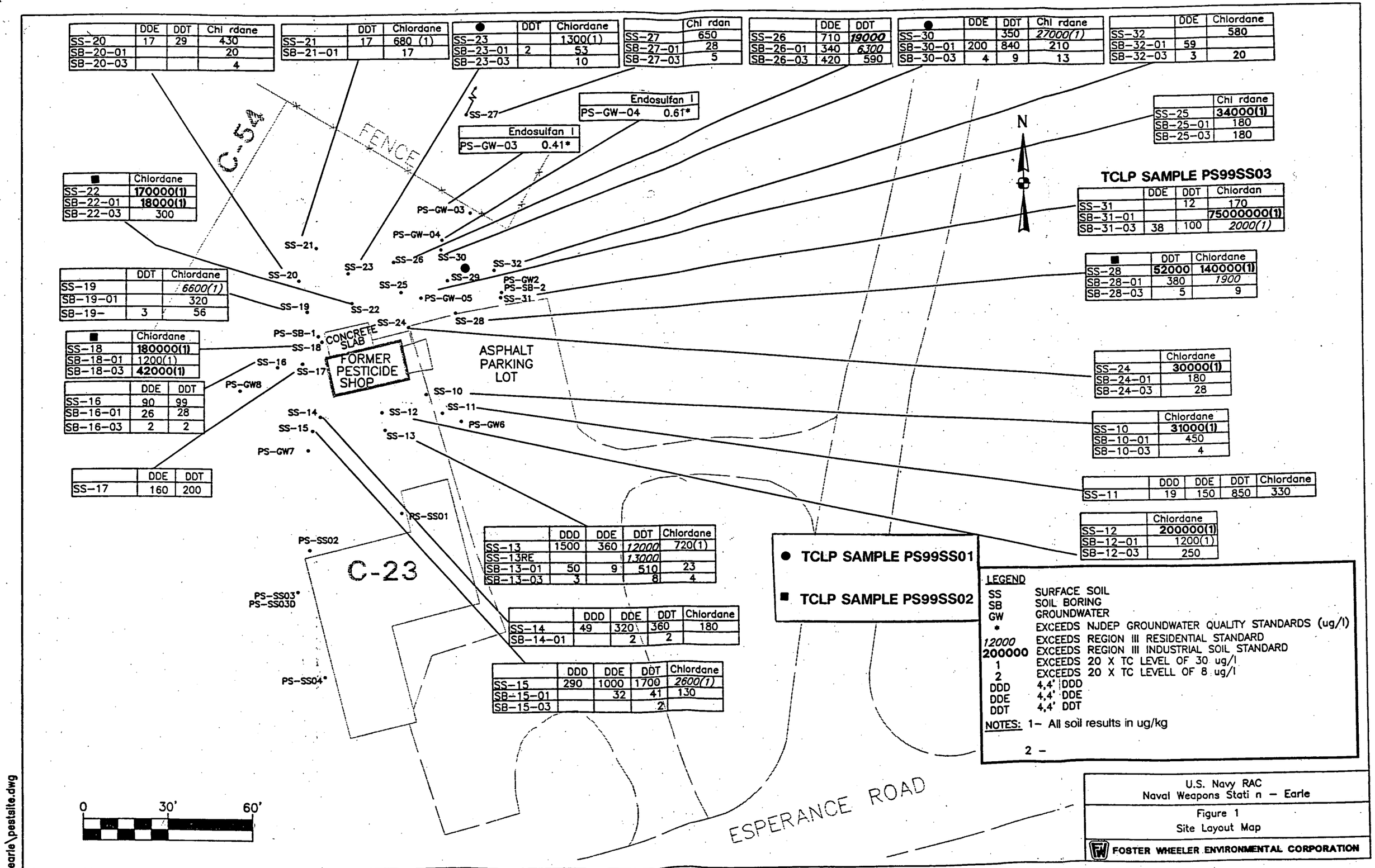
## 1.0 INTRODUCTION

The objective of the soil-sampling event at the Former Pesticide Shop at Naval Weapons Station-Earle was to obtain an expedient preliminary determination of the potential of soils with elevated concentrations of total chlordane to be hazardous for chlordane.

## 2.0 SAMPLE DISCUSSION

Foster Wheeler Environmental collected surface soil samples on April 4, 1999 in order to obtain preliminary waste classification information for the soils at the Former Pesticide Shop. Table 1-1 provides a summary of the soil sample description, and Attachment 1 contains the laboratory analytical data. Figure 1 depicts the former and present soil sample locations. The analytical results of former sampling episodes at the Former Pesticide Shop were used to establish the locations of the new soil samples. The former soil samples were analyzed for total pesticides, and the new soil samples were analyzed for TCLP pesticides and TCLP volatile organics. Soil sample PS99SS01 was obtained from former soil sample location areas that represented the median range of soil concentrations above the Region III Residential standard for chlordane (average of total chlordane: 1,357 ug/kg). Soil sample PS99SS02 was obtained from former soil sample locations that represented elevated concentrations of chlordane (average total chlordane: 490,000 ug/kg). Soil sample PS99SS03 was obtained from a former soil sample location that had the highest chlordane concentration (75,000,000 ug/kg).

Only one (PS99SS03) of the three TCLP soil samples collected contained chlordane concentrations above the detection limit, all other pesticide compounds were below the detection limits. The TCLP laboratory analyses of soil sample PS99SS03 revealed a chlordane concentration of 0.29 mg/l. According to 40CFR δ261.30, wastes exhibiting a TCLP chlordane concentration of 0.03 mg/l are hazardous (D020) due to the characteristic of toxicity. The laboratory results for TCLP volatile organics revealed that all the soil concentrations were below the detection limits.




| | DDE | DDT | Chl rdane |
|---|---|---|---|
| SS-20 | 17 | 29 | 430 |
| SB-20-01 | | | 20 |
| SB-20-03 | | | 4 |

| | DDT | Chlordane |
|---|---|---|
| SS-21 | 17 | 680 (1) |
| SB-21-01 | | 17 |

| ● | DDT | Chlordane |
|---|---|---|
| SS-23 | | 1300(1) |
| SB-23-01 | 2 | 53 |
| SB-23-03 | | 10 |

| | Chl rdan |
|---|---|
| SS-27 | 650 |
| SB-27-01 | 28 |
| SB-27-03 | 5 |

| | DDE | DDT |
|---|---|---|
| SS-26 | 710 | *19000* |
| SB-26-01 | 340 | *6300* |
| SB-26-03 | 420 | 590 |

| ● | DDE | DDT | Chl rdane |
|---|---|---|---|
| SS-30 | | 350 | *27000(1)* |
| SB-30-01 | 200 | 840 | 210 |
| SB-30-03 | 4 | 9 | 13 |

| | DDE | Chlordane |
|---|---|---|
| SS-32 | | 580 |
| SB-32-01 | 59 | |
| SB-32-03 | 3 | 20 |

| | Endosulfan I |
|---|---|
| PS-GW-04 | 0.61* |

| | Endosulfan I |
|---|---|
| PS-GW-03 | 0.41* |

| | Chl rdane |
|---|---|
| SS-25 | **34000(1)** |
| SB-25-01 | 180 |
| SB-25-03 | 180 |

| ■ | Chlordane |
|---|---|
| SS-22 | **170000(1)** |
| SB-22-01 | **18000(1)** |
| SB-22-03 | 300 |

**TCLP SAMPLE PS99SS03**

| | DDE | DDT | Chlordan |
|---|---|---|---|
| SS-31 | | 12 | 170 |
| SB-31-01 | | | **75000000(1)** |
| SB-31-03 | 38 | 100 | *2000(1)* |

| | DDT | Chlordane |
|---|---|---|
| SS-19 | | *6600(1)* |
| SB-19-01 | | 320 |
| SB-19- | 3 | 56 |

| ■ | DDT | Chlordane |
|---|---|---|
| SS-28 | **52000** | **140000(1)** |
| SB-28-01 | 380 | *1900* |
| SB-28-03 | 5 | 9 |

| ■ | Chlordane |
|---|---|
| SS-18 | **180000(1)** |
| SB-18-01 | 1200(1) |
| SB-18-03 | **42000(1)** |

| | Chlordane |
|---|---|
| SS-24 | **30000(1)** |
| SB-24-01 | 180 |
| SB-24-03 | 28 |

| | DDE | DDT |
|---|---|---|
| SS-16 | 90 | 99 |
| SB-16-01 | 26 | 28 |
| SB-16-03 | 2 | 2 |

| | Chlordane |
|---|---|
| SS-10 | **31000(1)** |
| SB-10-01 | 450 |
| SB-10-03 | 4 |

| | DDE | DDT |
|---|---|---|
| SS-17 | 160 | 200 |

| | DDD | DDE | DDT | Chlordane |
|---|---|---|---|---|
| SS-11 | 19 | 150 | 850 | 330 |

| | DDD | DDE | DDT | Chlordane |
|---|---|---|---|---|
| SS-13 | 1500 | 360 | *12000* | 720(1) |
| SS-13RE | | | *13000* | |
| SB-13-01 | 50 | 9 | 510 | 23 |
| SB-13-03 | 3 | | 8 | 4 |

| | Chlordane |
|---|---|
| SS-12 | **200000(1)** |
| SB-12-01 | 1200(1) |
| SB-12-03 | 250 |

| | DDD | DDE | DDT | Chlordane |
|---|---|---|---|---|
| SS-14 | 49 | 320 | 360 | 180 |
| SB-14-01 | | 2 | 2 | |

| | DDD | DDE | DDT | Chlordane |
|---|---|---|---|---|
| SS-15 | 290 | 1000 | 1700 | *2600(1)* |
| SB-15-01 | | 32 | 41 | 130 |
| SB-15-03 | | | 2 | |

● TCLP SAMPLE PS99SS01

■ TCLP SAMPLE PS99SS02

LEGEND

| | |
|---|---|
| SS | SURFACE SOIL |
| SB | SOIL BORING |
| GW | GROUNDWATER |
| * | EXCEEDS NJDEP GROUNDWATER QUALITY STANDARDS (ug/l) |
| *12000* | EXCEEDS REGION III RESIDENTIAL STANDARD |
| **200000** | EXCEEDS REGION III INDUSTRIAL SOIL STANDARD |
| 1 | EXCEEDS 20 X TC LEVEL OF 30 ug/l |
| 2 | EXCEEDS 20 X TC LEVELL OF 8 ug/l |
| DDD | 4,4' DDD |
| DDE | 4,4' DDE |
| DDT | 4,4' DDT |

NOTES: 1- All soil results in ug/kg

2 -

U.S. Navy RAC
Naval Weapons Stati n - Earle

Figure 1
Site Layout Map

FOSTER WHEELER ENVIRONMENTAL CORPORATION

Table 1-1 Naval Weapons Station-Earle
Former Pesticide Shop
TCLP Soil Sample Descriptions

| Soil Sample No. | Sample Location | Sample Description |
|---|---|---|
| PS99SS01 | Composite sample collected from 0 to 6 inches below grade at the former soil sample locations: SS-29, SS-30, and SS-23. | Brown fine to medium grained silty sand with some rounded cobbles. |
| PS99SS02 | Composite sample collected from 0 to 1 ft. below grade at the former soil sample locations: SS18, SS-22, and SS28. | Brown silty sand with some rounded cobbles stained gray in areas. Organic loam the first 2 inches. |
| PS99SS03 | Grab sample collected from 6 to 12 inches below grade at former soil sample location SS-31. | Black-stained fine to medium sand. |

## 2.0 CONCLUSIONS

Only one of the three soil samples had a TCLP chlordane concentration that was above the hazardous waste classification concentration. Two of the highest concentrations of chlordane have been detected in previous soil samples collected immediately north of the paved parking lot. It is recommended that a Sampling Plan be submitted and a sampling episode be performed to completely delineate the soils that are above the Non-Residential Soil Clean-Up Standards, as well as further delineate the chlordane concentration in soils in the vicinity of the area that exhibited hazardous concentrations. The soil samples collected for delineating the soils above the Clean-Up Standards would be analyzed for total pesticides and the soil samples collected in the area of the hazardous soil will be analyzed for total and TCLP pesticides.

Once the affected area is delineated a Work Plan could be submitted for the excavation and removal of the soil. The Work Plan would be completed in accordance to New Jersey Department of Environmental Protection's Guidance Document for the Remediation of Contaminated Soils, 1996. The soils would be stockpiled and composite soil samples obtained for waste classification and off-site disposal. Although this approach may involve additional sampling, it would ensure an accurate delineation and waste characterization of soils for off-site disposal.

# ATTACHMENT 1

Page 1 TOXIKON CORP. REPORT Work Order # 99-06-057
Received: 04/03/99 06/08/99 15:23:09

REPORT TO
FOSTER & WHEELER
1 OXFORD VALLEY, SUITE 200
LANGHORNE, PA. 19047
215-702-4007 FAX: 4045
ATTEN MICHAEL HEFFRON

PREPARED BY
TOXIKON CORPORATION
15 WIGGINS AVE
BEDFORD, MA 01730
CERTIFIED BY
ATTEN PAUL LEZBERG
PHONE (781)275-3330
CONTACT JAYSON

CLIENT FOSTER SAMPLES 3
COMPANY FOSTER & WHEELER
FACILITY 1 OXFORD VALLEY, SUITE 200
LANGHORNE, PA. 19047

MA CERT # M-MA064: TRACE METALS, SULFATE,CYANIDE,RES. FREE CHLORINE, Ca, TOTAL ALK., TDS, pH, THMs, VOC, PEST.,NUTRIENTS. DEMAND, O&G, PHENOLICS, PCBs . CT DHS #PH-0563, NY #10778 FL HRS E87143, NJ DEP 59538, NC DNR286, SC 88002, NH 204091-C.

WORK ID WWS-EARLE
TAKEN 6/2/99
TRANS
TYPE SOIL
P.O. #
INVOICE under separate cover

VERIFIED BY:

SAMPLE IDENTIFICATION

01 PS99SS01
02 PS99SS02
03 PS99SS03

TEST CODES and NAMES used on this workorder

| | |
|---|---|
| ETCLPP | EXT. TCLP PESTICIDES |
| ETCLPV | EXTRACTION TCLP, VOLATILES |
| TCLPP | PESTICIDES - TCLP |
| TCLPV | PURG. ORG. SOIL - TCLP |

Page 2 TOXIKON CORP. REPORT Work Order # 99-04-057
Received: 04/03/99 Results by Sample

SAMPLE ID PS99SS01 FRACTION 01A TEST CODE TCLPP NAME PESTICIDES - TCLP
Date & Time Collected 04/02/99 09:00:00 Category SOIL

## TCLP PESTICIDES

| EPA HW NO. (1) | CAS NO. (2) | TOXICITY CHARACTERISTIC CONTAMINANT | REGULATORY LEVEL (MG/L) | METHOD DETECT LIMIT | RESULT (MG/L) (3) | MATRIX SPIKE% RECOVERY | RESULT (MG/L) (4) |
|---|---|---|---|---|---|---|---|
| D020 | 57-74-9 | Chlordane | 0.03 | 0.010 | ND | 104 | ND |
| D012 | 72-20-8 | Endrin | 0.02 | 0.010 | ND | 78.2 | ND |
| D031 | 76-44-8 | Heptachlor | 0.008 | 0.0050 | ND | 100 | ND |
| D031 | 1024-57-3 | Heptachlor Epoxide | 0.008 | 0.0050 | ND | 80.0 | ND |
| D013 | 58-89-9 | Methoxychlor | 10.0 | 0.010 | ND | 92.2 | ND |
| D014 | 72-43-5 | Toxaphene | 0.5 | 0.010 | ND | 110 | ND |
| D015 | 8001-35-2 | Lindane | 0.4 | 0.010 | ND | 67.8 | ND |

Notes and Definitions for this Report:

EXTRACTED 04/06/99
DATE RUN 04/06/99
ANALYST CK
INSTRUMENT HP2
DIL. FACTOR 1

ND = not detected at detection limit

(1) Hazardous Waste Number
(2) Chemical Abstract Service Number
(3) Uncorrected Result
(4) Bias Corrected Result

Page 3
Received: 04/03/99

TOXIKON CORP. REPORT
Results by Sample

Work Order # 99-04-057

SAMPLE ID P9993S01 FRACTION 01A TEST CODE TCLPV NAME PURG. ORG. SOIL - TCLP
Date & Time Collected 04/02/99 09:00:00 Category SOIL

## TCLP VOLATILES

| EPA HW NO. (1) | CAS NO. (2) | TOXICITY CHARACTERISTIC CONTAMINANT | REGULATORY LEVEL (MG/L) | METHOD DETECT LIMIT | RESULT (MG/L) (3) | MATRIX SPIKE% RECOVERY | RESULT (MG/L) (4) |
|---|---|---|---|---|---|---|---|
| D018 | 71-43-2 | Benzene | 0.5 | 0.010 | ND | 98.0 | ND |
| D019 | 56-23-5 | Carbon Tetrachloride | 0.5 | 0.010 | ND | 92.0 | ND |
| D021 | 108-90-7 | Chlorobenzene | 100.0 | 0.010 | ND | 97.0 | ND |
| D022 | 67-66-3 | Chloroform | 6.0 | 0.010 | ND | 94.0 | ND |
| D028 | 107-06-2 | 1,2-Dichloroethane | 0.5 | 0.010 | ND | 105 | ND |
| D029 | 75-35-4 | 1,1-Dichloroethylene | 0.7 | 0.010 | ND | 82.0 | ND |
| D035 | 78-93-3 | Methyl-ethyl-ketone | 200.0 | 0.010 | ND | 112 | ND |
| D039 | 127-18-4 | Tetrachloroethylene | 0.7 | 0.010 | ND | 93.0 | ND |
| D040 | 79-01-6 | Trichloroethylene | 0.5 | 0.010 | ND | 93.0 | ND |
| D043 | 75-01-4 | Vinyl Chloride | 0.2 | 0.010 | ND | 91.0 | ND |

Notes and Definitions for this Report:

EXTRACTED 04/05/99
DATE RUN 04/06/99
ANALYST JPM
DILUTION FACTOR: 5

ND = not detected at detection limit
(1) Hazardous Waste Number
(2) Chemical Abstract Service Number
(3) Uncorrected Result
(4) Bias Corrected Result

Page 4 TOXICON CORP. REPORT Work Order # 99-04-057
Received: 04/03/99 Results by Sample

SAMPLE ID PS99SS02 FRACTION 02A TEST CODE TCLPP NAME PESTICIDES - TCLP
Date & Time Collected 04/02/99 09:30:00 Category SOIL

## TCLP PESTICIDES

| EPA HW NO. (1) | CAS NO. (2) | TOXICITY CHARACTERISTIC CONTAMINANT | REGULATORY LEVEL (MG/L) | METHOD DETECT LIMIT | RESULT (MG/L) (3) | MATRIX SPIKEX RECOVERY | RESULT (MG/L) (4) |
|---|---|---|---|---|---|---|---|
| D020 | 57-74-9 | Chlordane | 0.03 | 0.010 | ND | 104 | ND |
| D012 | 72-20-8 | Endrin | 0.02 | 0.010 | ND | 78.2 | ND |
| D031 | 76-44-8 | Heptachlor | 0.008 | 0.0050 | ND | 100 | ND |
| D031 | 1024-57-3 | Heptachlor Epoxide | 0.008 | 0.0050 | ND | 80.0 | ND |
| D013 | 58-89-9 | Methoxychlor | 10.0 | 0.010 | ND | 92.2 | ND |
| D014 | 72-43-5 | Toxaphene | 0.5 | 0.010 | ND | 110 | ND |
| D015 | 8001-35-2 | Lindane | 0.4 | 0.010 | ND | 67.8 | ND |

Notes and Definitions for this Report:

EXTRACTED 04/05/99
DATE RUN 04/06/99
ANALYST CK
INSTRUMENT HP2
DIL. FACTOR 1

ND = not detected at detection limit

(1) Hazardous Waste Number
(2) Chemical Abstract Service Number
(3) Uncorrected Result
(4) Bias Corrected Result

Page 5 TOXIKON CORP. REPORT Work Order # 99-04-057
Received: 04/03/99 Results by Sample

SAMPLE ID PS99SS02 FRACTION 02A TEST CODE TCLPV NAME PURG. ORG. SOIL - TCLP
Date & Time Collected 04/02/99 09:30:00 Category SOIL

## TCLP VOLATILES

| EPA HW NO. (1) | CAS NO. (2) | TOXICITY CHARACTERISTIC CONTAMINANT | REGULATORY LEVEL (MG/L) | METHOD DETECT LIMIT | RESULT (MG/L) (3) | MATRIX SPIKE% RECOVERY | RESULT (MG/L) (4) |
|---|---|---|---|---|---|---|---|
| D018 | 71-43-2 | Benzene | 0.5 | 0.010 | ND | 98.0 | ND |
| D019 | 56-23-5 | Carbon Tetrachloride | 0.5 | 0.010 | ND | 92.0 | ND |
| D021 | 108-90-7 | Chlorobenzene | 100.0 | 0.010 | ND | 97.0 | ND |
| D022 | 67-66-3 | Chloroform | 6.0 | 0.010 | ND | 94.0 | ND |
| D028 | 107-06-2 | 1,2-Dichloroethane | 0.5 | 0.010 | ND | 105 | ND |
| D029 | 75-35-4 | 1,1-Dichloroethylene | 0.7 | 0.010 | ND | 82.0 | ND |
| D035 | 78-93-3 | Methyl-ethyl-ketone | 200.0 | 0.010 | ND | 112 | ND |
| D039 | 127-18-4 | Tetrachloroethylene | 0.7 | 0.010 | ND | 93.0 | ND |
| D040 | 79-01-6 | Trichloroethylene | 0.5 | 0.010 | ND | 93.0 | ND |
| D043 | 75-01-4 | Vinyl Chloride | 0.2 | 0.010 | ND | 91.0 | ND |

Notes and Definitions for this Report:

EXTRACTED 04/05/99
DATE RUN 04/06/99
ANALYST JPM
DILUTION FACTOR: 5

ND = not detected at detection limit
(1) Hazardous Waste Number
(2) Chemical Abstract Service Number
(3) Uncorrected Result
(4) Bias Corrected Result

Page 6
Received: 04/03/99

TOXIKON CORP. REPORT
Results by Sample

Work Order # 99-04-057

SAMPLE ID PS99S503 FRACTION 03A TEST CODE TCLPP NAME PESTICIDES - TCLP
Date & Time Collected 04/02/99 09:40:00 Category SOIL

## TCLP PESTICIDES

| EPA HW NO. (1) | CAS NO. (2) | TOXICITY CHARACTERISTIC CONTAMINANT | REGULATORY LEVEL (MG/L) | METHOD DETECT LIMIT | RESULT (MG/L) (3) | MATRIX SPIKE% RECOVERY | RESULT (MG/L) (4) |
|---|---|---|---|---|---|---|---|
| D020 | 57-74-9 | Chlordane | 0.03 | 0.20 | 0.29 | 104 | 0.28 |
| D012 | 72-20-8 | Endrin | 0.02 | 0.010 | ND | 78.2 | ND |
| D031 | 76-44-8 | Heptachlor | 0.008 | 0.0050 | ND | 100 | ND |
| D031 | 1024-57-3 | Heptachlor Epoxide | 0.008 | 0.0050 | ND | 80.0 | ND |
| D013 | 58-89-9 | Methoxychlor | 10.0 | 0.010 | ND | 92.2 | ND |
| D014 | 72-43-5 | Toxaphene | 0.5 | 0.010 | ND | 110 | ND |
| D015 | 8001-35-2 | Lindane | 0.4 | 0.010 | ND | 67.8 | ND |

Notes and Definitions for this Report:

EXTRACTED 04/06/99
DATE RUN 04/06/99
ANALYST CK
INSTRUMENT HP2
DIL. FACTOR 1

ND = not detected at detection limit

(1) Hazardous Waste Number
(2) Chemical Abstract Service Number
(3) Uncorrected Result
(4) Bias Corrected Result

TEST CODE ETCLPP NAME EXT. TCLP PESTICIDES

EPA METHOD: 1311

Reference: Federal Register/ Vol. 55, No. 61/ June 29 1990. Rules and Regulations. Appendix II. Toxicity Characteristic Leaching Proceure (TCLP).

TEST CODE ETCLPV NAME EXTRACTION TCLP, VOLATILES

EPA METHOD: 1311: Volatile Organic Fraction.

Reference: Federal Register/ Vol. 55, No. 61/ June 29 1990. Rules and Regulations. Appendix II. Toxicity Characteristic Leaching Proceure (TCLP).

TEST CODE TCLPP NAME PESTICIDES - TCLP

EPA METHOD: 1311 Pesticide Fraction by 8080.

Reference: Federal Register/ Vol. 55, No. 61/ June 29 1990. Rules and Regulations. Appendix II. Toxicity Characteristic Leaching Proceure (TCLP).

TEST CODE TCLPV NAME PURG. ORG. SOIL - TCLP

EPA METHOD: 1311: Volatile Organic Fraction by 8240

Reference: Federal Register/ Vol. 55, No. 61/ June 29 1990. Rules and Regulations. Appendix II. Toxicity Characteristic Leaching Proceure (TCLP).

TOXIKON
15 Wiggins Ave., Bedford, MA 01730
Telephone: (781) 275-3330
Fax: (781) 275-7478

# CHAIN OF CUSTODY RECORD

WORK ORDER #: 99-04-057

DUE DATE : 4-8-99

COMPANY: Foster Wheeler
ADDRESS: One Oxford Valley Suite 300
Langhorne, PA 19047
PHONE #: (215) 291-4015 FAX #: (215) 702-7070
P.O. #: NWS-Ewll
PROJECT MANAGER: M. Hoff
PROJECT ID/LOCATION: NWS-Ewll

SAMPLE TYPE: 1. WASTEWATER, 2. SOIL, 3. SLUDGE, 4. OIL, 5. DRINKING WATER, 6. WATER (GW/MW/SW), 7. OTHER (SPECIFY)

CONTAINER TYPE: P - PLASTIC, G - GLASS, V - VOA

ANALYSES

| TOXIKON # | SAMPLE IDENTIFICATION | SAMPLE TYPE | CONTAINER SIZE | CONTAINER TYPE | CONTAINER # | SAMPLING DATE | SAMPLING TIME | PRESERVATIVE | TCLP Pesticides | TCLP VOAs | | | | | | | | | | | SPECIAL INSTRUCTIONS/ COMMENTS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | PS99S501 | Soil | 8oz | G | 1 | 4/1/99 | 9:00 | N/A | X | | | | | | | | | | | | 24-48 |
| | PS99S501 | Soil | 4oz | G | 1 | 4/1/99 | 9:00 | | | X | | | | | | | | | | | Rush |
| 2 | PS99S502 | Soil | 8oz | G | 1 | 4/1/99 | 9:30 | | X | | | | | | | | | | | | |
| | PS99S502 | Soil | 4oz | G | 1 | 4/1/99 | 9:30 | | | X | | | | | | | | | | | |
| 3 | PS99S503 | Soil | 8oz | G | 1 | 4/1/99 | 9:45 | ✓ | X | | | | | | | | | | | | ✓ |

SAMPLED BY: [signature] DATE: 4-1-99 TIME: - -
RELINQUISHED BY: [signature] DATE: 4-2-99 TIME: - -
RELINQUISHED BY: U.S.P.S DATE: 4-3-99 TIME: 12:00 - -
METHOD OF SHIPMENT

QUOTATION #:
RECEIVED BY: DATE: - - TIME: - -
RECEIVED FOR LAB BY: [signature] DATE: 4-3-99 TIME: 12:00 - -
COOLER TEMPERATURE

24-48 Hr

☒ RUSH ..... BUSINESS DAY TURN AROUND
☐ ROUTINE

*Sample disposal information*
Are there any other known or suspected contaminants in these samples other than those listed above?

04/08/99 15:47 FAX 009

# SECTION 02485
# SEEDING AND EROSION PROTECTION

## PART 1 - GENERAL

The work required under this Section includes furnishing all plant, labor, equipment, and materials to provide fertilizer, mulching, and seeding for the site area, as well as any other disturbed areas requiring vegetation.

1.1 Applicable Publications

Standards for Soil Erosion and Sediment Control in New Jersey, Latest edition.

## PART 2 - MATERIALS

2.1 Fertilizers

2.1.1 Quality and Formulation

Fertilizer may be either fluid or dry formulations of commercial carriers of available plant nutrients. Fertilizer shall contain total nitrogen, available phosphoric acid, and soluble potash in the ratio of 10-20-10.

2.1.2 Basis of Acceptance

Manufacturer's label or certificate indicating compliance with specifications. The Engineer or his designee reserves the right to reject any material that has become caked or otherwise damaged.

2.2 Seeds

2.2.1 Quality

Each species, variety, and strain of grasses, legumes, and cereals shall be as specified unless otherwise approved.

2.2.1.1 Materials other than pure live seed shall comprise only nonviable seed, chaff, hulls, live seed of crop plants other than those specified, harmless inert matter and weed seeds except that weed seeds other than seed of noxious weeds will be permitted up to 1 percent of gross weight of each kind of seed. Legume seeds shall be accompanied by adequate amounts of proper inoculants unless accompanied by certification of preinoculation.

2.2.1.2 The percentage of purity as shown on the label shall be acceptable. The percentage of germination as shown on the label shall be not less than the minimum percentage specified.

2.2.2 Packaging

Each kind of seed shall be furnished and delivered, unless otherwise approved, in separate, sealed containers, or bags acceptably sewn tight or sealed.

2.2.3 Seed Mixture

Seed mixture shall be:

| Name | Variety | Wt. of Seed Per Acre (lbs) |
|---|---|---|
| Tall Fescue | Commercial | 218 |
| Ryegrass | Commercial | 88 |
| Total | | 300 lbs/acre |

2.3 Mulch

Either hay or straw may be used for mulch. Hay for mulching shall be mowings of acceptable herbaceous growth free from noxious weeds. Straw for mulching shall be stalks of oats, wheat, rye or other approved crops free from noxious weeds. Materials which are low grade and unfit for farm use such as "U.S. Sample Grade" will be acceptable. Weight shall be calculated on the basis of material having not more than 15% of moisture content. In addition, wood chips, if available, may be used as mulch.

## PART 3 - APPLICATION AND CONSTRUCTION

3.1 Fertilizer Application

Fertilizer shall be evenly spread over surface of soil in areas as directed. Rates of application shall be as required to promote plant growth. Tests required to determine rate of fertilizer application shall be made by the Contractor and the rate accepted by the Engineer. Any method of application which will ensure an even distribution will be acceptable.

3.2 Seeding Application

3.2.1 Rates

Rates for seeding shall be as specified.

3.2.2 Season

Unless otherwise directed by the Engineer, work shall be performed during normal planting seasons of the year. The Contractor shall notify the Engineer at least 48 hours in advance of the time he intends to begin sowing seed and shall not proceed with such work until permission has been obtained. When delays in operations carry the work beyond dates which are specified, or when conditions of high winds, excessive moisture or ice are such that satisfactory results are not likely to be obtained for any stage of the work, the Engineer will stop work. Work shall be resumed with the Engineer's approval when desired results are likely to be obtained or when accepted corrective measures and procedures are adopted.

3.2.3 Ground Preparation and Seeding

3.2.3.1 Areas to be seeded shall be maintained at approved grades. Irregularities and low places which will hold water shall be eliminated. Fertilizers and seeds shall be evenly distributed on the surfaces to be seeded. All mechanical equipment for soil preparation or seeding shall be as approved and shall pass parallel to the contours unless otherwise approved.

3.2.3.2 When directed by the Engineer, measured plots shall be established to determine if specified quantities of seed, fertilizer, and mulch are being applied. The finished surface of any area that is seeded shall not be rougher, more uneven or have more or larger stones, clods, roots, or other foreign materials than the area it adjoins.

3.2.3.3 Areas to be seeded shall be scarified sufficiently to break up surface crust immediately before seeding except where ground is loose and friable as immediately following grading or as otherwise approved. All stones over six inches in greatest dimension which are loose and subject to rolling or sliding or other sizes as specified and all other objects detrimental to mowing shall be removed and disposed of as approved. Fertilizers and seed may be mixed together immediately before placing. Methods of distribution such as by air or water pressure will be acceptable except that the seed shall not be injured in the process of spreading.

3.3 Mulching

3.3.1 Surface of areas where mulch is to be applied shall be cleared of stones, stumps, wire, and other obstacles which might hinder subsequent seeding operations. Ground shall be harrowed or disked to produce a state of suitable tillage.

3.3.2 Mulch shall be spread uniformly in a continuous blanket of sufficient thickness to completely hide soil from view. Mulch may be spread before

or not later than three days after seeding unless otherwise approved. Anchorage to hold mulch in place may be applied by an approved method during mulching operation or subsequently.

3.3.3 Contractor shall install a vegetative mat, Miramat TM8, on all sloped areas, as manufactured by Mirafi or Engineer-approved equal. The mat shall be installed in accordance with manufacturer's recommendations.

3.4 Erosion and Sediment Control

3.4.1 Contractor shall conduct his operations in accordance with the approved erosion and sediment control plan included in the Contract Documents. Temporary erosion and sediment control measures shall be provided and maintained until the permanent work is completed. The area of bare soil exposed at any given time by construction shall be restricted to a minimum.

## PART 4 - CARE DURING CONSTRUCTION

The Contractor shall care for seeded and mulched areas until final acceptance. Such care shall consist of repairing areas damaged following seeding or mulching operations due to wind, water, fire or other causes. Damaged areas shall be repaired to re-establish condition and grade of area prior to seeding and shall be re-fertilized, re-seeded, and re-mulched as specified herein. The Contractor shall keep seeded areas mowed until acceptance by cutting to a height of three inches when growth reaches six inches, or as directed.

## PART 5 - QUALITY CONTROL

5.1 When, in the judgment of the Engineer, at any time prior to acceptance, any area which has been seeded fails to produce a satisfactory growth of grass after a suitable period of time has elapsed, the Contractor shall re-seed and re-fertilize such areas as specified. If deemed necessary by the Engineer, the Contractor shall also re-mulch such areas at the rate specified.

END OF SECTION

* * * * *

<MTA NAME=SUBFORMAT
CONTENT=NEW>**********
**********

DEPARTMENT OF THE NAVY
NORTHERN DIVISION
NAVAL FACILITIES
ENGINEERING COMMAND
GUIDE SPECIFICATION

NFGS-N-02300A
30 September 1999

Use in lieu of NFGS-02301, NFGS-02302 and NFGS-02315

**********

SECTION 02300

EARTHWORK
09/99

**********
NOTE: This guide specification is issued by the Northern Division, Naval Facilities Engineering Command, as approved by the Naval Facilities Engineering Command (Code 15G), for regional use.
**********

**********
NOTE: This guide specification covers earthwork requirements for the construction of buildings, roads, and utilities.
**********

**********
NOTE: This revision "A" to NFGS-N-02300 amends the issue dated 31 March 1998 by revising the submittal article to comply with the agreement reached by the SPECSINTACT Tri-Agency Committee.
**********

**********
NOTE: The following information shall be indicated on the project drawings:

~~1. Surface elevations, existing and new;~~

2. Location of underground obstructions and existing utilities;

3. Location and record of soil borings ~~and test pits.~~ Include ground water observations and topsoil thickness encountered in boring, soil classifications~~, and properties such as moisture content and Atterberg limit determinations. The boring logs must show the two letter Unified Soil's classification on them~~;

4. Location of borrow and disposal area if located on Government property;

5. Clearing, stripping and/or grubbing limits;

6. **Areas to be seeded;**

~~7. Hydrological data where available;~~

~~8. Location where shoring and sheeting is required (trench protection is specified in Corps of Engineers Manual EM 385-1-1); and~~

~~9. Pipe trench excavation details including rock payment line if applicable.~~

**********

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

| | |
|---|---|
| ASTM C 33 | (1993) Concrete Aggregates |
| ASTM C 136 | (1996; Rev. A) Sieve Analysis of Fine and Coarse Aggregates |
| ASTM D 698 | (1991) Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft (600 kN-m/m)) |
| ASTM D 1140 | (1992) Amount of Material in Soils Finer Than the No. 200 (75-Micrometer) Sieve |
| ASTM D 1556 | (1990) Density and Unit Weight of Soil in Place by the Sand-Cone Method |
| ASTM D 1557 | (1991) Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft (2,700 kN-m/m)) |
| ASTM D 2487 | (1993) Classification of Soils for Engineering Purposes (Unified Soil Classification System) |
| ASTM D 2922 | (1991) Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth) |
| ASTM D 3017 | (1996) Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth) |
| ASTM D 4318 | (1995; Rev.A) Liquid Limit, Plastic Limit, and Plasticity Index of Soils |

AMERICAN WATER WORKS ASSOCIATION (AWWA)

AWWA C600 (1993) Installation of Ductile-Iron Water Mains and Their Appurtenances

COMMERCIAL ITEM DESCRIPTIONS (CID)

CID A-A-1909 Fertilizer

CORPS OF ENGINEERS (COE)

COE EM-385-1-1 (1996) Safety and Health Requirements Manual

## 1.2 DEFINITIONS

**********

**NOTE: Delete definitions that are not used in the specification text for a specific project, however, if either hard materials or rock are included, both definitions must be retained.**

**********

### 1.2.1 Hard Materials

Weathered rock, dense consolidated deposits, or conglomerate materials which are not included in the definition of "rock" but which usually require the use of heavy excavation equipment, ripper teeth, or jack hammers for removal.

### 1.2.2 Rock

Solid homogeneous interlocking crystalline material with firmly cemented, laminated, or foliated masses or conglomerate deposits, neither of which can be removed without systematic drilling and blasting, drilling and the use of expansion jacks or feather wedges, or the use of backhoe-mounted pneumatic hole punchers or rock breakers; also large boulders, buried masonry, or concrete other than pavement exceeding [1/2] [_____] cubic yard in volume. Removal of hard material will not be considered rock excavation because of intermittent drilling and blasting that is performed merely to increase production.

### [1.2.3 Pile Supported Structure

As used herein, a structure where both the foundation and floor slab are pile supported.

### ]1.2.4 Unsatisfactory Material

Existing, in situ soil or other material which can be identified as having insufficient strength characteristics or stability to carry intended loads without excessive consolidation or loss of stability. Materials classified as [_____], PT, OH, or OL by ASTM D 2487 are unsatisfactory. Unsatisfactory materials may also include man-made fills, refuse, frozen material, uncompacted backfills from previous construction, unsound rock or soil lenses, or other deleterious or objectionable material.

1.3 SUBMITTALS

**********
**NOTE: The "G" in submittal tags following a submittal item indicates Government approval and should be retained. Add "G" in submittal tags following any added or existing submittal items deemed sufficiently critical, complex, or aesthetically significantly to merit approval by the Government. Submittal items not designated with a "G" will be approved by the QC organization.**
**********

Submit the following in accordance with Section 01330, "Submittal Procedures."

[SD-02 Shop Drawings

**********
**NOTE: Include this paragraph when excavations are not sloped or benched, or excavation will be near enough to adjacent structures or roads to cause stability problems.**
**********

Supporting system drawings for shoring and sheeting or trench boxes; G]

[SD-05 Design Data

**********
**NOTE: Include this paragraph when excavations are not sloped or benched, or excavation will be near enough to adjacent structures or roads to cause stability problems.**
**********

Supporting system calculations for shoring and sheeting or trench boxes ; G]

SD-06 Test Reports

Fill and backfill test

Select material test

Porous fill test

Density tests

SD-07 Certificates

Dewatering plan

[Blasting plan; G]

Submit 15 days prior to starting work.

1.4 DELIVERY, STORAGE, AND HANDLING

Perform in a manner to prevent contamination or segregation of materials.

1.5 CRITERIA FOR BIDDING

**********

**NOTE: For most projects, the scope of earthwork can accurately be determined. However, if it is known that large quantities of unsatisfactory material are to be removed, specify those quantities herein.**

**********

Base bids on the following criteria:

a. Surface elevations are as indicated.

b. Pipes or other artificial obstructions, except those indicated, will not be encountered.

**********

**NOTE: When excavation work is required, obtain boring logs from new investigation work, or from previous projects. If no specific subsurface information is available, specify a ground water depth representative of the area. Choose one of the following bracketed options.**

**********

[c. Ground water elevations indicated by the boring log were those existing at the time subsurface investigations were made and do not necessarily represent ground water elevation at the time of construction.]

between 18 and 35

[c. Ground water elevation is [_____] feet below existing surface elevation.]

[d. Material character is indicated by the boring logs.]

**********

**Note: Edit to indicate the condition which will be encountered and nature of the materials to be removed, if any. When hard materials or rock will be encountered, specify an approximate depth at which the materials will be encountered and an estimated quantity of rock to be removed.**

**********

~~[e. [Hard materials] [and] [rock] will [not] be encountered [at [_____] feet below existing surface elevations]. [The quantity of mass rock to be removed is [_____] cubic yards.] [The quantity of trench rock to be removed is [_____] cubic yards.] [Quantity of removed rock will be determined by post removal surveys of the excavation. Rock removed beyond indicated payment lines will not be paid for as rock excavation].]~~

**********

**NOTE: Choose one of the following bracketed options. If blasting is permitted additional activity specific requirements may have to be added.**

**********

[f. Blasting will not be permitted. Remove material in an approved manner.]

[f. Blasting will be permitted. Blasting shall be conducted in accordance with COE EM-385-1-1, and Federal, State, and local safety regulations. Submit for approval a blasting plan, including calculations for overpressure and debris hazard, prepared and sealed by a registered professional engineer. Blasting mats shall be provided, and non-electric blasting caps shall be used. Notify the Contracting Officer 24 hours prior to blasting.]

1.6 QUALITY ASSURANCE

[1.6.1 Required Drawings

Submit drawings for shoring and sheeting or trench boxes and calculations by a registered professional engineer. Drawings shall include material sizes and types, arrangement of members, and the sequence and method of installation and removal.

][1.6.2 Design Data

Submit drawings and calculations for shoring and sheeting or trench boxes by a registered professional engineer. Calculations shall include data and references used.

]PART 2 PRODUCTS

2.1 SOIL MATERIALS

Free of debris, roots, wood, scrap material, vegetation, refuse, soft unsound particles, and frozen, deleterious, or objectionable materials. Unless specified otherwise, the maximum particle diameter shall be one-half the lift thickness at the intended location.

2.1.1 Common Fill

Approved, unclassified soil material with the characteristics required to compact to the soil density specified for the intended location.

2.1.2 Backfill and Fill Material

ASTM D 2487, classification GW, GP, [GM,] [GC,] SW, SP, [SM,] [SC] with a maximum ASTM D 4318 liquid limit of [35] [_____], maximum ASTM D 4318 plasticity index of [12] [_____], and a maximum of 25 percent by weight passing ASTM D 1140, No. 200 sieve.

2.1.3 Topsoil

**********

**NOTE: Choose the first bracketed paragraph if seeding is minor, otherwise, choose the second bracketed paragraph and edit Section 02921, "Turf", as appropriate for the project.**

**********

[Natural, friable soil representative of productive, well-drained soils in the area, free of subsoil, stumps, rocks larger than one inch diameter, brush, weeds, toxic substances, and other material detrimental to plant growth. Amend topsoil pH range to obtain a pH of 5.5 to 7.]

[Provide as specified in Section 02921, "Turf".]

~~2.1.4 Select Material~~

~~ASTM D 2487, classification GW, GP, SW, SP with a maximum of 10 percent~~ by ~~weight passing ASTM D 1140, No. 200 sieve.~~

~~2.1.5~~ Pipe Bedding

Provide material for pipe bedding consisting of [GW] ~~[GP]~~ [GS] [SW] [SP] [SC] materials as classified in accordance with ASTM D 2487.

2.1.6 Porous Fill

ASTM C 33 fine aggregate grading with a maximum of 3 percent by weight passing ASTM D 1140, No. 200 sieve, or coarse aggregate Size 57, 67, or 77. [For subsurface drains provide coarse aggregate only.]

2.2 BORROW

**********

**NOTE: Choose the first bracketed paragraph when borrow material has to come from off site. Choose the second bracketed paragraph when use of a Government borrow pit is available and edit the paragraph to suit requirements for use of a Government borrow pit.**

**********

[Obtain borrow materials required in excess of those furnished from excavations from sources outside of Government property.]

[Obtain borrow materials required in excess of those furnished from excavations from sources outside of Government property, except that borrow materials conforming to [common fill] [and] [fill and backfill material] [pipe bedding] [_____] may be obtained from the Government borrow pit. The Government borrow pit is located [as indicated] [within a haul distance of [_____] miles from the work site]. If the Government borrow pit is used, the Contractor shall perform clearing, grubbing, and stripping required for providing access to suitable borrow material. Dispose of materials from clearing and grubbing operations [off Government property] [at the Government landfill indicated]. Strip top 12 inches of soil material from borrow area and stockpile. After removal of borrow material, regrade borrow pit using stockpiled soil material to contours which will blend in with adjacent topography. Maximum side slopes shall be two horizontal to one

vertical. Excavation and backfilling of borrow pit shall ensure proper drainage.]

## 2.3 BURIED WARNING AND IDENTIFICATION TAPE

**********

**NOTE: Delete paragraph if tape is not required in the project. The use of a plastic warning tape for identification is mandatory for buried hazardous utilities such as electrical conduit, gas lines, fuel lines, high pressure nitrogen, high pressure water and steam lines, domestic sewage force mains, industrial waste force mains and industrial sewers carrying hazardous, explosive, or toxic waste. Coordinate color codes with other specification sections and conform, if possible, to local practice for identifying buried utilities.**

**********

[Polyethylene plastic] [and] [metallic core or metallic-faced, acid- and alkali-resistant, polyethylene plastic] warning tape manufactured specifically for warning and identification of buried utility lines. Provide tape on rolls, 3 inch minimum width, color coded as specified below for the intended utility with warning and identification imprinted in bold black letters continuously over the entire tape length. Warning and identification to read, "CAUTION, BURIED (intended service) LINE BELOW" or similar wording. Color and printing shall be permanent and unaffected by moisture or soil.

Warning Tape Color Codes

| | |
|---|---|
| [Yellow:] | [Electric] |
| [Yellow:] | [Gas, Oil; Dangerous Materials] |
| [Orange:] | [Telephone and Other Communications] |
| [Blue:] | [Water Systems] |
| [Green:] | [Sewer Systems] |
| [White:] | [Steam Systems] |
| [Gray:] | [Compressed Air] |

### [2.3.1 Warning Tape for Metallic Piping

Acid and alkali-resistant polyethylene plastic tape conforming to the width, color, and printing requirements specified above. Minimum thickness of tape shall be 0.003 inch. Tape shall have a minimum strength of 1500 psi lengthwise, and 1250 psi crosswise, with a maximum 350 percent elongation.

### ][2.3.2 Detectable Warning Tape for Non-Metallic Piping

Polyethylene plastic tape conforming to the width, color, and printing requirements specified above. Minimum thickness of the tape shall be 0.004 inch. Tape shall have a minimum strength of 1500 psi lengthwise and 1250 psi crosswise. Tape shall be manufactured with integral wires, foil backing, or other means of enabling detection by a metal detector when tape is buried up to 3 feet deep. Encase metallic element of the tape in a protective jacket or provide with other means of corrosion protection.

# ]PART 3 EXECUTION

## 3.1 SURFACE PREPARATION

**********
**NOTE: If special site preparation notes are indicated, they should be referenced here.**
**********

### 3.1.1 Clearing and Grubbing

**********
**NOTE: Choose the first bracketed paragraph when selective clearing is required and identify the items to be removed. Indicate tree diameter measured at 4 1/2 feet from the existing ground. When removal of bushes or shrubs are required indicate the height of the item to be removed.**

**Choose the second bracketed paragraph when large wooded areas need to be cleared and edit Section 02231, "Clearing and Grubbing" as appropriate for the project.**
**********

[Unless indicated otherwise, remove trees, stumps, logs, shrubs, and brush within the [clearing limits] [_____]. Remove stumps entirely. Grub out matted roots and roots over 2 inches in diameter to at least 18 inches below existing surface.]

[Provide as specified in Section 02231, "Clearing and Grubbing".]

### 3.1.2 Stripping

Strip existing topsoil to a depth of [4] [_____] inches without contamination by subsoil material. Stockpile topsoil separately from other excavated material and locate convenient to finish grading area.

### 3.1.3 Unsatisfactory Material

Remove unsatisfactory materials underneath concrete slabs and paved areas.

#### 3.1.3.1 Proof Rolling

**********
**NOTE: Specify proof rolling for all new structures or when the quality of the existing subgrade is questionable. Proof rolling can be used to verify that no unsatisfactory material is present (no bid quantity required, location shown or specified) or to locate suspected unsatisfactory material (specify a bid quantity to be removed).**
**********

Proof rolling shall be done on an exposed subgrade free of surface water (wet conditions resulting from rainfall) which would promote degradation of an otherwise acceptable subgrade. Proof roll the new subgrade [of the building] [_____] with six passes of a 15 ton, pneumatic-tired roller.

Operate the roller in a systematic manner to ensure the number of passes over all areas, and at speeds between 2 1/2 to 3 1/2 miles per hour. [When proof rolling under buildings, the building subgrade shall be considered to extend 5 feet beyond the building lines, and one-half of the passes made with the roller shall be in a direction perpendicular to the other passes.] [Proof tamp footing subgrades with one pass using a 30 pound pneumatic tamper.] Notify the Contracting Officer a minimum of 3 days prior to proof rolling or tamping. Proof rolling or tamping shall be performed in the presence of the Contracting Officer. Rutting or pumping of material shall be undercut [as directed by the Contracting Officer] [to a depth of [_____] inches and replaced with [backfill and fill] [select] material]. [Base bids on replacing approximately [_____] square yards, with an average depth of [_____] inches at various locations.]

## 3.2 PROTECTION

### 3.2.1 Protection Systems

**********

**NOTE: The Contractor should not be given the opportunity to slope the faces of excavations in lieu of providing shoring unless the following conditions are met:**

**1. The excavation is less than 20 feet in depth;**

**2. Adjacent structures, roads, or pavements will not affect or be effected by the excavation;**

**3. Equipment or stored material will not affect the excavation;**

**4. Vibration from equipment, traffic, or blasting will not affect the excavation;**

**5. There will be no ground water problems;**

**6. Surcharges will not affect the excavation;**

**7. Station operational considerations allow laying back the slopes of the excavation; and**

**8. No rock will be encountered.**

**********

Provide shoring, bracing, trench boxes and sheeting in accordance with COE EM-385-1-1 [, except that banks may be sloped only when approved by the Contracting Officer]. [Provide additional supporting systems where indicated.]

### 3.2.2 Drainage [and Dewatering]

Provide for the collection and disposal of surface and subsurface water encountered during construction. Submit a dewatering plan. Describe methods to be employed in removing water from exposed surfaces and diverting surface water or piped flow away from other areas or structures. Describe the basic components of the dewatering system proposed and its planned

method of operation. Dewatering plan, as a minimum, shall address those requirements outlined herein.

3.2.2.1 Drainage

So that construction operations progress successfully, completely drain construction site during periods of construction to keep soil materials sufficiently dry. Provide temporary ditches, swales, and other drainage features and equipment as required to maintain dry soils. When unsuitable working platforms for equipment operation and unsatisfactory soil support for subsequent construction features develop, remove unsatisfactory material and provide new soil material as specified herein.

[3.2.2.2 Dewatering

**********

**NOTE: Include this paragraph when surface runoff and groundwater may flow toward or into excavations. Consider subsurface soils data, seasonal variations in water table, weather conditions and the presence of major drainage ways in determining whether or not dewatering will be required in the project. Check depth of new utilities and foundations relative to the existing ground water elevation prior to editing this paragraph.**

**********

Groundwater flowing toward or into excavations shall be controlled to prevent sloughing of excavation slopes and walls, boils, uplift and heave in the excavation and to eliminate interference with orderly progress of construction. French drains, sumps, ditches or trenches will not be permitted within 3 feet of the foundation of any structure, except with specific written approval from the Contracting Officer, and after specific contractual provisions for restoration of the foundation area have been made. Control measures shall be taken by the time the excavation reaches the water level in order to maintain the integrity of the in situ material. While the excavation is open, the water level shall be maintained continuously, at least [_____] feet below the working level.

[Operate dewatering system continuously until construction work below existing water levels is complete. Record performance and effectiveness of method or system in use and submit records weekly.] [Measure and record performance of dewatering system at same time each day by use of observation wells or piezometers installed in conjunction with the dewatering system.] [Relieve hydrostatic head in previous zones below subgrade elevation in layered soils to prevent uplift.]

]3.2.3 Underground Utilities

Locations of the existing utilities indicated are approximate. The Contractor shall physically verify the location and elevation of the existing utilities indicated prior to starting construction. The Contractor shall obtain a "Dig Safe" permit for all excavation work.

3.2.4 Machinery and Equipment

Movement of construction machinery and equipment over pipes during construction shall be at the Contractor's risk. Repair, or remove and provide new pipe for existing or newly installed pipe that has been displaced or damaged.

3.3 EXCAVATION

**********

**NOTE: For most projects specify ASTM D 698 compaction, except for under major roads, airfields, and other heavily loaded areas, where ASTM D 1557 compaction should be specified. Specify compaction in terms of one compaction effort (ASTM D 698 or ASTM D 1557), if possible.**

**********

Excavate to contours, elevation, and dimensions indicated. ~~Reuse excavated~~ materials that meet the specified requirements for the material type ~~required at the intended location~~. Keep excavations free from water. Excavate soil disturbed or weakened by Contractor's operations, soils softened or made unsuitable for subsequent construction due to exposure to weather. Refill with [backfill and fill material] [select material] [porous fill] and compact~~, to [95] [_____] percent of [ASTM D 698] [ASTM D 1557] maximum density. Unless specified otherwise, refill excavations cut below indicated depth with [backfill and fill material] [select material] [porous fill] and compact to [95] [_____] percent of [ASTM D 698] [ASTM D 1557] maximum density at no additional cost to the Government.~~

3.3.1 Structures With Spread Footings

Ensure that footing subgrades have been inspected and approved by the Contracting Officer prior to concrete placement. Fill overexcavations with concrete during foundation placement at no additional cost to the Government.

3.3.2 Pile Cap Excavation and Backfilling

Excavate to bottom of pile cap prior to placing or driving piles, unless authorized otherwise by the Contracting Officer. Backfill and compact overexcavations and changes in grade due to pile driving operations to 95 percent of ASTM D 698 maximum density.

3.3.3 Pipe Trenches

Excavate to the dimension indicated. Grade bottom of trenches to provide uniform support for each section of pipe after pipe bedding placement.

[3.3.4 Hard Material [and Rock] Excavation

**********

**NOTE: Where rock excavation is planned, foundation section details or typical grading or trench cross sections on plans must show the required limits of rock excavation and any special refill or bedding requirements.**

**********

Remove hard material [and rock] to elevations indicated in a manner that will leave foundation material in an unshattered and solid condition. Roughen level surfaces and cut sloped surfaces into benches for bond with concrete. [Protect shale from conditions causing decomposition along joints or cleavage planes and other types of erosion.] Removal of hard material [and rock] beyond lines and grades indicated unless previously authorized by the Contracting Officer will not be grounds for a claim for additional payment.

]3.4 FILLING AND BACKFILLING

Fill and backfill to contours, elevations, and dimensions indicated. Compact each lift before placing overlaying lift.

3.4.1 Common Fill Placement

Provide for general site conditions [and] [,] [under porous fill] [and under pile-supported structures]. Place in [6] [__6__] inch lifts. Compact areas not accessible to rollers or compactors with mechanical hand tampers. Aerate material excessively moistened by rain to a satisfactory moisture content. Finish to a smooth surface by blading, rolling with a smooth roller, or both.

3.4.2 Backfill and Fill Material Placement

Provide for paved areas, under concrete slabs, and adjacent to underground structures except where select material is provided. Place in [6] [_____] inch lifts. Place backfill material adjacent to structures as the structural elements are completed and accepted. Backfill against concrete only when approved by the Contracting Officer.

3.4.3 Select Material Placement

Provide under [porous fill of] structures not pile supported. Place in [6] [_____] inch lifts. Place select material adjacent to structures as structural elements are completed and accepted. Place material against concrete only when approved by the Contracting Officer.

3.4.4 Porous Fill Placement

Provide under floor slab on a compacted subgrade [and around subsurface drains as indicated]. Place in [4] [_____] inch lifts.

3.4.5 Trench Backfilling

Backfill as rapidly as construction, testing, and acceptance of work permits. Under structures and paved areas place backfill in [6] [_____] inch lifts to top of trench. Outside of structures and paved areas place backfill in [6] [_____] inch lifts to one foot over pipe.

3.4.5.1 Bedding Requirements

Except as specified otherwise in the individual piping section, provide bedding for buried piping in accordance with AWWA C600, Type 4, except as specified herein. Plastic piping shall have bedding to spring line of pipe.

3.5 BURIED WARNING AND IDENTIFICATION TAPE

Provide buried utility lines with utility identification tape. Bury tape 12 inches below finished grade; under pavements and slabs, bury tape 6 inches below top of subgrade.

3.6 COMPACTION

**********

**NOTE: For most projects specify ASTM D 698 compaction, except for under major roads, airfields, and other heavily loaded areas, where ASTM D 1557 compaction should be specified. Specify compaction in terms of one compaction effort (ASTM D 698 or ASTM D 1557), if possible.**

**********

Expressed as a percentage of maximum density.

3.6.1 General Site

Compact underneath areas designated for vegetation and areas outside the 5 foot line of the structure to [85] [_____] percent of [ASTM D 698] [ASTM D 1557].

3.6.2 Structures, Spread Footings, and Concrete Slabs

Compact top 12 inches of subgrades to [95] [_____] percent of [ASTM D 698] [ASTM D 1557]. Compact [common fill] [fill and backfill material] [select material] to [95] [_____] percent of [ASTM D 698] [ASTM D 1557].

3.6.3 Porous Fill

Compact with two passes of a hand-operated, plate type vibratory compactor.

3.6.4 Adjacent Area

Compact areas within 5 feet of structures to [90] [_____] percent of [ASTM D 698] [ASTM D 1557].

3.6.5 Paved Areas

Compact top 12 inches of subgrades to [95] [_____] percent of [ASTM D 698] [ASTM D 1557]. Compact fill and backfill materials to 95 percent of [ASTM D 698] [ASTM D 1557].

3.6.6 Airfield Pavements

Compact top 24 inches below finished pavement or top 12 inches of subgrades, whichever is greater, to [100] [_____] percent of ASTM D 1557; compact fill and backfill material to [100] [_____] percent of ASTM D 1557.

3.6.7 Trenches

Use hand-operated, plate-type, vibratory, or other suitable hand tampers in areas not accessible to larger rollers or compactors. Avoid damaging pipes

~~and protective coatings. Compact initial backfill and bedding material surrounding pipes, conduits, ducts or utility appurtenances to [95] [_____] percent of [ASTM D 698] [ASTM D 1557]. Compact succeeding layers of final backfill as specified in the previous paragraphs.~~

## 3.7 FINISH OPERATIONS

### 3.7.1 Grading

Finish grades as indicated within one-tenth of one foot. Grade areas to drain water away from structures. For existing grades that will remain but which were disturbed by Contractor's operations, grade as directed.

### 3.7.2 Seed

**********

**NOTE: Choose the first bracketed paragraph if seeding is minor, otherwise, choose the second bracketed paragraph and edit Section 02921, "Turf", as appropriate for the project.**

**********

[Scarify existing subgrade. Provide 6 inches of topsoil for newly graded finish earth surfaces and areas disturbed by the Contractor. [Additional topsoil will not be required if work is performed in compliance with stripping and stockpiling requirements.] [If there is insufficient on-site topsoil meeting specified requirements for topsoil, provide topsoil required in excess of that available.] Seed shall match existing vegetation. Provide ~~seed at 5 pounds per~~ 1000 square feet. ~~Provide CID A-A-1909, Type~~ I, Class 2, 10-10-10 analysis ~~fertilizer at 25 pounds per 1000 square feet. [Provide commercial agricultural limestone of 94-80-14 analysis at 70 pounds per 1000 square feet.] [Provide mulch and water to establish an acceptable stand of grass.]]~~

[Provide as specified in Section 02921, "Turf".]

### 3.7.3 Protection of Surfaces

Protect newly graded areas from traffic, erosion, and settlements that may occur. Repair or reestablish damaged grades, elevations, or slopes.

## 3.8 DISPOSITION OF SURPLUS MATERIAL

**********

**NOTE: Select the second bracketed paragraph only when directed by the Navy.**

**********

[Remove from Government property surplus or other soil material not required or suitable for filling or backfilling, and brush, refuse, stumps, roots, and timber.]

[Waste in Government disposal area [indicated] [which is located within a haul distance of [_____] miles] surplus or other soil material not required or suitable for filling or backfilling, and brush, refuse, stumps, roots, and timber.]

## 3.9 FIELD QUALITY CONTROL

### 3.9.1 Sampling

Take the number and size of samples required to perform the following tests.

### 3.9.2 Testing

Perform one of each of the following tests for each material used. Provide additional tests for each source change.

#### 3.9.2.1 Fill and Backfill Material Testing

Test fill and backfill material in accordance with ASTM C 136 for conformance to ASTM D 2487 gradation limits; ASTM D 1140 for material finer than the No. 200 sieve; ASTM D 4318 for liquid limit and for plastic limit; ASTM D 698 or ASTM D 1557 for moisture density relations, as applicable.

#### 3.9.2.2 Select Material Testing

Test select material in accordance with ASTM C 136 for conformance to ASTM D 2487 gradation limits; ASTM D 1140 for material finer than the No. 200 sieve; ASTM D 698 or ASTM D 1557 for moisture density relations, as applicable.

#### 3.9.2.3 Porous Fill Testing

Test porous fill in accordance with ASTM C 136 for conformance to gradation specified in ASTM C 33.

#### 3.9.2.4 Density Tests

**********

**NOTE: Density test frequency can vary from one test per 100 square feet for small areas up to one test per 10,000 square feet. The following table will also help establish test frequency for various situations:**

| Material Type | Location of Material | Test Frequency |
|---|---|---|
| Undisturbed native soil | Structures | Four random tests in building footings and four tests on subgrade within building line. |
| Fills and backfills | Structures (adjacent to) | One test per structure per 2,000 sq. ft taken 12 inches below finished grade. |
| Subgrades | Site (except airfields) | One test per lift per 2,500 sq. ft |
| Embankments or borrow | Any | One test per lift per 500 cubic yds placed. |

| | | |
|---|---|---|
| **Native soil subgrade other than structures and parking** | **Any** | **One test or one test per 10,000 sq. ft, whichever is greater.** |
| **Borrow** | **Any** | **One test per lift per 500 cubic yds placed.** |

**********

Test density in accordance with ASTM D 1556, or ASTM D 2922 and ASTM D 3017. When ASTM D 2922 and ASTM D 3017 density tests are used, verify density test results by performing an ASTM D 1556 density test at a location already ASTM D 2922 and ASTM D 3017 tested as specified herein. Perform an ASTM D 1556 density test at the start of the job, and for every 10 ASTM D 2922 and ASTM D 3017 density tests thereafter.

Undisturbed native soil under structures, perform [four] [____] random tests in building footings and [four] [_____] tests on subgrade within building line.

For structures and concrete slabs, test each lift of fill at randomly selected locations every [2,000] [_____] square feet of subgrade.

Native soil subgrade other than under structures and parking, perform one test or one test per 10,000 square feet whichever provides the greater number of tests.

For other fill areas, test each lift of fill at randomly selected locations every [2,500] [_____] square feet of subgrade in cut.

**********

**NOTE: Suggestions for improvement of this specification will be welcomed using the Navy "Change Request Forms" subdirectory located in SPECSINTACT in Jobs or Masters under "Forms/Documents" directory or DD Form 1426. Suggestions should be forwarded to:**

**Commanding Officer**
**Northern Division, Code 4013**
**Naval Facilities Engineering Command**
**10 Industrial Highway, Mail Stop 82**
**Lester, PA 19113-2090**

**FAX: (610) 595-0554 or DSN 443-0554**

**********

# Findings and Recommendations for the Remediation of Historic Pesticide Contamination

## Historic Pesticide Contamination Task Force

**Final Report - March 1999**

# Findings and Recommendations for the Remediation of Historic Pesticide Contamination

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## Addendum 2
## Organochlorine Pesticide Analyte List

| Pesticide | CAS # (Chemical Abstract Number) | NJDEP Residential Soil Cleanup Criteria | NJDEP Non-Residential Soil Cleanup Criteria |
|---|---|---|---|
| Aldrin | 309-00-2 | 0.04 | 0.17 |
| alpha-BHC | 319-84-6 | * | * |
| beta-BHC | 319-85-7 | * | * |
| delta-BHC | 319-86-8 | * | * |
| gamma-BHC (Lindane) | 58-89-9 | 0.52 | 2.2 |
| alpha-Chlordane | 5103-71-9 | 0.25 | 2.1 |
| gamma-Chlordane | 5103-74-2 | 0.25 | 2.1 |
| 4,4-DDD (TDE) | 72-54-8 | 3 | 12 |
| 4,4-DDE | 72-55-9 | 2 | 9 |
| 4,4-DDT (DDT) | 50-29-3 | 2 | 9 |
| Dieldrin | 60-57-1 | 0.042 | 0.18 |
| Endrin | 72-20-8 | 17 | 310 |
| Endrin aldehyde | 7421-93-4 | * | * |
| Endrin ketone | 73494-70-5 | * | * |
| Endosulfan I | 959-98-8 | 340 | 6200 |
| Endosulfan II | 33213-65-9 | 340 | 6200 |
| Endosulfan sulfate | 1031-07-8 | * | * |
| Heptachlor | 76-44-8 | 0.15 | 0.65 |
| Heptachlor epoxide | 111024-57-3 | * | * |
| Methoxychlor | 72-43-5 | 280 | 5200 |
| Toxaphene | 8001-35-2 | 0.1 | 0.2 |

Notes
- All Soil Cleanup Criteria provided in units of mg/kg (ppm) on a dry weight basis.
- Table includes pesticides identified by SW-846 8081A analytical method.
- alpha and gamma chlordane isomers are summed when compared to soil criteria.

* Indicates NJDEP has not developed cleanup criteria for compound.

# SOIL CLEANUP CRITERIA (mg/kg)
(LAST REVISED - 5/12/99)

This listing represents the combination of Tables 3-2 and 7-1 from the Department of Environmental Protection and Energy's February 3, 1992 proposed rule entitled Cleanup Standards for Contaminated Sites, N.J.A.C. 7:26D, as corrected based upon errors identified by the Department during or subsequent to the comment period as well as new toxicological or other information obtained since the rule proposal. Please refer to the respective footnotes for more detail. Notwithstanding, where the following criteria are based on human health impacts, the Department shall still consider environmental impacts when establishing site specific cleanup criteria. This along with other site-specific factors including background conditions may result in site specific cleanup criteria which differ from the criteria listed below. Therefore, this list shall not be assumed to represent approval by the Department of any remedial action or to represent the Department's opinion that a site requires remediation.

Note: Material bracketed **[thus]** is deleted and material underlined <u>thus</u> is added

| Contaminant | CASRN | Residential Direct Contact Soil Cleanup Criteria (a) (b) (RDCSCC) | Non- Residential Direct Contact Soil Cleanup Criteria (a) (b) (NRDCSCC) | Impact to Ground water Soil Cleanup Criteria (b) (IGWSCC) |
|---|---|---|---|---|
| Acenaphthene | 83-32-9 | 3400 | 10000(c) | 100 |
| Acetone (2-propanone) | 67-64-1 | 1000(d) | 1000(d) | 100 |
| Acrylonitrile | 107-13-1 | 1 | 5 | 1 |
| Aldrin | 309-00-2 | 0.040 | 0.17 | 50 |
| Anthracene | 120-12-7 | 10000(c) | 10000(c) | 100 |
| Antimony | 7440-36-0 | 14 | 340 | (h) |
| Arsenic | 7440-38-2 | 20 (e) | 20 (e) | (h) |
| Barium | 7440-39-3 | 700 | 47000(n) | (h) |
| Benz n | 71-43-2 | 3 | 13 | 1 |
| Benzo(b)fluoranthene (3,4-Benzofluoranthene) | 205-99-2 | 0.9 | 4 | 50 |
| Benzo(a)anthracene (1,2-Benzanthracene) | 56-55-3 | 0.9 | 4 | 500 |
| Benzo(a)pyrene (BaP) | 50-32-8 | 0.66(f) | 0.66(f) | 100 |
| Benzo(k)fluoranthene | 207-08-9 | 0.9 | 4 | 500 |
| Benzyl Alcohol | 100-51-6 | 10000(c) | 10000(c) | 50 |
| Beryllium | 7440-41-7 | [1(f)] <u>2 (e)</u> | [1(f)] <u>2 (e)</u> | (h) |
| Bis(2-chloroethyl) ether | 111-44-4 | 0.66(f) | 3 | 10 |

## SOIL CLEANUP CRITERIA (mg/kg)
(LAST REVISED - 5/12/99)

| Contaminant | CASRN | (RDCSCC) | (NRDCSCC ) | (IGWSCC ) |
|---|---|---|---|---|
| Bis(2-chloroisopropyl)ether | 108-60-1 | 2300 | 10000(c) | 10 |
| Bis(2-ethylhexyl) phthalate | 117-81-7 | 49 | 210 | 100 |
| Bromodichloromethane (Dichlorobromomethane) | 75-27-4 | 11 | 46 | 1 |
| Bromoform | 75-25-2 | 86 | 370 | 1 |
| Bromomethane (Methyl bromide) | 74-83-9 | 79 | 1000 (d) | 1 |
| 2-Butanone (Methyl ethyl ketone) (MEK) | 78-93-3 | 1000 (d) | 1000 (d) | 50 |
| Butylbenzyl phthalate | 85-68-7 | 1100 | 10000 (c) | 100 |
| Cadmium | 7440-43-9 | [1] 39 | 100 | (h) |
| Carbon tetrachloride | 56-23-5 | 2 (k) | 4 (k) | 1 |
| 4-Chloroaniline (*p*-Chloroaniline) | 106-47-8 | 230 | 4200 | (r) |
| Chlorob nzene | 108-90-7 | 37 | 680 | 1 |
| Chloroform | 67-66-3 | 19 (k) | 28 (k) | 1 |
| 4-Chloro-3-methyl phenol (*p*-Chloro-*m*-cresol) | 59-50-7 | 10000 (c) | 10000 (c) | 100 |
| Chloromethane (Methyl chloride) | 74-87-3 | 520 | 1000 (d) | 10 |
| 2-Chlorophenol (*o*-Chlorophenol) | 95-57-8 | 280 | 5200 | 10 |
| Chromium – hexavalent (VI) | 18540-29-9 | 240; 270 (g); (i) | 6100; 20 (g); (i) | (h) |
| Chr mium – trivalent (III) | 16065-83-1 | 120,000 | (j) | (l) |
| Chrysene | 218-01-9 | 9 | 40 | 500 |
| Copper | 7440-50-8 | 600 (m) | 600 (m) | (h) |
| Cyanide | 57-12-5 | 1100 | 21000 (o) | (h) |
| 4,4'-DDD (p,p'-TDE) | 72-54-8 | 3 | 12 | 50 |
| 4,4'-DDE (p,p'-DDX) | 72-55-9 | 2 | 9 | 50 |
| 4,4'-DDT | 50-29-3 | 2 | 9 | 500 |
| Dibenz(a,h)anthracene | 53-70-3 | 0.66 (f) | 0.66 (f) | 100 |
| Dibromochloromethane (Chlorodibromomethane) | 124-48-1 | 110 | 1000 (d) | 1 |
| Di-n-butyl phthalate | 84-74-2 | 5700 | 10000 (c) | 100 |
| Di-n-octyl phthalat | 117-84-0 | 1100 | 10000 (c) | 100 |
| 1,2-Dichlor benzene (*o*-Dichl robenzene) | 95-50-1 | 5100 | 10000 (c) | 50 |
| 1,3-Dichlorobenzene (*m*-Dichlorobenzene) | 541-73-1 | 5100 | 10000 (c) | 100 |

## SOIL CLEANUP CRITERIA (mg/kg)
(LAST REVISED - 5/12/99)

| Contaminant | CASRN | (RDCSCC) | (NRDCSCC ) | (IGWSCC ) |
|---|---|---|---|---|
| 1,4-Dichlorobenzene (p-Dichlorobenzene) | 106-46-7 | 570 | 10000 (c) | 100 |
| 3,3'-Dichlorobenzidine | 91-94-1 | 2 | 6 | 100 |
| 1,1-Dichloroethane | 75-34-3 | 570 | 1000 (d) | 10 |
| 1,2-Dichloroethane | 107-06-2 | 6 | 24 | 1 |
| 1,1-Dichloroethene | 75-35-4 | 8 | 150 | 10 |
| 1,2-Dichl roethene (trans) | 156-60-5 | 1000 (d) | 1000 (d) | 50 |
| 1,2-Dichloroethene (cis) | 156-59-2 | 79 | 1000 (d) | 1 |
| 2,4-Dichlorophenol | 120-83-2 | 170 | 3100 | 10 |
| 1,2-Dichloropropane | 78-87-5 | 10 | 43 | (r) |
| 1,3-Dichloropropene(cis and trans) | 542-75-6 | 4 | 5 (k) | 1 |
| Dieldrin | 60-57-1 | 0.042 | 0.18 | 50 |
| Diethyl phthalate | 84-66-2 | 10000 (c) | 10000 (c) | 50 |
| 2,4-Dimethyl phenol | 105-67-9 | 1100 | 10000 (c) | 10 |
| Dimethyl phthalate | 131-11-3 | 10000 (c) | 10000 (c) | 50 |
| 2,4-Dinitrophenol | 51-28-5 | 110 | 2100 | 10 |
| Dinitrotoluene(2,4-/2,6-mixture) | 25321-14-6 | 1 (l) | 4 (l) | 10 (l) |
| Endosulfan | 115-29-7 | 340 | 6200 | 50 |
| Endrin | 72-20-8 | 17 | 310 | 50 |
| Ethylbenzene | 100-41-4 | 1000 (d) | 1000 (d) | 100 |
| Fluoranthene | 206-44-0 | 2300 | 10000 (c) | 100 |
| Fluoren | 86-73-7 | 2300 | 10000 (c) | 100 |
| Heptachlor | 76-44-8 | 0.15 | 0.65 | 50 |
| Hexachlorobenzene | 118-74-1 | 0.66 (f) | 2 | 100 |
| Hexachlorobutadiene | 87-68-3 | 1 | 21 | 100 |
| Hexachlorocyclopentadiene | 77-47-4 | 400 | 7300 | 100 |
| Hexachloroethane | 67-72-1 | 6 | 100 | 100 |
| Indeno(1,2,3-cd)pyrene | 193-39-5 | 0.9 | 4 | 500 |
| Is phor ne | 78-59-1 | 1100 | 10000 (c) | 50 |
| Lead | 7439-92-1 | 400 (p) | 600 (q) | (h) |

## SOIL CLEANUP CRITERIA (mg/kg)
(LAST REVISED - 5/12/99)

| Contaminant | CASRN | (RDCSCC) | (NRDCSCC ) | (IGWSCC ) |
|---|---|---|---|---|
| Lindane (gamma BHC) (gamma HCH) | 58-89-9 | 0.52 | 2.2 | 50 |
| 2-Methylphenol (*o*-creosol) | 95-48-7 | 2800 | 10000 (c) | (r) |
| 4-Methylphenol (*p*creosol) | 106-44-5 | 2800 | 10000 (c) | (r) |
| Methoxychlor | 72-43-5 | 280 | 5200 | 50 |
| Mercury | 7439-97-6 | 14 | 270 | (h) |
| 4-Methyl-2-pentanone (MIBK) | 108-10-1 | 1000 (d) | 1000 (d) | 50 |
| Methylene chloride (Dichloromethane) | 75-09-2 | 49 | 210 | 1 |
| Naphthalene | 91-20-3 | 230 | 4200 | 100 |
| Nickel | 7440-02-0 | 250 | 2400 (k) (n) | (h) |
| Nitrobenzene | 98-95-3 | 28 | 520 | 10 |
| N-Nitrosodiphenylamine | 86-30-6 | 140 | 600 | 100 |
| N-Nitrosodi-n-propylamine | 621-64-7 | 0.66 (f) | 0.66 (f) | 10 |
| PCBs (Polychlorinated biphenyls) | 1336-36-3 | 0.49 | 2 | 50 |
| Pentachlorophenol | 87-86-5 | 6 | 24 | 100 |
| Phenol | 108-95-2 | 10000 (c) | 10000 (c) | 50 |
| Pyren | 129-00-0 | 1700 | 10000 (c) | 100 |
| Selenium | 7782-49-2 | 63 | 3100 (n) | (h) |
| Silver | 7440-22-4 | 110 | 4100 (n) | (h) |
| Styr ne | 100-42-5 | 23 | 97 | 100 |
| 1,1,1,2-Tetrachloroethane | 630-20-6 | 170 | 310 | 1 |
| 1,1,2,2-Tetrachloroethane | 79-34-5 | 34 | 70 (k) | 1 |
| Tetrachloroethene (Tetrachloroethylene) (PCE) | 127-18-4 | 4 (k) | 6 (k) | 1 |
| Thallium | 7440-28-0 | 2 (f) | 2 (f) | (h) |
| Toluene | 108-88-3 | 1000 (d) | 1000 (d) | 500 |
| Toxaphene | 8001-35-2 | 0.10 (k) | 0.2 (k) | 50 |
| 1,2,4-Trichlorobenzene | 120-82-1 | 68 | 1200 | 100 |
| 1,1,1-Trichl roethane | 71-55-6 | 210 | 1000 (d) | 50 |
| 1,1,2-Trichloroethane | 79-00-5 | 22 | 420 | 1 |
| Trichloroethene (Trichloroethylene) (TCE) | 79-01-6 | 23 | 54 (k) | 1 |

## SOIL CLEANUP CRITERIA (mg/kg)
(LAST REVISED - 5/12/99)

| Contaminant | CASRN | (RDCSCC) | (NRDCSCC ) | (IGWSCC ) |
|---|---|---|---|---|
| 2,4,5-Trichlorophenol | 95-95-4 | 5600 | 10000 (c) | 50 |
| 2,4,6-Trichlorophenol | 88-06-2 | 62 | 270 | 10 |
| Vanadium | 7440-62-2 | 370 | 7100 (n) | (h) |
| Vinyl chloride | 75-01-4 | 2 | 7 | 10 |
| Xylenes (Total) | 1330-20-7 | 410 | 1000 (d) | [10] 67 (s) |
| Zinc | 7440-66-6 | 1500 (m) | 1500 (m) | (h) |

### Footnotes:

(a) Criteria are health based using an incidental ingestion exposure pathway except where noted below.
(b) Criteria are subject to change based on site specific factors (e.g., aquifer classification, soil type, natural background, environmental impacts, etc.).
(c) Health based criterion exceeds the 10,000 mg/kg maximum for total organic contaminants.
(d) Health based criterion exceeds the 1000 mg/kg maximum for total volatile organic contaminants.
(e) Cleanup standard proposal was based on natural background.
(f) Health based criterion is lower than analytical limits; cleanup criterion based on practical quantitation level.
(g) Criterion based on the inhalation exposure pathway.
(h) The impact to ground water values for inorganic constituents will be developed based upon site specific chemical and physical parameters.
(i) Site specific determination required for SCC for the allergic contact dermatitis exposure pathway.
(j) Contaminant not regulated for this exposure pathway.
(k) Criteria based on inhalation exposure pathway, which yielded a more stringent criterion than the incidental ingestion exposure pathway.
(l) No criterion derived for this contaminant.
(m) Criterion based on ecological (phytotoxicity) effects.
(n) Level of the human health based criterion is such that evaluation for potential environmental impacts on a site by site basis is recommended.
(o) Level of the criterion is such that evaluation for potential acute exposure hazard is recommended.
(p) Criterion based on the USEPA Integrated Exposure Uptake Biokinetic (IEUBK) model utilizing the default parameters. The concentration is considered to protect 95% of target population (children) at a blood lead level of 10 $\mu$g/dl.
(q) Criteria were derived from a model developed by the Society for Environmental Geochemistry and Health (SEGH) and were designed to be protective for adults in the workplace.
(r) Insufficient information available to calculate impact to ground water criteria.
(s) Criterion based on new drinking water standard.