Comprehensive Long-Term Environmental Action Navy (CLEAN) for Pacific Division, Naval Facilities Engineering Command Pearl Harbor, Hawaii

Comprehensive Long-Term Environmental Action Navy

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ABBREVIATED REMEDIAL INVESTIGATION REPORT (DRAFT) FOR THE ACTIVE AND ABANDONED HOUSING AREAS NAVAL AIR FACILITY (NAF) MIDWAY ISLAND

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LIST OF ACRONYMS AND ABBREVIATIONS

APCL	Applied Physics and Chemical Laboratory
ARAR	Applicable or Relevant and Appropriate Requirement
ATSDR	Agency for Toxic Substances and Disease Registry
BCT	BRAC Cleanup Team
BEQ	Bachelor Enlisted Quarters
BF	Bioaccumulation Factor
bgs	below ground surface
BOQ	Bachelor Officer Quarters
BOS	Base Operations Support
BRAC	Base Realignment and Closure
CAMU	Corrective Action Management Unit
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CLEAN	Comprehensive Long-Term Environmental Action Navy
CPEC	Contaminant of Potential Ecological Concern
CTO	Contract Task Order
DDD	Dichlorodiphenyldichloroethane
DDE	Dichlorodiphenylethylene
DDT	Dichlorodiphenyltrichloroethane
DoD	Department of Defense
DoN	Department of the Navy
EC	Environmental Concentration
EPV	Exposure Point Value
HSP	Health and Safety Plan
ID	Identification
IDW	Investigation-Derived Waste
IR	Installation Restoration
Koc	Organic carbon partition coefficient
LCD	Laboratory Control Duplicate
LCS	Laboratory Control Sample
LOAEL	Lowest Observed Adverse Effect Level

MEM	Measure of Effect Model
mg/kg	milligrams per kilogram
NAF	Naval Air Facility
NFESC	Naval Facilities Engineering Service Center
NOAEL	No Observed Adverse Effect Level
Ogden	Ogden Environmental and Energy Services Co., Inc.
OHM	OHM Corporation
PACNAVFACENGCOM	Pacific Division, Naval Facilities Engineering Command
PE	Performance Evaluation
PMC	Piquniq Management Corporation, Inc.
QA/QC	Quality Assurance/Quality Control
QAPjP	Quality Assurance Project Plan
QC	Quality Control
RAC	Remedial Action Contract
RAGS	Risk Assessment Guidance for Superfund
RCRA	Resource Conservation and Recovery Act
RI	Remedial Investigation
RPD	Relative Percent Difference
SAP	Sampling and Analysis Plan
SERA	Screening Ecological Risk Assessment
SI	Site Inspection
SQL	Sample Quantitation Limit
TACAN	Tactical Aid to Navigation
TBC	To Be Considered
TCLP	Toxicity Characteristic Leaching Procedure
TQ	Toxicity Quotient
TRV	Toxicity Reference Values
UCL	Upper Confidence Limit
USCS	Unified Soil Classification System
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service

EXECUTIVE SUMMARY

This report presents the results of an Abbreviated Remedial Investigation (RI) conducted at the Abandoned and Active Housing Areas on Sand Island (hereafter referred to as the "Housing Area" at Naval Air Facility (NAF) Midway Island.

On the basis of the results of a Site Inspection (SI) performed on Midway in 1994, this RI was conducted to accomplish the following objectives:

- Evaluate the presence and overall extent of DDT, DDE, and DDD surface soil contamination
- Identify potential hot spots
- Assess potential risk to special status bird species from these contaminants
- Determine if remediation is warranted to reduce unacceptable risks

RI field sampling activities were conducted in three phases between July 1 and October 15, 1996. Phase 1 field activities included a land survey of a 270-foot square sampling grid located throughout the Housing Area, collection of 44 composite surface soil samples, and analysis of the samples for DDT, DDE, and DDD. Forty surface soil samples were analyzed by an onsite field laboratory and four duplicate samples were submitted to an offsite laboratory on the U.S. mainland.

Phase 2 field activities consisted of collecting 9 composite and 14 discrete surface soil samples (23 total) in the vicinity of two hot spots identified from the results of the Phase 1 sampling. The two hot spots were located adjacent to Commodore Drive. The second sampling phase attempted to delineate the extent of the identified hot spots. All Phase 2 samples, with the exception of one co-located sample, were analyzed by the field laboratory for DDT, DDE, and DDD. The co-located sample was analyzed by the offsite laboratory.

Phase 3 field activities consisted of collecting 16 discrete surface soil samples to further delineate contamination identified around the two hot spots. All of these samples were analyzed by the field laboratory for DDT, DDE, and DDD.

All chemical data obtained were validated and used for a screening ecological risk assessment (SERA). The SERA was performed using reasonable, yet conservative, assumptions. Analytical data indicated that low levels of DDE, DDT, and DDD are present in surface soils throughout the Housing Area as a result of past pesticide application. The area along Commodore Drive appears to exhibit moderately higher levels of these compounds. The analytical data also indicate that DDT is degrading naturally, with concentrations of DDE exceeding DDT in the majority of samples.

The SERA concluded that the detected concentrations of these compounds present a low risk to special status bird species on a Housing Area-wide basis. However, the identified hot spots near Commodore Drive present a moderate risk to bird species on a point basis; therefore, removal of surface soils from the hot spot area is recommended. This action will reduce site-wide and point location risks to bird species to an acceptable level. Due to the extensive sampling conducted in the area to date, confirmation sampling following soil removal was considered unnecessary.

The excavated soil will contain elevated levels of DDT, DDE, and DDD but is not considered a hazardous waste from a regulatory standpoint because the compounds are present due to past application of pesticides using best management practices and not due to a spill or release. The excavated soil should be treated by stabilization/solidification and placed in the existing Corrective Action Management Unit (CAMU) established in the new Bulky Waste Landfill on Sand Island. Following implementation of this removal action, no further action or investigation is recommended.

SECTION 1
INTRODUCTION

This report presents the results of the Abbreviated Remedial Investigation (RI) of the Abandoned and Active Housing Areas on Sand Island (hereafter referred to as the "Housing Area") at Naval Air Facility (NAF) Midway Island. The Report was prepared by Ogden Environmental and Energy Services Company, Inc. (Ogden) for the Pacific Division, Naval Facilities Engineering Command (PACNAVFACENGCOM) under Comprehensive Long-Term Environmental Action Navy (CLEAN) Contract Task Order (CTO) Number 0136.

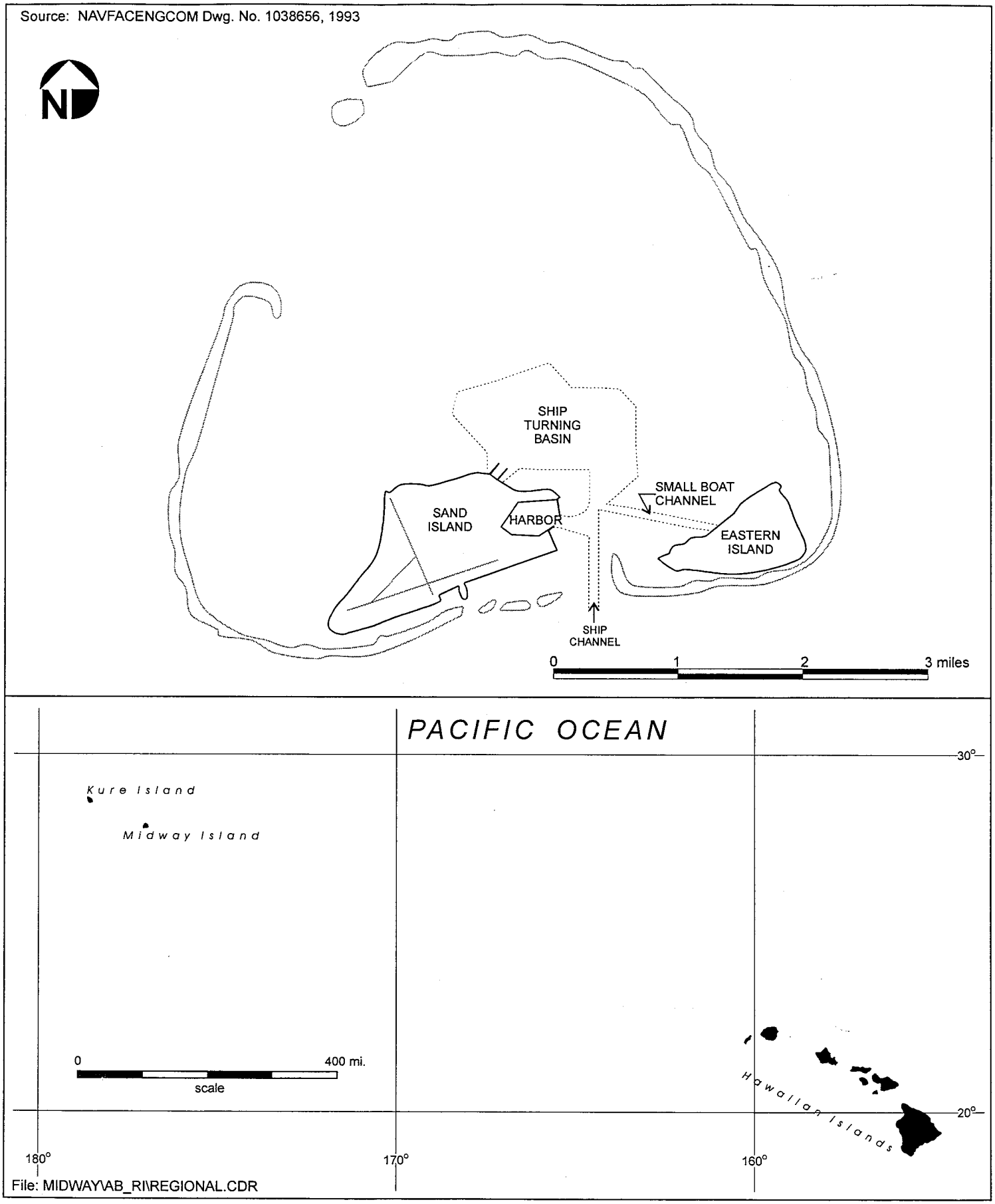
1.1 PROJECT HISTORY

NAF Midway Island (hereafter referred to as "Midway"), in Midway Atoll, located approximately 1,100 miles northwest of Pearl Harbor, Hawaii (Figure 1-1), has been identified for closure pursuant to the Department of Defense (DoD) Base Realignment and Closure Act (BRAC) of 1990 (Public Law 101-510). As a part of this closure, PACNAVFACENGCOM conducted Site Inspections (SIs) at 35 Installation Restoration (IR) sites on Midway (Ogden 1996a); three of the sites inspected and one background sampling area were located within, or immediately adjacent to, the Housing Area. Abandoned portions of the Housing Area were occupied by Navy personnel and their dependents from the 1940s through the early 1970s. Active portions of the Housing Area have been occupied by Navy personnel, contractors, and base tenants since the 1940s.

1.2 PREVIOUS INVESTIGATIONS

Figure 1-2 illustrates the investigation area and the boundaries of the current, abbreviated RI and four of the sites investigated during the previous SI. The analytical results of the SI indicated that the organochlorine pesticide 4,4'-DDT had been widely applied in and around the Housing Area and that elevated levels of 4,4'-DDT, and metabolites 4,4'-DDE and 4,4'-DDD (hereafter referred to as DDT, DDE, and DDD) are present in surface soils. A Screening Ecological Risk Assessment (SERA) was performed as part of the SI to identify potential risks to seabirds exposed to analytes in soils. Figure 1-3 summarizes the analytical results for the four sites investigated during the SI.

Source: NAVFACENGCOM Dwg. No. 1038656, 1993



File: MIDWAY\AB_RI\REGIONAL.CDR

Regional Location Map
Midway Atoll

FIGURE

1-1

LEGEND

HOUSING AREA BOUNDARY

NEW BULKY WASTE LANDFILL

NOTES

1. THE ACCURACY OF THIS DOCUMENT IS LIMITED TO THE QUALITY OF THE SOURCE INFORMATION AND IS NOT SUITABLE FOR MAPPING ENGINEERING APPLICATIONS AND IS NOT TO BE USED FOR "AS BUILT"
2. HORIZONTAL CONTROL POINT ESTABLISHED BY USNS ON SITE WAS USED AS BASIS OF DRAWING
3. VERTICAL CONTROL WAS BASED ON BM#11 WITH AN ELEVATION OF 8.52 FEET (MLLW)
4. PLANE COORDINATE SYSTEM FOR SAND AND EASTERN ISLANDS, ES-217, DRAWING NO.: SUR-6, USNS MIDWAY ISLAND
5. PROJECT NUMBER: 110190136
6. FILE : G:\MIDWAY\RI_PLAN\SAMPLING\HOUSING\04309602.DWG HFP 4-30-96

SOURCES

PERRY ASSOCIATES INC., HOWARD LAWSON & ASSOC.
U. S. NAVAL STATION, MIDWAY ISLAND
DWG. #1038656 DWG. #1038657

TITLE

HOUSING AREA, SI SITES, AND NEW BULKY WASTE LANDFILL SAND ISLAND

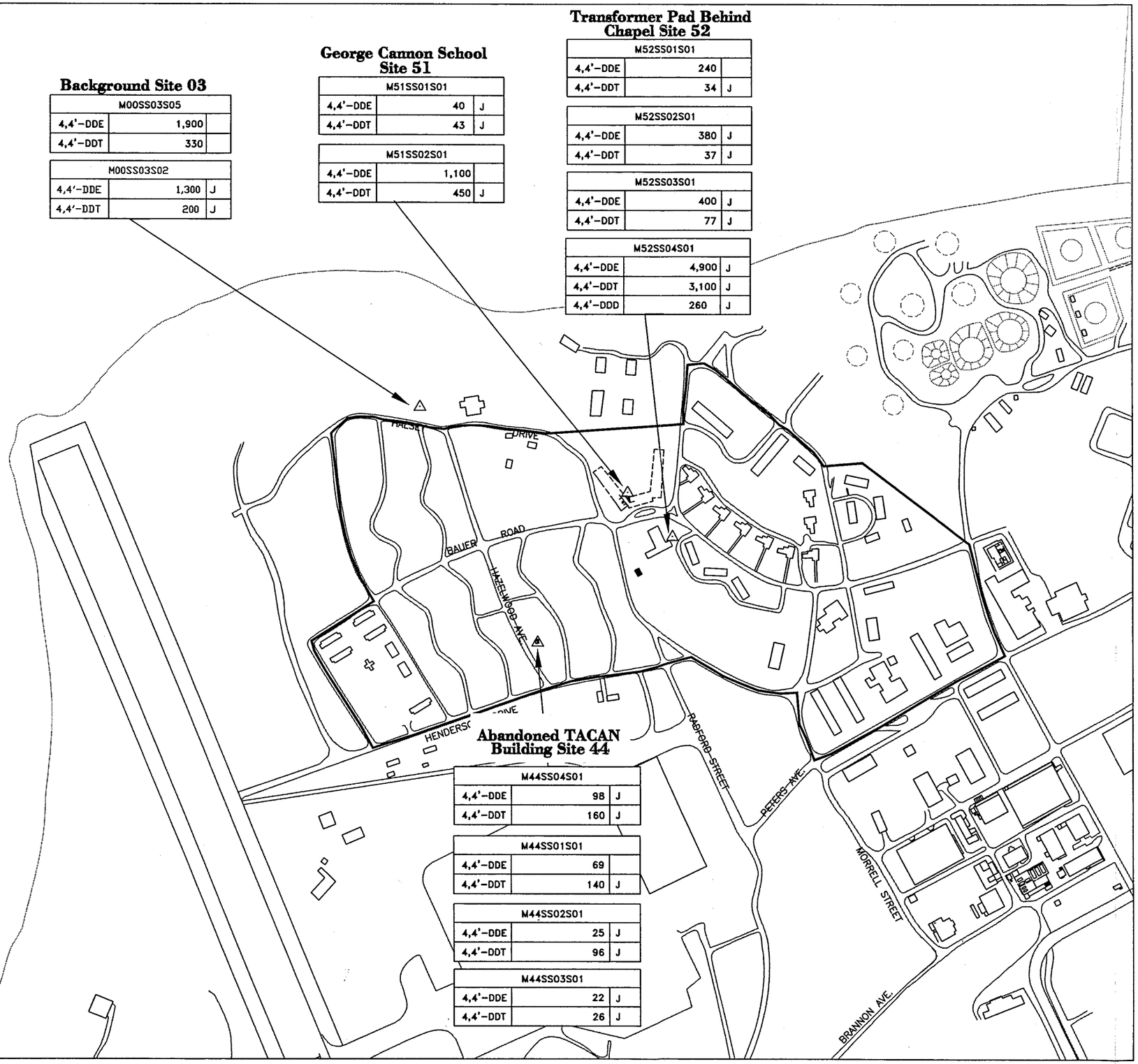
N

FEET
250 0 500 1000

DATE	REV	DRWN	INIT	CHKD	INIT	APPR	INIT
11-18-96		HFP		BW		JMC	

FIGURE

1-2



LEGEND

HOUSING AREA BOUNDARY

△ PREVIOUS SURFACE SOIL SAMPLING LOCATIONS

UNITS IN µg/kg (PARTS PER BILLION)

NOTES

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5. PROJECT NUMBER: 110190136
6. FILE : G:\MIDWAY\RI_PLAN\SAMPLING\HOUSING\05039601.DWG HFP 5-3-96

SOURCES

PERRY ASSOCIATES INC., HOWARD LAWSON & ASSOC.
U. S. NAVAL STATION, MIDWAY ISLAND
DWG. #1038656 DWG. #1038657

TITLE

SURFACE SOIL ANALYTICAL RESULTS FROM PREVIOUS INVESTIGATIONS

N

FEET
250 0 500 1000

DATE	REV	DRWN	INIT	CHKD	INIT	APPR	INIT
11-19-96		HFP		BW		JMC	

FIGURE

1-3

At Site 44 (Abandoned TACAN Building), DDT was detected at a maximum concentration of 0.160 milligrams per kilogram (mg/kg) during the SI. At Site 51 (George Cannon School) DDE was detected at a maximum concentration of 1.1 mg/kg as illustrated in Figure 1-3. The SERA indicated a low level of risk to burrowing birds and shorebirds from exposure to DDE in surface soils at Site 51.

At Site 52 (Transformer Pad Behind Chapel) DDE was detected at a maximum concentration of 4.90 mg/kg during the SI; DDT was detected at a maximum concentration of 3.10 mg/kg (Figure 1-3). On the basis of the results of the SERA, terrestrial wildlife are predicted to be at a low to moderate risk of exposure to DDE and DDT in surface soils at Site 52. Concentrations of DDD, DDE, and DDT detected at Background Site 03 during the SI ranged from 0.20 mg/kg to a maximum of 1.90 mg/kg.

On the basis of the SI and SERA findings, the NAF Midway BRAC Cleanup Team (BCT) identified the Housing Area as an area of concern: DDT and metabolites are present in surface soils at levels that may pose a risk to ground-nesting seabirds, which inhabit Midway in substantial numbers.

1.3 Abbreviated RI Objectives

The primary objectives of the Abbreviated RI were

- To identify DDT and metabolite "hot spots" (concentrations of DDT in soil that have the potential to cause an adverse, short-term chronic effect on ecological receptors) and characterize the extent of contamination, as practicable
- To assess potential contaminant transport pathways and potential receptor populations
- To perform a SERA
- To evaluate appropriate remedial action alternatives where unacceptable risks are identified

To meet these objectives, this abbreviated RI was conducted in accordance with the following planning and guidance documents:

- *Abbreviated Remedial Investigation Sampling and Analysis Plan (SAP) and Quality Assurance Project Plan (QAPjP) for the Active and Abandoned Housing Area, NAF Midway Island* (Ogden 1996b)

- *Navy/Marine Corps Installation Restoration Manual*, February 1992 (Department of the Navy [DoN] 1992)

- *Project Procedures Manual, CLEAN Program*, December 1994 (Ogden 1994 and subsequent updates)

- *U.S. EPA Requirements for Quality Assurance Project Plans for Environmental Data Operations, Interim Final*, May 1994 (USEPA QA/R-5, 1994a)

- *Base Realignment and Closure (BRAC) Cleanup Plan for Midway* (Update No. 2, Ogden 1996c)

SECTION 2
FIELD INVESTIGATION

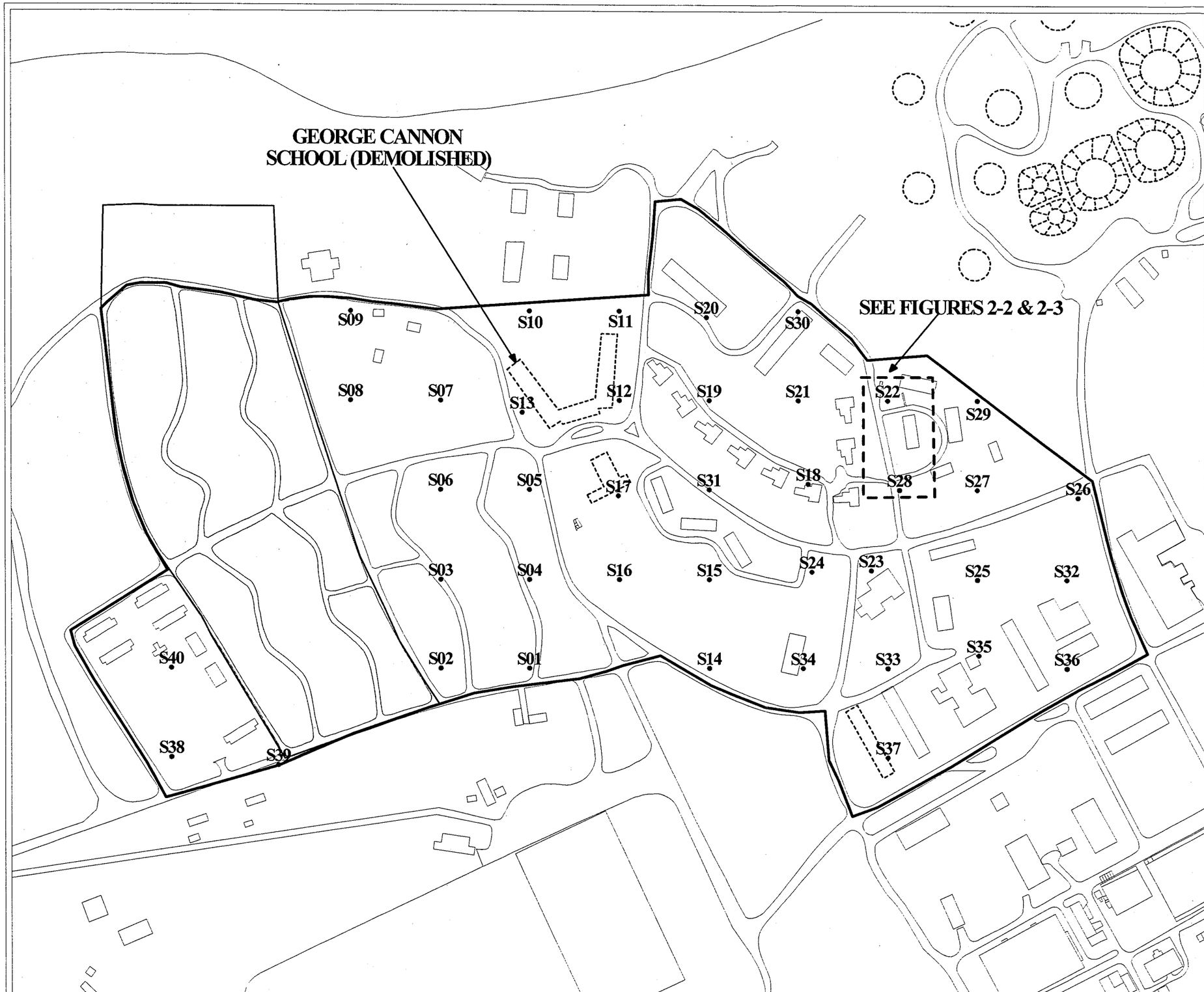
Abbreviated RI field sampling activities were conducted in three separate phases: on July 1 through July 4, 1996; on August 28, 1996; and on October 15, 1996. The initial field sampling event was implemented by the Navy Remedial Action Contract (RAC) Contractor, OHM Corporation (OHM), with oversight by the Ogden Field Manager. The two subsequent sampling events were implemented by OHM personnel only. The field effort was also supported by the Navy Base Operations Support (BOS) Contractor, Piquniq Management Corporation (PMC), who provided land surveying services for layout of the soil sampling grid. Specific field activities are discussed below.

2.1 PRE-INVESTIGATION ACTIVITIES

Before starting field activities, personnel from Ogden, the Navy, the U.S. Fish and Wildlife Service (USFWS), PMC, and OHM met on Midway to review the SAP and QAPjP and to coordinate the planned field activities. A "kick-off" health and safety meeting was also held during which all field personnel reviewed and signed the site-specific Health and Safety Plan (HSP). All field sampling activities were coordinated with onsite USFWS personnel to minimize the impact of field activities to wildlife.

2.2 LAND SURVEY

From June 24 through June 27, 1996, PMC personnel conducted a land survey to layout the sample grid, locate and mark sample locations, and record the horizontal coordinates of the sampling locations (Figure 2-1). Coordinates were referenced to existing site maps prepared as part of the previous SI investigation (Ogden 1996a). The origin of the sampling grid is the intersection of Henderson Drive and Radford Street. Proposed sample locations that were unusable because they fell on paved areas, buildings, or other obstructions were moved to the closest available open space. Sampling locations that were relocated were resurveyed by PMC following completion of sampling activities.



LEGEND

- SAMPLE LOCATIONS
- FORMER STRUCTURES
- BUILDINGS
- HOUSING BOUNDARY
- NEW BULKY WASTE LANDFILL

NOTES

1. THE ACCURACY OF THIS DOCUMENT IS LIMITED TO THE QUALITY OF THE SOURCE INFORMATION AND IS NOT A LEGAL REPRESENTATION OF THE ORIGINAL SURVEY
2. HORIZONTAL CONTROL POINT ESTABLISHED BY USNS ON SITE, WAS USED AS BASIS OF DRAWING
3. VERTICAL CONTROL WAS BASED ON BM#11 WITH AN ELEVATION OF 8.52 FEET (MLLW)
4. PLANE COORDINATE SYSTEM FOR SAND AND EASTERN ISLANDS, ES-217, DRAWING NO.: SUR-6, USNS MIDWAY ISLAND
5. PROJECT NUMBER 3147900001
6. FILE :g:\midway\ri_plan\sampling\housing\abrev_ri.apr 10-5-96

SOURCES

PERRY ASSOCIATES INC., HOWARD LAWSON & ASSOC.
US S. NAVAL STATION, MIDWAY ISLAND, DWG NO.: #1038656, #1038657

TITLE

FIRST PHASE SAMPLING GRID WITH SAMPLE IDENTIFICATION NUMBERS HOUSING AREA

N

250 0 250 500 750 Feet

DATE	REV	DRWN	INT	CHKD	INT	APPR	INT
12/18/96		HFP		BW			

FIGURE

2-1

2.2.1 Soil Sampling Location Layout

The initial sampling layout consisted of 40 surface soil samples located at the nodes of a 270-foot square grid (Figure 2-1). The grid size and number of samples were determined statistically to evaluate the Site effectively. The grid sampling layout produced a 90 percent chance of identifying a contaminant "hot spot" 150-feet in radius. The 150-foot radius was chosen on the basis of the average size of a building in the area.

2.3 SURFACE SOIL SAMPLING

Three separate rounds of sampling were conducted as described below. Table 2-1 lists the types, numbers, and locations of the samples.

2.3.1 First Phase Sampling

From July 1 through July 4, 1996, 40 composite surface soil samples, and 4 composite duplicate samples, were collected by OHM and Ogden field personnel from the locations shown in Figure 2-1. Because of landfill construction and housing demolition activities, no sampling was conducted in the area of the New Bulky Waste Landfill (Figure 2-1).

The samples were collected using a four-point composite sampling technique. At each sample location a 5-foot-by-5-foot square was established, and at each of the four corners of the square, one surface soil sample was collected as follows: the upper 1 to 2 inches of disturbed soil and debris were removed with a clean, stainless steel hand trowel; then a representative sample of the deeper soil, down to a maximum of 6 inches below ground surface (bgs), was collected using a precleaned, disposable plastic hand trowel.

Each of the four discrete soil samples at each grid location was sealed in a glass jar, labeled, and placed in a cooler with frozen blue ice for transport to the OHM field analytical laboratory. There, the four discrete soil samples were homogenized and composited to form one representative soil sample in accordance with USEPA Sections 4.5–4.7, *Removal Program Representative Sampling Guidance* (USEPA 1991). Ten percent of the samples were split in the field lab. OHM submitted one replicate sample to Applied Physics and Chemical Laboratory (APCL) in Chino, California for offsite confirmation analysis.

Table 2-1
SAMPLE LOCATIONS, TYPES, AND LABORATORIES
(Page 2 of 2)

Grid Location	Sample Type	Sample Identification	QC Type	Laboratory
First Sampling Phase (Continued)				
S40	Composite	MX044		OHM
		MX045	PE	APCL
		MX045	PE	OHM
Second Sampling Phase				
N/A	Discrete	MX046		OHM
N/A	Discrete	MX047		OHM
N/A	Discrete	MX048		OHM
N/A	Discrete	MX049		OHM
N/A	Discrete	MX050		OHM
N/A	Discrete	MX051		OHM
N/A	Composite	MX052		OHM
N/A	Composite	MX053		OHM
N/A	Composite	MX054		OHM
N/A	Composite	MX055	Co-located with MX054	APCL
N/A	Composite	MX056		OHM
N/A	Discrete	MX057		OHM
N/A	Discrete	MX058		OHM
N/A	Discrete	MX059		OHM
N/A	Discrete	MX060		OHM
N/A	Discrete	MX061		OHM
N/A	Discrete	MX062		OHM
N/A	Composite	MX063		OHM
N/A	Composite	MX064		OHM
N/A	Composite	MX065		OHM
N/A	Composite	MX066		OHM
N/A	Discrete	MX067		OHM
N/A	Discrete	MX068		OHM
Third Sampling Phase				
N/A	Discrete	MX069		OHM
N/A	Discrete	MX070		OHM
N/A	Discrete	MX071		OHM
N/A	Discrete	MX072		OHM
N/A	Discrete	MX073	Duplicate of MX072	OHM
N/A	Discrete	MX074		OHM
N/A	Discrete	MX075		OHM
N/A	Discrete	MX076		OHM
N/A	Discrete	MX077		OHM
N/A	Discrete	MX078		OHM
N/A	Discrete	MX079		OHM
N/A	Discrete	MX080		OHM
N/A	Discrete	MX081		OHM
N/A	Discrete	MX082		OHM
N/A	Discrete	MX083		OHM
N/A	Discrete	MX084	Duplicate of MX083	OHM

Table 2-1
SAMPLE LOCATIONS, TYPES, AND LABORATORIES
(Page 1 of 2)

Grid Location	Sample Type	Sample Identification	QC Type	Laboratory
First Sampling Phase				
S01	Composite	MX001		OHM
S02	Composite	MX002		OHM
S03	Composite	MX003		OHM
S04	Composite	MX004		OHM
S05	Composite	MX005		OHM
S06	Composite	MX006		OHM
S07	Composite	MX007		OHM
S08	Composite	MX008		OHM
S09	Composite	MX009		OHM
S10	Composite	MX010	Duplicate of MX011	APCL
S10	Composite	MX010	Duplicate of MX011	OHM
S10	Composite	MX011		OHM
S11	Composite	MX012		OHM
S12	Composite	MX013		OHM
S13	Composite	MX014		OHM
S14	Composite	MX015		OHM
S15	Composite	MX016		OHM
S16	Composite	MX017		OHM
S17	Composite	MX018		OHM
S18	Composite	MX019		OHM
S19	Composite	MX020		OHM
S20	Composite	MX021	Duplicate of MX022	APCL
S20	Composite	MX021	Duplicate of MX022	OHM
S20	Composite	MX022		OHM
S21	Composite	MX023		OHM
S22	Composite	MX024		OHM
S23	Composite	MX025		OHM
S24	Composite	MX026		OHM
S25	Composite	MX027		OHM
S26	Composite	MX028		OHM
S27	Composite	MX029		OHM
S28	Composite	MX030		OHM
S29	Composite	MX031		OHM
S30	Composite	MX032	Duplicate of MX033	APCL
S30	Composite	MX032	Duplicate of MX033	OHM
S30	Composite	MX033		OHM
S31	Composite	MX034		OHM
S32	Composite	MX035		OHM
S33	Composite	MX036		OHM
S34	Composite	MX037		OHM
S35	Composite	MX038		OHM
S36	Composite	MX039		OHM
S37	Composite	MX040		OHM
S38	Composite	MX041		OHM
S39	Composite	MX042		OHM
S40	Composite	MX043	Duplicate of MX044	APCL
S40	Composite	MX043	Duplicate of MX044	OHM

2.3.2 Second Phase Sampling

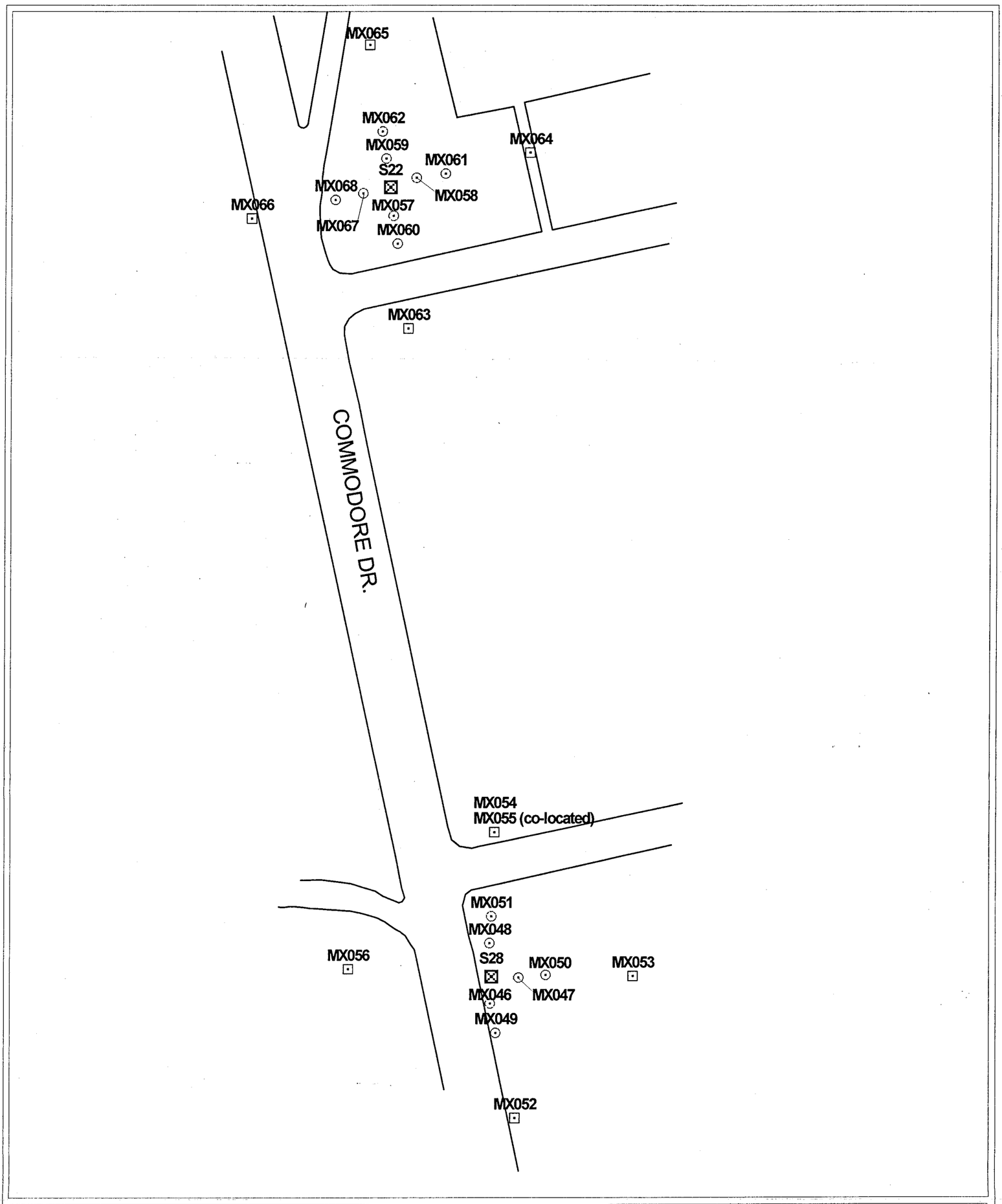
Following receipt of analytical results from the first round of sampling, the BCT requested a second round of sampling to further delineate two hotspots identified at sampling locations MX024 and MX030, respectively (Figure 2-2). OHM personnel thus collected the following additional surface soil samples on August 28, 1996: four discrete samples (non-composited) collected at a 10-foot radius, and four discrete samples collected at a 20-foot radius around each of the two initial sample locations (MX 057 through MX062, MX067, MX068, and MX046 through MX051 in Figure 2-2). Then, four composited samples were collected at a 50-foot radius around each of the two initial sample locations (MX063 through MX066 and MX052 through MX056 in Figure 2-2). The composite samples were homogenized and composited by the OHM field analytical lab. Each discrete sample was collected from one location using the general soil sampling methodology described in Section 2.3.1. All samples were analyzed at the OHM field analytical lab, with one co-located sample submitted to APCL for confirmation analysis.

2.3.3 Third Phase Sampling

Following receipt of analytical results from the second round of sampling, a third round of sampling was implemented to further delineate elevated concentrations of DDE identified at sampling locations MX052, MX056, and MX066 (Figure 2-3). The following additional surface soil samples were collected by OHM personnel on October 15, 1996: at MX052 six discrete samples (non-composited) were collected at 10- and 20-foot radii to the north, east, and south respectively. At MX056 four discrete samples were collected at 10- and 20-foot radii to the west and south, respectively. At MX066 four discrete samples were collected at 10- and 20-foot radii to the northwest and southwest, respectively (Figure 2-3). All samples were analyzed at the OHM field analytical lab.

2.4 FIELD QA/QC REQUIREMENTS

Field Quality Assurance/Quality Control (QA/QC) requirements established in the QAPjP were followed during the entire sampling effort to ensure the integrity of the analytical results. Field QC included field duplicate samples (10 pecent) and two performance evaluation (PE) samples.



LEGEND

SAMPLES
- FIRST PHASE COMPOSITE SAMPLE
- SECOND PHASE COMPOSITE SAMPLE
- SECOND PHASE DISCRETE SAMPLE

ROAD

N

30 0 30 60 90 Feet

NOTES

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3. VERTICAL CONTROL WAS BASED ON BM#11 WITH AN ELEVATION OF 8.52 FEET (MLLW)
4. PLANE COORDINATE SYSTEM FOR SAND AND EASTERN ISLANDS, ES-217, DRAWING NO.: SUR-6, USNS MIDWAY ISLAND
5. PROJECT NUMBER 314790001
6. FILE :g:\midway\ri_plan\sampling\housing\abrev_ri.apr 11-20-96

SOURCES

PERRY ASSOCIATES INC., HOWARD LAWSON & ASSOC.
US S. NAVAL STATION, MIDWAY ISLAND, DWG NO.: #1038656, #1038657

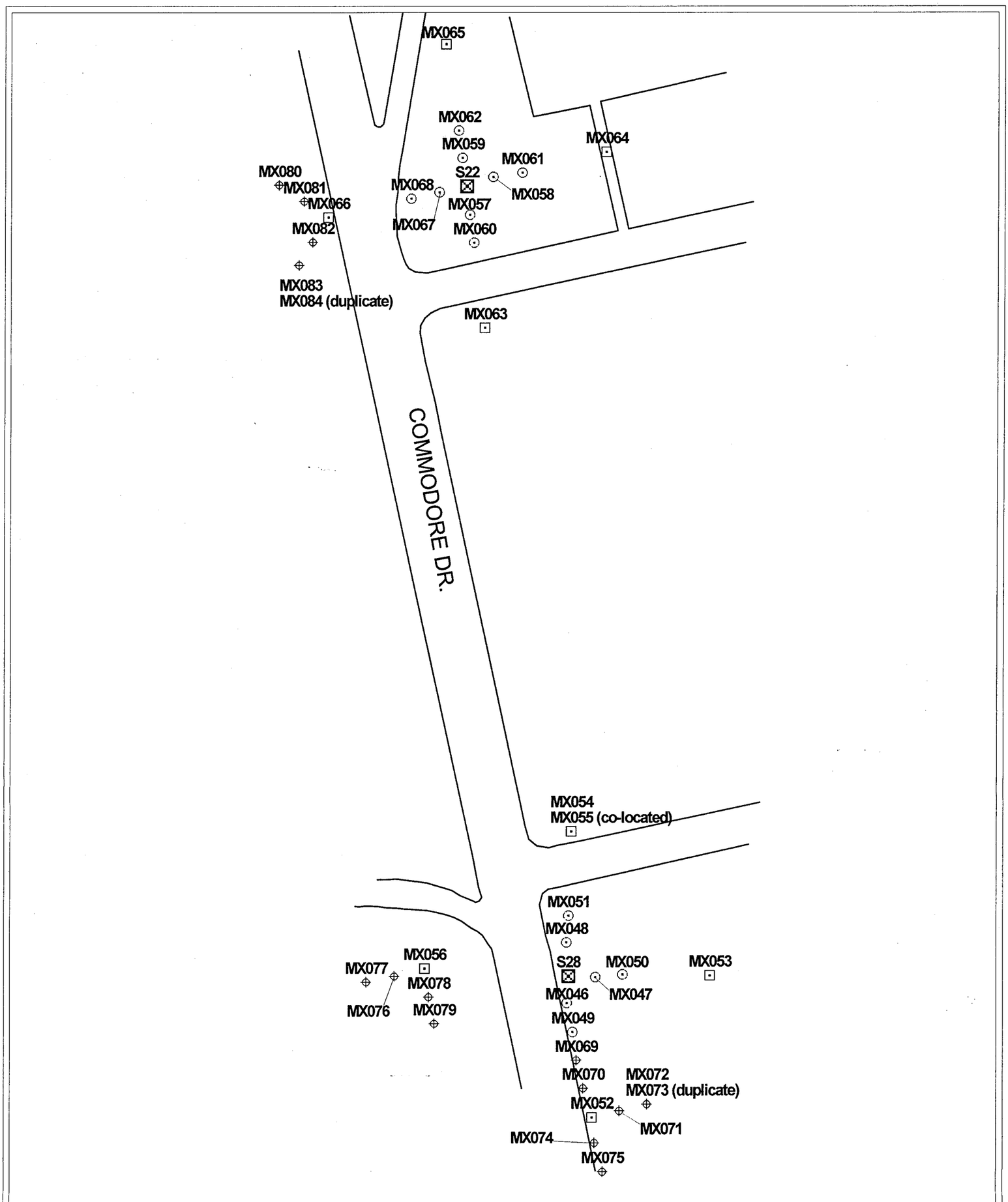
TITLE

SAMPLING LOCATIONS FOR PHASE 2 SAMPLING EPISODES

FIGURE

2-2

DATE	REV	DRWN	INT	CHKD	INT	APPR	INT
12/16/96		HFP		BW			



LEGEND

SAMPLES
- FIRST PHASE COMPOSITE SAMPLE
- SECOND PHASE COMPOSITE SAMPLE
- SECOND PHASE DISCRETE SAMPLE
- THIRD PHASE DISCRETE SAMPLE
- ROAD

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6. FILE :g:\midway\ri_plan\sampling\housing\abrev_ri.apr 11-20-96

SOURCES

PERRY ASSOCIATES INC., HOWARD LAWSON & ASSOC.
US S. NAVAL STATION, MIDWAY ISLAND, DWG NO.: #1038656, #1038657

N

30 0 30 60 90 Feet

FIGURE

2-3

DATE	REV	DRWN	INT	CHKD	INT	APPR	INT
11/20/96		HFP		BW			

TITLE

SAMPLING LOCATIONS FOR PHASE 2 AND 3 SAMPLING EPISODES

Confirmation samples were submitted to APCL for offsite analysis. One PE sample was submitted to the OHM field analytical laboratory and one PE sample was submitted to APCL. Because all sampling equipment used for collection of soil samples was dedicated and disposable, no equipment decontamination rinsate samples or field blank samples were needed or collected.

SECTION 3
PHYSICAL CHARACTERISTICS

This section describes the physical setting of the Housing Area, including the geology, soils, and hydrogeology of the Site and the natural resources found there.

3.1 PHYSICAL SETTING

The Housing Area, as defined in this investigation, is located in the north-central portion of Sand Island and is bordered to the north by Halsey Drive and Commodore Avenue, to the south by Henderson Drive and Peters Avenue, to the east by Nimitz Avenue, and to the west by Decatur Avenue and Roosevelt Avenue (Figure 1-2). Because of the pending closure and transfer of NAF Midway Island, extensive demolition and landfill construction activities are currently underway within the boundaries of the Housing Area. As a result, the number of structures, vegetation patterns, and general Site conditions are changing rapidly. The Housing Area comprises an area of approximately 85 acres and, as of the date of this abbreviated RI, encompasses the following abandoned and operational structures:

- New Bulky Waste Landfill (under construction)
- 6000-series family housing (demolished)
- 400-series officer housing (operational)
- 4000-series officer and VIP housing (operational)
- George Cannon School (demolished)
- Bachelor Officer Quarters (BOQ) "Bravo" and "Charlie" (operational)
- Bachelor Enlisted Quarters (BEQ), Midway Galley, and gymnasium (all operational except BEQ-E which was demolished in July 1996)
- Chapel (demolished)

- Medical Clinic (operational)

Because the abbreviated RI involved sampling of surficial soils only, the following information concerning geologic and hydrogeologic conditions was obtained from the SI performed in September through November 1994 at the following sites within the Housing Area:

- Abandoned TACAN, Bldg. 6395 (Site 44, *surface soil sampling only*)
- George Cannon School, Bldg. 6346 (Site 51, *surface soil sampling only*)
- Transformers Behind Chapel (Site 52, *surface soil sampling only*)
- Sand Island Background Sampling Site Number 03 (*surface soil, subsurface soil, and direct-push ground-water sampling)*

3.1.1 Geology and Soils

On the basis of the surface soil samples, and subsurface samples collected from excavated trenches, the near surface soil is generally described as pale yellow (Munsell color: 2.5Y 8/3), fine- to coarse-grained, poorly sorted coralline sand (Unified Soil Classification System: SW), with minor amounts of silt and coral gravel.

3.1.2 Hydrogeology

Field observations indicated that ground water beneath the Housing Area exists under unconfined conditions within a calcareous sand formation. On the basis of the ground-water sampling performed in the vicinity of the Housing Area, the water table level ranges from 3 to 5 feet bgs.

3.2 Natural Resource Features

The habitat within the Housing Area consists of ruderal, disturbed, and developed habitats. Developed areas onsite include all of the buildings and paved areas that are unvegetated. Due to the base closure operations a considerable portion of the Site consists of recently disturbed habitats, either open ground where buildings were recently demolished, or areas where excavation has occurred, such as the new Bulky Waste Landfill that is undergoing construction and operation at this time. These disturbed areas

are only sparsely vegetated with opportunistic plant species, primarily golden crown-beard (*Verbesina encelioides*). The remainder of the land is vegetated with ruderal habitat consisting of lawns and ornamental plantings along the roads and around buildings. Most of these areas are regularly maintained by mowing and trimming.

The ruderal and disturbed habitats onsite are used for nesting by several species of migratory seabirds and for foraging by two species of shorebirds. White terns (*Gygis alba*) use trees and level areas of buildings as nesting sites. Bird species observed onsite include Laysan albatross (*Diomedea immutabilis*), white tern, red-tailed tropicbird (*Phaethon rubricauda*), white-tailed tropicbird (*Phaethon lepturus*), Bonin petrel (*Pterodroma hypoleuca*), ruddy turnstone (*Arenaria interpres*), and Pacific golden-plover (*Pluvialis fulva*).

3.2 Sensitive Resources

No sensitive habitats or threatened or endangered species currently occur within the Housing Area on Midway. The sensitive wildlife species that occur onsite are those migratory sea and shore birds listed above, which are federally protected under the Migratory Bird Treaty Act.

SECTION 4
NATURE AND EXTENT OF CONTAMINATION

This section presents information on the concentrations of DDT and metabolites detected in surface soil samples collected at the Housing Area, as determined by laboratory chemical analyses.

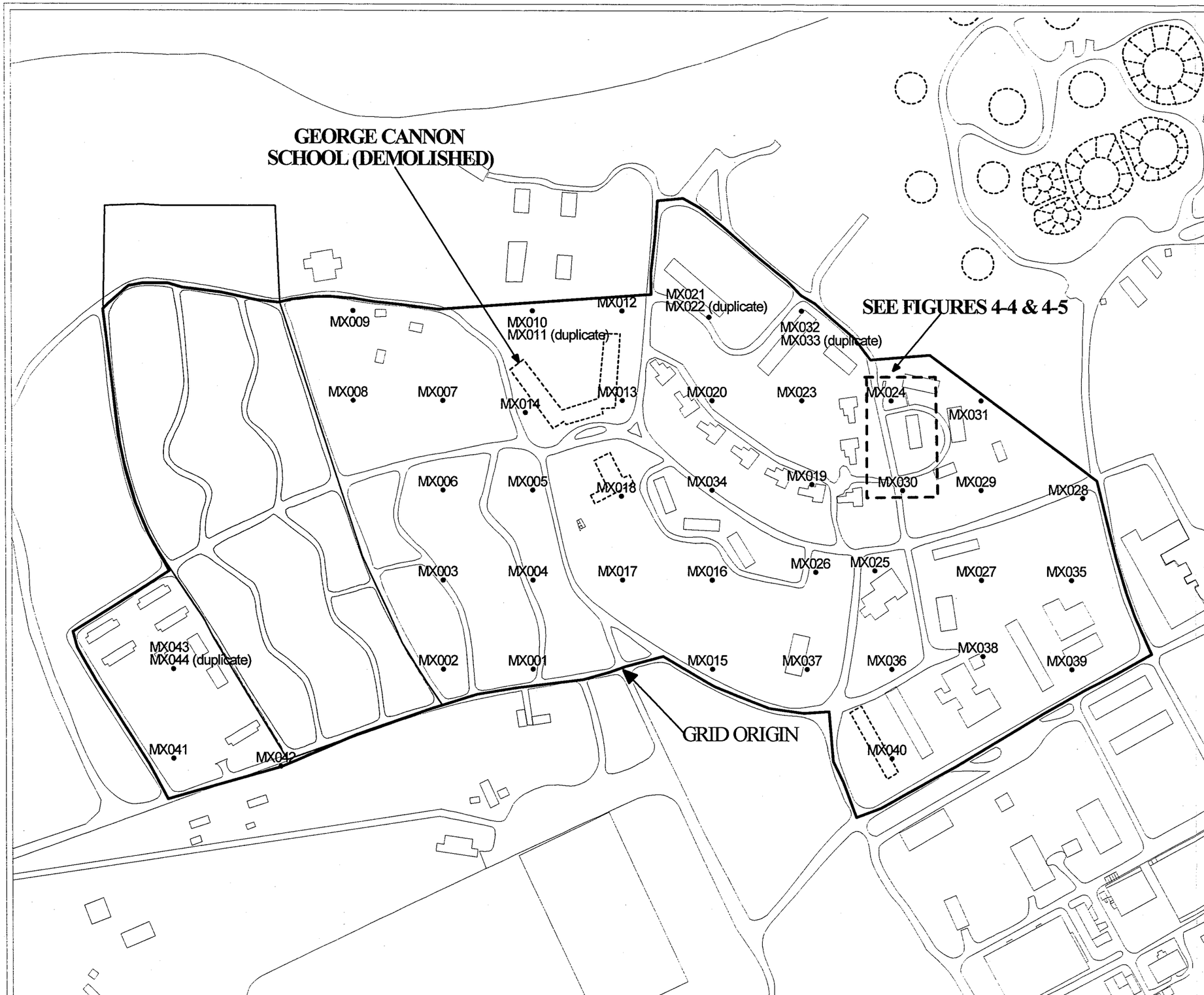
4.1 DATA PRESENTATION

Chemical analytical data are presented using the sample numbers assigned by the field laboratory. For composite sampling, four grab samples were collected at each grid node, as described in Section 2, and were labeled in the field according to the grid node number. For example, at grid node number 04, samples were labeled S04A, S04B, S04C, and S04D. In the field laboratory, the four samples were homogenized, composited, and assigned a unique sample identification (ID) number (e.g., MX004). It should be noted that because duplicate samples were collected, the unique sample ID number does not usually reflect the grid node number from which the sample was derived. Figure 4-1 illustrates the sample grid and associated composite sample identification numbers.

During sampling phases two and three, composite samples were handled the same as described above; however, discrete (i.e. non-composited) samples were assigned a unique sample ID number in the field (e.g. MX070). Figure 4-2 illustrates the sampling locations and associated sample ID numbers for the second and third phase of sampling.

4.2 ANALYTICAL METHODS

The soil samples were analyzed for DDT, DDE, and DDD by the OHM field laboratory using Modified USEPA Method 8080. All field laboratory results were validated by Ogden using NFESC Level E QC standards (equivalent to USEPA Level V). Approximately 10 percent of the samples were replicates (homogenized split samples) submitted to APCL in Chino, California for confirmation analysis by USEPA Method 8080. These results were validated by Ogden using NFESC Level D QC standards (equivalent to USEPA Level IV). Table 4-1 summarizes the analytical methods used for all samples collected during the field investigation.



LEGEND

- SAMPLE LOCATIONS
- FORMER STRUCTURES
- BUILDINGS
- HOUSING BOUNDARY
- NEW BULKY WASTE LANDFILL

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5. PROJECT NUMBER 314790001
6. FILE :g:\midway\ri_plan\sampling\housing\abrev_ri.apr 10-5-96

SOURCES

PERRY ASSOCIATES INC., HOWARD LAWSON & ASSOC.
US S. NAVAL STATION, MIDWAY ISLAND, DWG NO.: #1038656, #1038657

TITLE

FIRST PHASE SAMPLING GRID WITH SAMPLE IDENTIFICATION NUMBERS HOUSING AREA

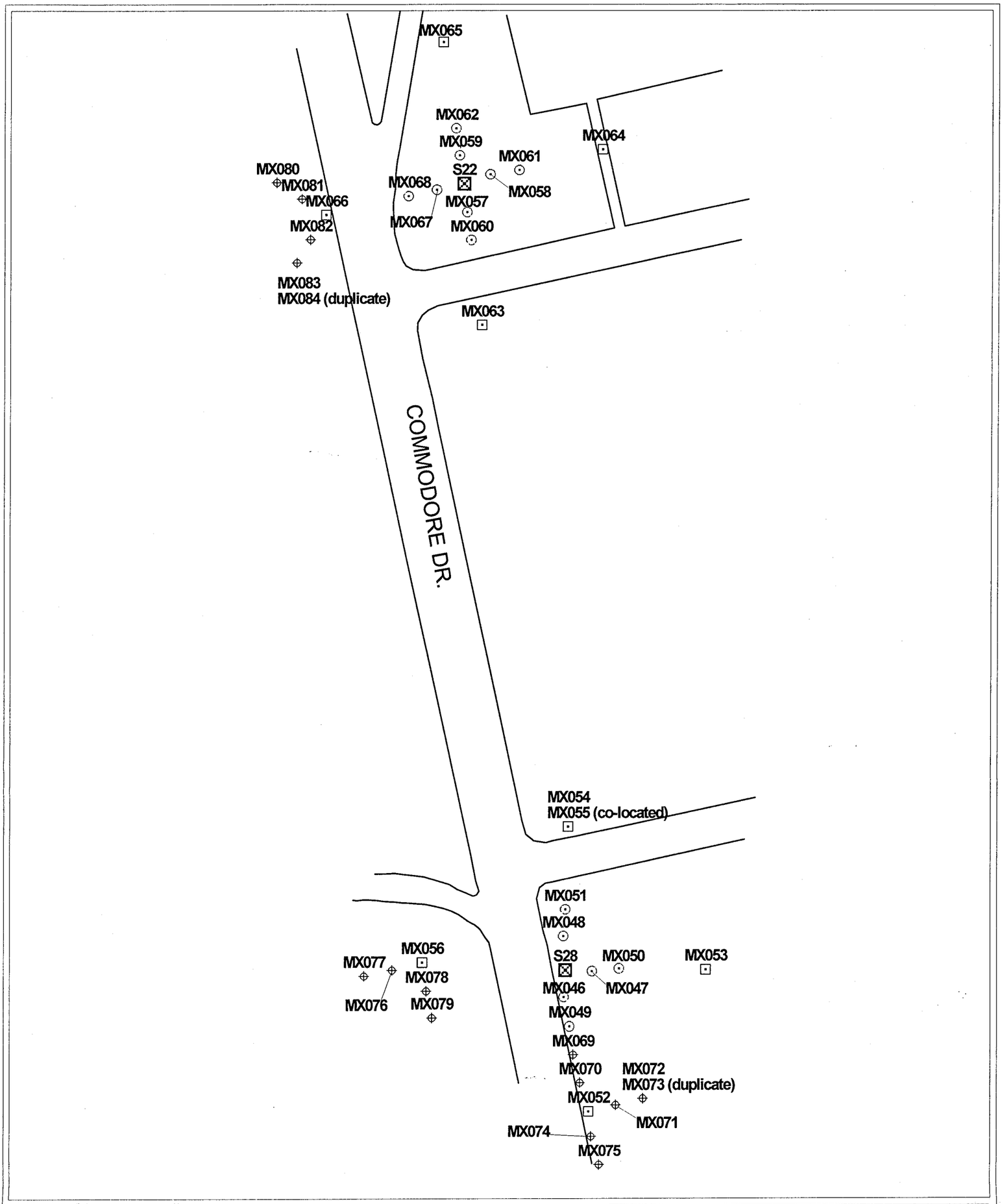
N

250 0 250 500 750 Feet

DATE	REV	DRWN	INT	CHKD	INT	APPR	INT
12/16/96		HFP		BW			

FIGURE

4-1



LEGEND

SAMPLES
- ⊠ FIRST PHASE COMPOSITE SAMPLE
- ⊡ SECOND PHASE COMPOSITE SAMPLE
- ⊙ SECOND PHASE DISCRETE SAMPLE
- ⌖ THIRD PHASE DISCRETE SAMPLE
- ROAD

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5. PROJECT NUMBER 314790001
6. FILE :g:\midway\ri_plan\sampling\housing\abrev_ri.apr 11-20-96

SOURCES

PERRY ASSOCIATES INC., HOWARD LAWSON & ASSOC.
US S. NAVAL STATION, MIDWAY ISLAND, DWG NO.: #1038656, #1038657

N

30 0 30 60 90 Feet

FIGURE

4-2

DATE	REV	DRWN	INT	CHKD	INT	APPR	INT
11/20/96		HFP		BW			

TITLE

SAMPLING LOCATIONS FOR PHASE 2 AND 3 SAMPLING EPISODES

Table 4-1
ANALYTICAL METHODS
(Page 1 of 2)

Sample Identification	Analytical Method	Laboratory
First Sampling Phase		
MX001	EPA 8080 Mod	OHM
MX002	EPA 8080 Mod	OHM
MX003	EPA 8080 Mod	OHM
MX004	EPA 8080 Mod	OHM
MX005	EPA 8080 Mod	OHM
MX006	EPA 8080 Mod	OHM
MX007	EPA 8080 Mod	OHM
MX008	EPA 8080 Mod	OHM
MX009	EPA 8080 Mod	OHM
MX010	EPA 8080	APCL
MX010	EPA 8080 Mod	OHM
MX011	EPA 8080 Mod	OHM
MX012	EPA 8080 Mod	OHM
MX013	EPA 8080 Mod	OHM
MX014	EPA 8080 Mod	OHM
MX015	EPA 8080 Mod	OHM
MX016	EPA 8080 Mod	OHM
MX017	EPA 8080 Mod	OHM
MX018	EPA 8080 Mod	OHM
MX019	EPA 8080 Mod	OHM
MX020	EPA 8080 Mod	OHM
MX021	EPA 8080	APCL
MX021	EPA 8080 Mod	OHM
MX022	EPA 8080 Mod	OHM
MX023	EPA 8080 Mod	OHM
MX024	EPA 8080 Mod	OHM
MX025	EPA 8080 Mod	OHM
MX026	EPA 8080 Mod	OHM
MX027	EPA 8080 Mod	OHM
MX028	EPA 8080 Mod	OHM
MX029	EPA 8080 Mod	OHM
MX030	EPA 8080 Mod	OHM
MX031	EPA 8080 Mod	OHM
MX032	EPA 8080	APCL
MX032	EPA 8080 Mod	OHM
MX033	EPA 8080 Mod	OHM
MX034	EPA 8080 Mod	OHM
MX035	EPA 8080 Mod	OHM
MX036	EPA 8080 Mod	OHM
MX037	EPA 8080 Mod	OHM
MX038	EPA 8080 Mod	OHM
MX039	EPA 8080 Mod	OHM
MX040	EPA 8080 Mod	OHM
MX041	EPA 8080 Mod	OHM
MX042	EPA 8080 Mod	OHM
MX043	EPA 8080	APCL
MX043	EPA 8080 Mod	OHM

Table 4-1
ANALYTICAL METHODS
(Page 2 of 2)

Sample Identification	Analytical Method	Laboratory
First Sampling Phase (Continued)		
MX044	EPA 8080 Mod	OHM
MX045	EPA 8080	APCL
MX045	EPA 8080 Mod	OHM
Second Sampling Phase		
MX046	EPA 8080 Mod	OHM
MX047	EPA 8080 Mod	OHM
MX048	EPA 8080 Mod	OHM
MX049	EPA 8080 Mod	OHM
MX050	EPA 8080 Mod	OHM
MX051	EPA 8080 Mod	OHM
MX052	EPA 8080 Mod	OHM
MX053	EPA 8080 Mod	OHM
MX054	EPA 8080 Mod	OHM
MX055	EPA 8080	APCL
MX056	EPA 8080 Mod	OHM
MX057	EPA 8080 Mod	OHM
MX058	EPA 8080 Mod	OHM
MX059	EPA 8080 Mod	OHM
MX060	EPA 8080 Mod	OHM
MX061	EPA 8080 Mod	OHM
MX062	EPA 8080 Mod	OHM
MX063	EPA 8080 Mod	OHM
MX064	EPA 8080 Mod	OHM
MX065	EPA 8080 Mod	OHM
MX066	EPA 8080 Mod	OHM
MX067	EPA 8080 Mod	OHM
MX068	EPA 8080 Mod	OHM
Third Sampling Phase		
MX069	EPA 8080 Mod	OHM
MX070	EPA 8080 Mod	OHM
MX071	EPA 8080 Mod	OHM
MX072	EPA 8080 Mod	OHM
MX073	EPA 8080 Mod	OHM
MX074	EPA 8080 Mod	OHM
MX075	EPA 8080 Mod	OHM
MX076	EPA 8080 Mod	OHM
MX077	EPA 8080 Mod	OHM
MX078	EPA 8080 Mod	OHM
MX079	EPA 8080 Mod	OHM
MX080	EPA 8080 Mod	OHM
MX081	EPA 8080 Mod	OHM
MX082	EPA 8080 Mod	OHM
MX083	EPA 8080 Mod	OHM
MX084	EPA 8080 Mod	OHM

4.3 SUMMARY OF ANALYTICAL RESULTS

In the following sections, results are presented in units of mg/kg. The tables presenting analytical data include data validation qualifier codes. Complete NFESC Level E analytical data packages from the OHM field laboratory are included in Appendix A. Complete NFESC Level D analytical data packages from APCL laboratory are included in Appendix B. Data validation results are summarized in Section 4.4; the full data validation reports are provided in Appendix C.

4.3.1 First Sampling Phase Analytical Results

Forty composite surface soil samples and four duplicate samples were collected from the Housing Area and analyzed for DDT, DDE, and DDD. Figure 4-1 illustrates the sample locations and corresponding sample identification numbers. Table 4-2 summarizes the analytical results for all samples.

DDE was the most frequently detected analyte, and was quantitated above the field laboratory detection limit of 0.10 mg/kg in 25 of the 44 samples (including duplicates) collected. DDT was the next most frequently detected compound (13 out of 44 samples), while DDD was detected in 5 out of 44 samples.

Sampling location MX030 exhibited the maximum concentrations for DDT, DDE, and DDD (73.0, 45.0, and 8.5 mg/kg, respectively) as shown on Figure 4-3. The next highest concentrations were detected in sample MX024 (65.0, 27.0, and 6.0 mg/kg, respectively). These samples were collected at adjacent grid nodes, immediately east of Commodore Drive adjacent to Buildings 4209 and 4212 (Figure 4-3). Two samples, MX013 and MX014, located immediately east and west of the former George Cannon school (demolished in summer 1996) exhibited elevated levels of the analytes DDE and DDT. Sample MX013 contained 8.8 mg/kg DDE, 1.9 mg/kg DDT, and 0.13 mg/kg DDD; sample MX014 was found to contain 9.3 mg/kg DDE, 1.5 mg/kg DDT, and 0.14 mg/kg DDD (Figure 4-3).

Six samples contained DDE at a concentration greater than 1 mg/kg: MX012 (3.4 mg/kg), MX018 (4.5 mg/kg), MX019 (4.3 mg/kg), MX020 (4.3 mg/kg), MX037 (1.5 mg/kg), and MX041 (3.7 mg/kg). None of these samples contained DDT or DDD above 1 mg/kg. No other sample exhibited any analyte at a concentration greater than 1 mg/kg (Figure 4-3).

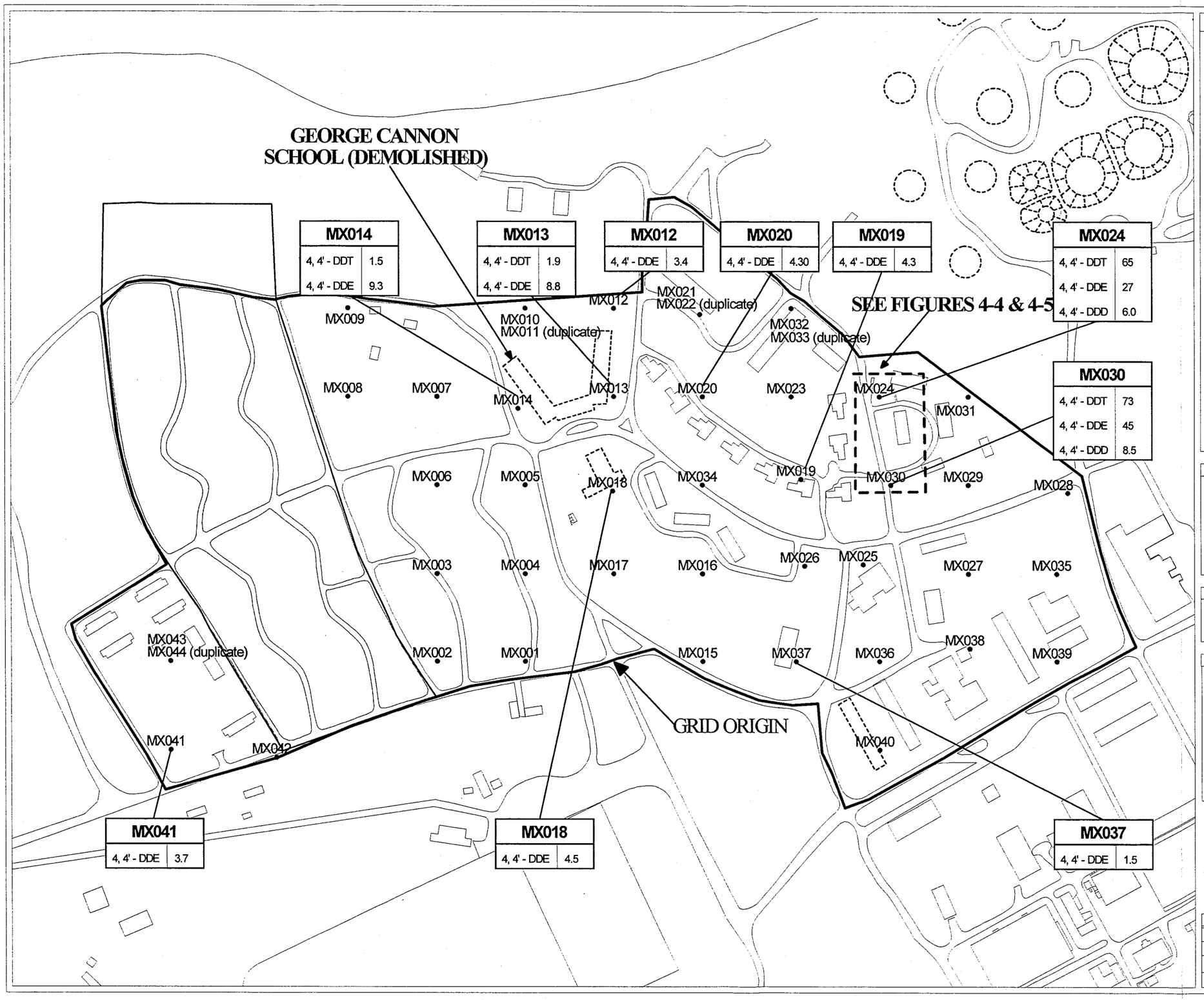
Table 4-2
SUMMARY OF ANALYTICAL RESULTS
ABBREVIATED RI, HOUSING AREA
NAF MIDWAY ISLAND
(Page 1 of 2)

Sample Identification	Sample Type	4,4'-DDE (mg/kg)	4,4'-DDD (mg/kg)	4,4'-DDT (mg/kg)
First Sampling Phase				
MX001	Composite	0.16	0.10 U	0.10 U
MX002	Composite	0.14	0.10 U	0.10 U
MX003	Composite	0.10 U	0.10 U	0.10 U
MX004	Composite	0.52	0.10 U	0.12
MX005	Composite	0.10 U	0.10 U	0.10 U
MX006	Composite	0.53	0.10 U	0.10 U
MX007	Composite	0.10 U	0.10 U	0.10 U
MX008	Composite	0.10 U	0.10 U	0.10 U
MX009	Composite	0.38	0.10 U	0.10 U
MX010 (Duplicate of MX011)[1]	Composite	0.007	0.001 J	0.005
MX010 (Duplicate of MX011)[2]	Composite	0.10 U	0.10 U	0.10 U
MX011	Composite	0.10 U	0.10 U	0.10 U
MX012	Composite	3.40	0.10 U	0.53
MX013	Composite	8.80	0.13	1.90
MX014	Composite	9.30	0.14	1.50
MX015	Composite	0.10 U	0.10 U	0.10 U
MX016	Composite	0.10 U	0.10 U	0.10 U
MX017	Composite	0.58	0.10 U	0.10 U
MX018	Composite	4.50	0.10 U	0.34
MX019	Composite	4.30	0.10 U	0.51
MX020	Composite	4.30	0.10 U	0.42
MX021 (Duplicate of MX022)[1]	Composite	0.002 U	0.0009 J	0.006
MX021 (Duplicate of MX022)[2]	Composite	0.10 U	0.10 U	0.10 U
MX022	Composite	0.10 U	0.10 U	0.10 U
MX023	Composite	0.10 U	0.10 U	0.10 U
MX024	Composite	27.00	6.00	65.00
MX025	Composite	0.17	0.10 U	0.10 U
MX026	Composite	0.63	0.10 U	0.10 U
MX027	Composite	0.26	0.10 U	0.10 U
MX028	Composite	0.10 U	0.10 U	0.10 U
MX029	Composite	0.20	0.10 U	0.10 U
MX030	Composite	45.00	8.50	73.00
MX031	Composite	0.10 U	0.10 U	0.10 U
MX032 (Duplicate of MX033)[1]	Composite	0.491 D	0.065 D	0.206 D
MX032 (Duplicate of MX033)[2]	Composite	0.65	0.10 U	0.16
MX033	Composite	0.73	0.10 U	0.18
MX034	Composite	0.23	0.10 U	0.10 U
MX035	Composite	0.10 U	0.10 U	0.10 U
MX036	Composite	0.10 U	0.10 U	0.10 U
MX037	Composite	1.5	0.10 U	0.18
MX038	Composite	0.38	0.10 U	0.10 U
MX039	Composite	0.10 U	0.10 U	0.10 U
MX040	Composite	0.10 U	0.10 U	0.10 U
MX041	Composite	3.7	0.11	0.63
MX042	Composite	0.22	0.10 U	0.10 U
MX043 (Duplicate of MX044)[1]	Composite	0.009	0.0009 JP	0.004

Table 4-2
SUMMARY OF ANALYTICAL RESULTS
ABBREVIATED RI, HOUSING AREA
NAF MIDWAY ISLAND
(Page 2 of 2)

Sample Identification	Sample Type	4,4'-DDE (mg/kg)	4,4'-DDD (mg/kg)	4,4'-DDT (mg/kg)
First Sampling Phase (Continued)				
MX043 (Duplicate of MX044)[2]	Composite	0.10 U	0.10 U	0.10 U
MX044	Composite	0.10 U	0.10 U	0.10 U
MX045 (PE)[1]	Composite	1.24	0.77	0.34
MX045 (PE)[2]	Composite	1.03	1.10	0.36
Second Sampling Phase				
MX046	Discrete	8.30	0.41	1.30
MX047	Discrete	4.00	0.10 U	0.43
MX048	Discrete	7.30	0.10 U	0.83
MX049	Discrete	9.60	0.70	2.1
MX050	Discrete	4.00	0.10 U	0.79
MX051	Discrete	1.30	0.10 U	0.10 U
MX052	Composite	6.90	0.55	2.40
MX053	Composite	0.81	0.10 U	0.10 U
MX054	Composite	2.60	0.10 U	0.77
MX055 (Co-located with MX054)[1]	Composite	0.10	0.49	0.23
MX056	Composite	14.00	0.76	2.00
MX057	Discrete	6.40	0.10 U	0.48
MX058	Discrete	3.50	0.10 U	0.10 U
MX059	Discrete	9.30	0.24	0.99
MX060	Discrete	2.60	0.10 U	0.10 U
MX061	Discrete	0.43	0.10 U	0.10 U
MX062	Discrete	5.60	0.10 U	0.55
MX063	Composite	4.20	0.10 U	0.50
MX064	Composite	1.40	1.90	0.31
MX065	Composite	3.80	0.10 U	0.38
MX066	Composite	13.00	0.45	4.30
MX067	Discrete	9.40	0.23	0.96
MX068	Discrete	7.40	0.29	0.72
Third Sampling Phase				
MX069	Discrete	4.61	0.10 U	1.34
MX070	Discrete	4.81	0.14	2.11
MX071	Discrete	1.22	0.10 U	0.14
MX072	Discrete	2.54	0.10 U	0.21
MX073 (Duplicate of MX072)	Discrete	1.69	0.10 U	0.13
MX074	Discrete	5.01	0.13	1.19
MX075	Discrete	8.23	0.32	3.06
MX076	Discrete	12.58	0.29	1.47
MX077	Discrete	7.40	0.26	1.05
MX078	Discrete	5.23	0.10 U	0.38
MX079	Discrete	2.65	0.10 U	0.45
MX080	Discrete	5.81	0.19	1.38
MX081	Discrete	9.19	0.26	1.83
MX082	Discrete	17.51	0.30	2.03
MX083	Discrete	1.23	0.10 U	0.10 U
MX084 (Duplicate of MX083)	Discrete	1.25	0.10 U	0.10 U

(1) Sample analyzed by APCL
(2) Sample analyzed by OHM
Duplicates were replicates that were homogenized and split by the OHM Field Laboratory



LEGEND

- SAMPLE LOCATIONS
- FORMER STRUCTURES
- BUILDINGS
- HOUSING BOUNDARY
- NEW BULKY WASTE LANDFILL

ALL UNITS IN MG/KG

NOTES

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2. HORIZONTAL CONTROL POINT ESTABLISHED BY USNS ON SITE, WAS USED AS BASIS OF DRAWING
3. VERTICAL CONTROL WAS BASED ON BM#11 WITH AN ELEVATION OF 8.52 FEET (MLLW)
4. PLANE COORDINATE SYSTEM FOR SAND AND EASTERN ISLANDS, ES-217, DRAWING NO.: SUR-6, USNS MIDWAY ISLAND
5. PROJECT NUMBER 314790001
6. FILE :g:\midway\ri_plan\sampling\housing\abrev_ri.apr 10-5-96

SOURCES

PERRY ASSOCIATES INC., HOWARD LAWSON & ASSOC.
US S. NAVAL STATION, MIDWAY ISLAND, DWG NO.: #1038656, #1038657

TITLE

SUMMARY OF FIRST PHASE DETECTED COMPOUNDS GREATER THAN 1 MG/KG HOUSING AREA

N

250 0 250 500 750 Feet

DATE	REV	DRWN	INT	CHKD	INT	APPR	INT
12/16/96		HFP		BW			

FIGURE

4-3

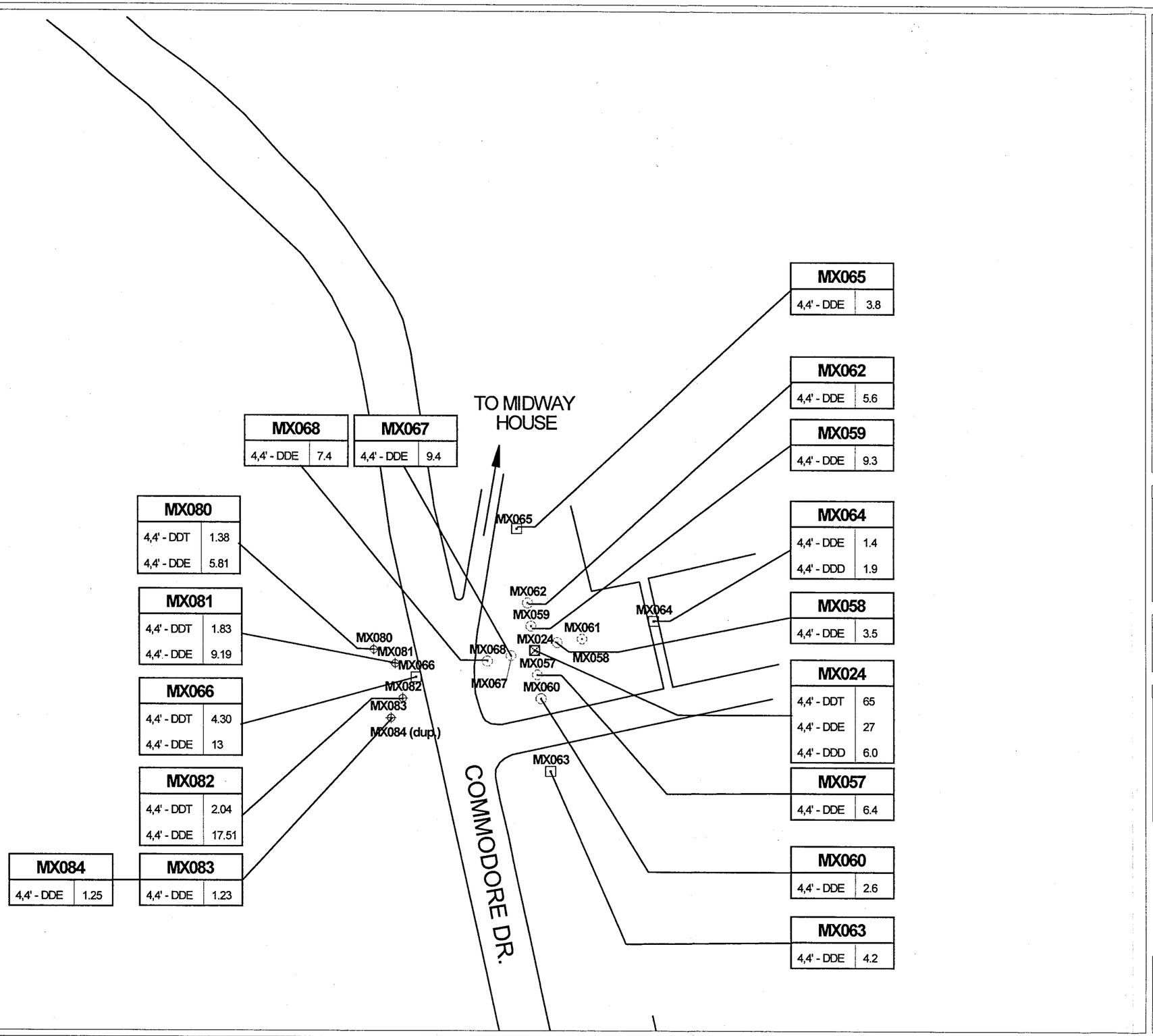
Following evaluation of these analytical data, the BCT determined that additional sampling was necessary in the vicinity of samples MX024 and MX030 to delineate the extent of the high concentrations of DDT and metabolites. Therefore, a second phase of sampling was initiated as summarized below. The BCT required no additional sampling of other areas. George Cannon school (samples MX013 and MX014) was not sampled again because the building was demolished after the sampling event; surface soils adjacent to the building were removed following demolition to mitigate risks to nesting seabirds from ingesting chips of lead-based paint; and the hot spot analysis showed that the concentrations did not pose a risk to seabirds (Section 7.0).

4.3.2 Second Sampling Phase Analytical Results

Twenty three surface soil samples (including one co-located sample) were collected during the second sampling phase. Nine composite surface soil samples (including one duplicate), and 14 discrete surface soil samples were collected from the area adjacent to Commodore Drive as illustrated in Figure 4-2. The composite samples were collected at a distance of 50 feet from each of the initial sampling locations, while the discrete samples were collected at distances of 10 and 20 feet from the initial sampling locations.

DDE was the most frequently detected analyte and was quantitated above the field laboratory detection limit of 0.10 mg/kg in 23 of the 23 samples collected. DDT was the next most frequently detected compound (18 of 23 samples), while DDD was detected in 10 of 23 samples. Figures 4-4 and 4-5 illustrate the analytes detected at concentrations greater than 1 mg/kg in the second round of sampling.

The concentration of DDE exceeded that of DDT in all but one of the second round samples. Composite sample MX056, exhibited the maximum concentration of DDE (14 mg/kg), with a DDT concentration of 2.0 mg/kg, while composite sample MX052 contained the highest DDT concentration (2.4 mg/kg) and a DDE concentration of 6.9 mg/kg (Figure 4-4). Only composite samples MX055 and MX064 collected during the abbreviated RI exhibited greater concentrations of DDD (0.49, 1.9) than DDE (0.1, 1.4) or DDT (0.23, 0.31, respectively).



LEGEND

SAMPLES
- ⊠ FIRST PHASE COMPOSITE SAMPLE
- ⊡ SECOND PHASE COMPOSITE SAMPLE
- ⊙ SECOND PHASE DISCRETE SAMPLE
- ⌖ THIRD PHASE DISCRETE SAMPLE

ALL UNITS IN MG/KG

NOTES

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4. PLANE COORDINATE SYSTEM FOR SAND AND EASTERN ISLANDS, ES-217, DRAWING NO.: SUR-6, USNS MIDWAY ISLAND
5. PROJECT NUMBER 314790001
6. FILE :g:\midway\ri_plan\sampling\housing\abrev_ri.apr 10-5-96

SOURCES

PERRY ASSOCIATES INC., HOWARD LAWSON & ASSOC.
US S. NAVAL STATION, MIDWAY ISLAND, DWG NO.: #1038656, #1038657

TITLE

SUMMARY OF SECOND AND THIRD PHASE DETECTED COMPOUNDS GREATER THAN 1 MG/KG NEAR SAMPLE MX024

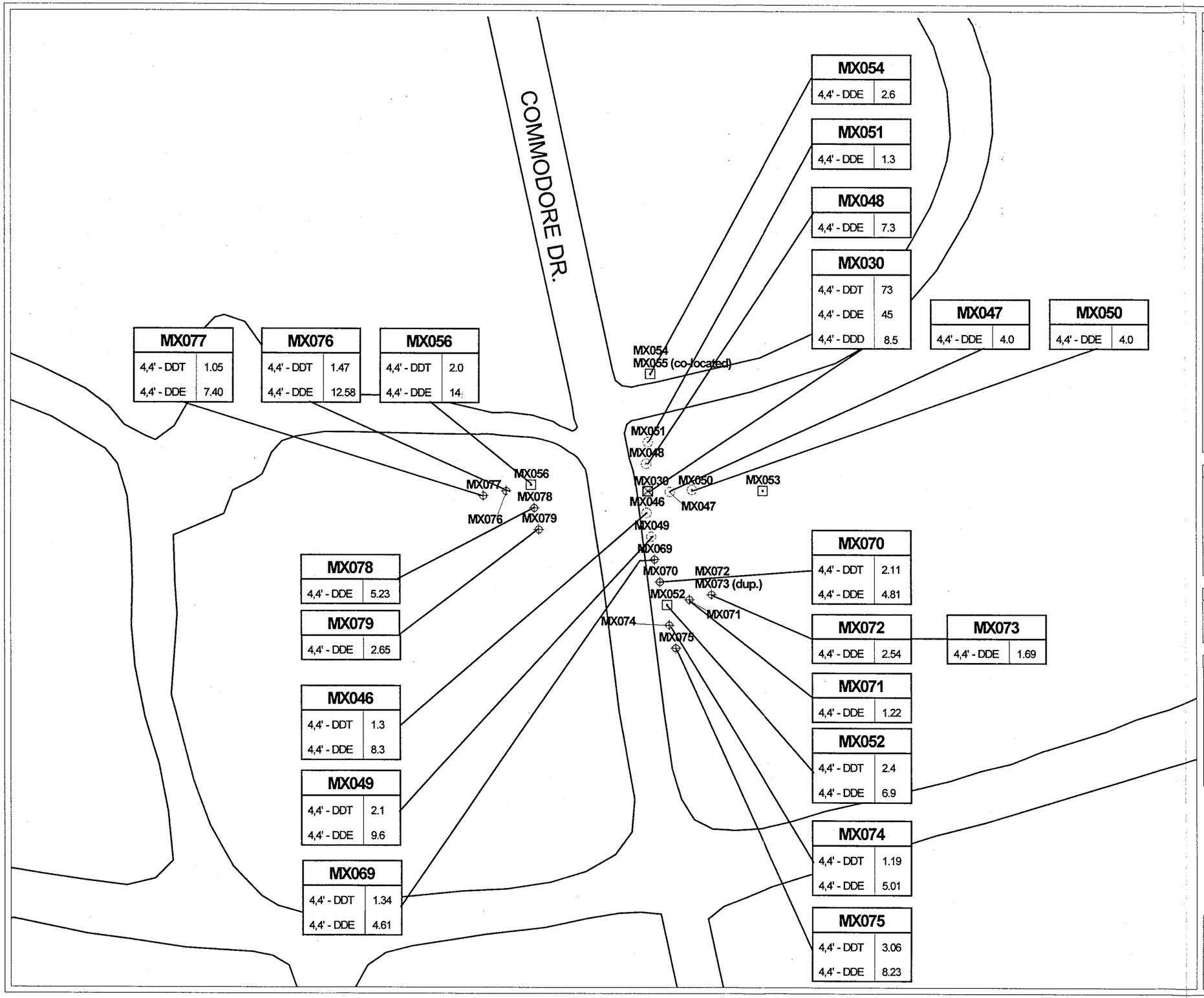
N

250 0 250 500 750 Feet

DATE	REV	DRWN	INT	CHKD	INT	APPR	INT
11/26/96		HFP		BW			

FIGURE

4-4



LEGEND

SAMPLES
- ⊠ FIRST PHASE COMPOSITE SAMPLE
- ⊡ SECOND PHASE COMPOSITE SAMPLE
- ⊙ SECOND PHASE DISCRETE SAMPLE
- ⊕ THIRD PHASE DISCRETE SAMPLE

ALL UNITS IN MG/KG

NOTES

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5. PROJECT NUMBER 314790001
6. FILE :g:\midway\ri_plan\sampling\housing\abrev_ri.apr 11-26-96

SOURCES

PERRY ASSOCIATES INC., HOWARD LAWSON & ASSOC.
US S. NAVAL STATION, MIDWAY ISLAND, DWG NO.: #1038656, #1038657

TITLE

SUMMARY OF SECOND AND THIRD PHASE DETECTED COMPOUNDS GREATER THAN 1 MG/KG NEAR SAMPLE MX030

N

32 0 32 64 96 Feet

DATE	REV	DRWN	INT	CHKD	INT	APPR	INT
12/16/96		HFP		BW			

FIGURE

4-5

Twenty of the 23 samples collected contained DDE at a concentration greater than 1 mg/kg; 11 samples contained DDE at a concentration greater than 5 mg/kg; 2 samples contained DDE at a concentration greater than 10 mg/kg (Table 4-2). Five of the 23 samples contained DDT at a concentration greater than 1 mg/kg; no samples contained DDT at a concentration greater than 5 mg/kg. One of the 23 samples contained DDD at a concentration greater than 1 mg/kg; no samples contained DDD at a concentration greater than 5 mg/kg.

Following evaluation of these analytical data, Ogden recommended collection of additional samples in the vicinity of samples MX052, MX056, and MX066 to delineate elevated concentrations of DDT and metabolites. The BCT concurred with this recommendation; therefore, a third and final sampling was implemented as described below.

4.3.3 Third Sampling Phase Analytical Results

Sixteen discrete surface soil samples (including two duplicates) were collected during the third sampling phase as illustrated in Figure 4-2. The discrete samples were collected at distances of 10 and 20 feet from the MX052, MX056, and MX066 sampling locations.

As in the previous sampling phases, DDE was the most frequently detected analyte (16 of 16 samples). DDT was the next most frequently detected compound (14 of 16 samples), while DDD was detected in 8 of 16 samples. Figures 4-4 and 4-5 illustrate the analytes detected at concentrations greater than 1 mg/kg in the third round of sampling.

Sample MX082 exhibited the maximum concentration of DDE (17.51 mg/kg), with a DDT concentration of 2.03 mg/kg; sample MX075 contained the highest DDT concentration (3.06 mg/kg), with a DDE concentration of 8.23 mg/kg (Figures 4-4 and 4-5).

Sixteen of the 16 samples collected contained DDE at a concentration greater than 1 mg/kg; 8 samples contained DDE at a concentration greater than 5 mg/kg; two samples (MX076 and MX082) contained DDE at a concentration greater than 10 mg/kg (Table 4-2). Nine of the 16 samples contained DDT at a concentration greater than 1 mg/kg; no samples contained DDT at a concentration greater than 5 mg/kg. None of the 16 samples contained DDD at a concentration greater than 1 mg/kg.

4.4 DATA VALIDATION SUMMARY

This section summarizes the data validation results for the Housing Area samples and assesses the impact of data validation findings on the quality of the data presented in previous sections. Full data validation reports are provided in Appendix C.

Analytical results were validated to evaluate compliance with the specified analytical methods and the data quality objectives outlined in the Draft Abbreviated RI Quality Assurance Project Plan (QAPjP) for Midway Island (Ogden 1996b). As specified in the QAPjP, all analytical data obtained under CTO 0136 were validated according to Ogden Level E data validation procedures. In general, Level E data validation procedures require the review of Form I data summary sheets only.

When the analytical data did not meet the required QC criteria or when special consideration by the data user was required, standard "data qualifiers" were applied to the specific analytical results. Data qualifiers are defined in the *USEPA Contract Laboratory Program National Functional Guidelines For Organic Data Review* (USEPA 1994c) and are presented in Appendix C. In addition, standard "qualification codes" were applied to explain the use of data qualifiers and to identify possible limitations of data use. Qualification codes are defined in Appendix C.

4.5 DATA QUALITY ASSESSMENT

This section summarizes the data validation methodology and results in terms of data precision, accuracy, representativeness, completeness, and comparability. Each of these data quality parameters is evaluated through review of Form Is and associated field and/or laboratory QC sample results. A thorough discussion of the data quality assessment can be found in Appendix C.

In general, the overall usability of the data is acceptable with respect to the precision, accuracy, representativeness, completeness, and comparability data results. No individual sample and/or target compound failed to meet established QC criteria, therefore no data qualifiers were applied to the data.

Precision

Precision was determined by the relative percent differences (RPDs) of both the field duplicates and the laboratory control sample duplicates (LCDs). The precision results from the field duplicates and the LCDs were within the QC criteria established by the field laboratory and the QAPjP (Ogden 1996b) and considered acceptable.

Accuracy

Accuracy was determined by the percent recoveries (%R) of the laboratory control samples (LCS). The accuracy results from the LCSs were within the QC criteria established by the field laboratory and the QAPjP and considered acceptable. No qualifications were assigned to the data for LCS deficiencies.

Representativeness

Representativeness was determined by evaluating overall sample management (sample collection, handling, and documentation) and method specific issues (calibration and surrogate recovery). The overall usability of the data was acceptable with respect to representativeness. No qualifications are assigned to the data for method or field blank contaminants, surrogate recoveries, and calibration deficiencies.

Completeness

Completeness was determined from both the sampling program (number of samples planned vs. number of samples collected) and the analytical program (total number of analytes vs. number of analytes rejected). The sampling program exceeded the 90 percent completeness goal for the overall soil sampling events due to additional samples collected during the field investigative effort. The analytical program also exceeded the 90-percent completeness goal for the pesticide analysis.

Comparability

Comparability was determined using considerations such as the consistency of the sampling plan and consistency in the sample analysis. The comparability of both the sampling and analysis was determined to be acceptable.

SECTION 5
CONTAMINANT FATE AND TRANSPORT

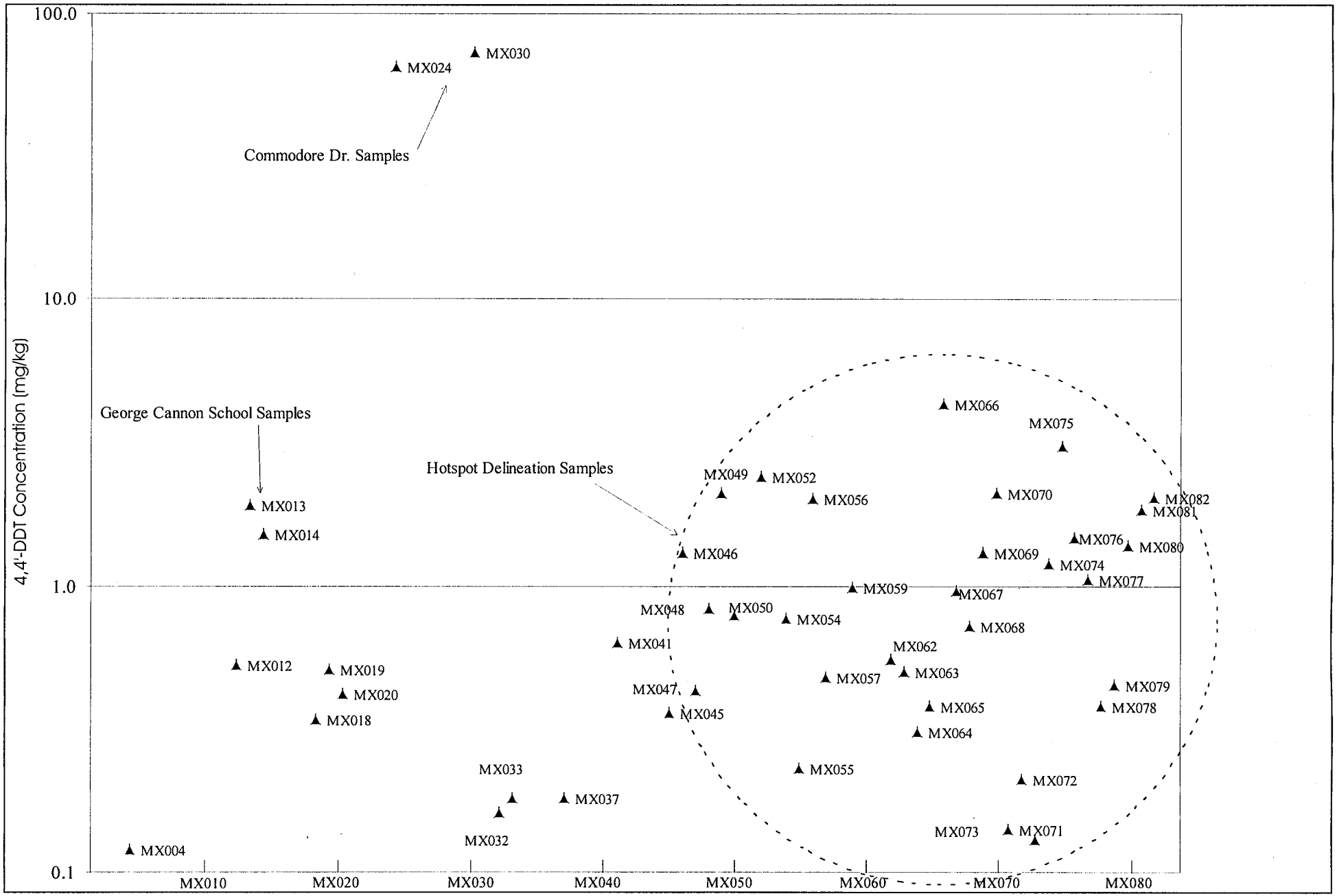
This section presents information on the environmental fate and transport of the DDT and metabolites detected in surface soil samples collected at the Housing Area. Toxicological information on these compounds is presented in the NAF Midway SI Report (Ogden 1996a), and in Section 7.

DDT was used extensively in the United States and elsewhere for control of insects and insect-transmitted diseases from about 1939 through 1972. Its use was banned in the United States in 1972, but it is still widely used in Asia, India, and parts of Central and South America (ATSDR 1994). It is clear from the results of this and previous investigations that DDT was extensively applied in the past to soils on Midway. It is unknown when the use of DDT on Midway was discontinued because no records of pesticide use and storage could be located for the period prior to 1991, when PMC took over operations on Midway. PMC has reportedly never used DDT on Midway.

5.1 CONTAMINANT PERSISTENCE

Studies of DDT persistence in soil indicate that its half-life can range from 2 to more than 15 years (ATSDR 1994). DDT in soil typically breaks down to form DDE under aerobic conditions and DDD under anaerobic conditions. Because DDE also exhibits a prolonged half-life, average levels of DDT decline rather slowly, while the ratio of DDE to DDT increases.

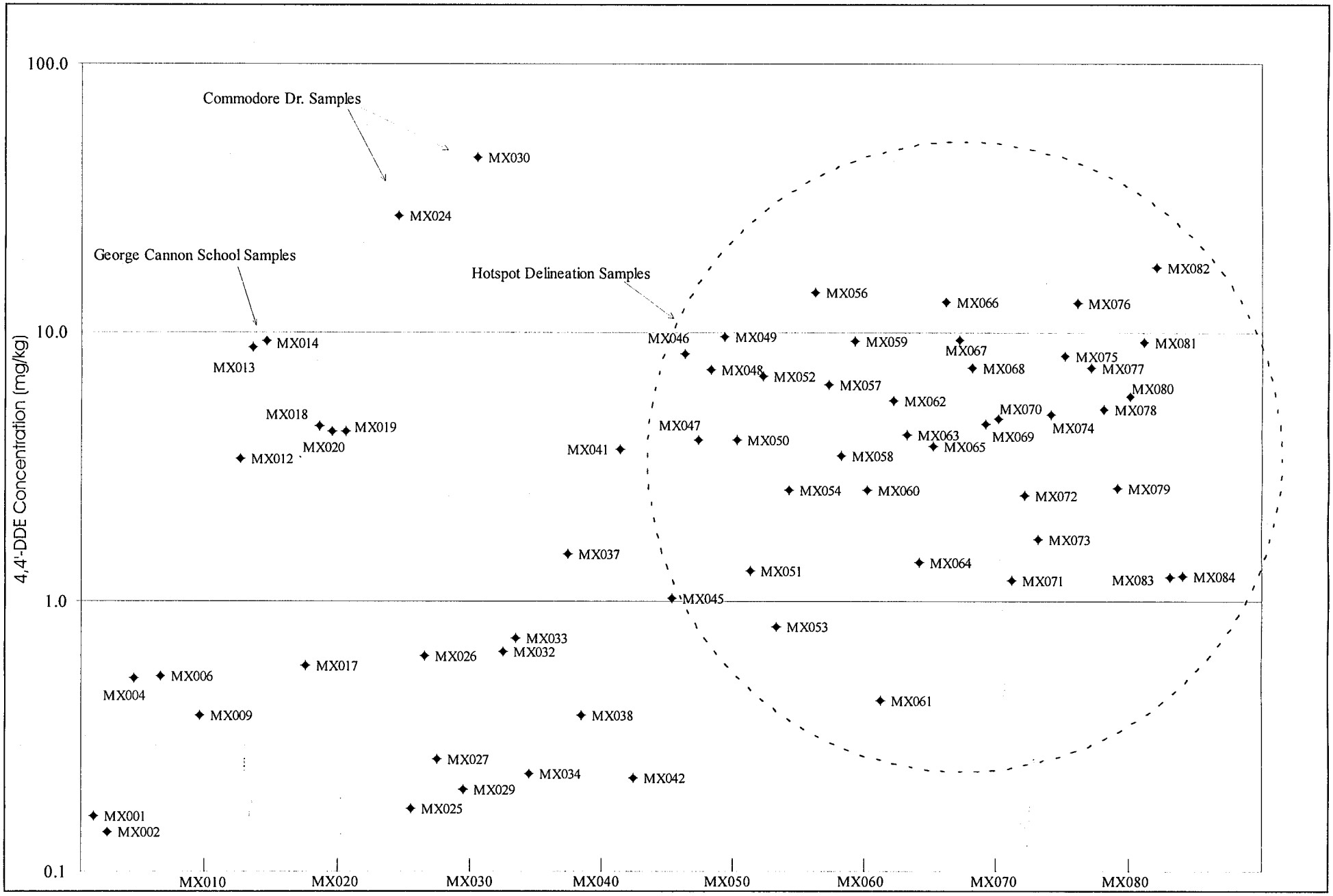
Figures 5-1 through 5-3 present graphs of the concentrations of DDT, DDE, and DDD detected in all samples collected in the three sampling phases. On these graphs analyte concentration (vertical axis) is plotted against sample identification number (horizontal axis). A comparison of these figures indicates that DDE is present in more samples, and at generally higher concentrations than DDT. Concentrations in samples collected around the two Commodore Dr. hot spots are generally much higher than other samples and have been illustrated.



DETECTED CONCENTRATIONS OF 4,4'-DDT
HOUSING AREA
NAF MIDWAY ISLAND

FIGURE

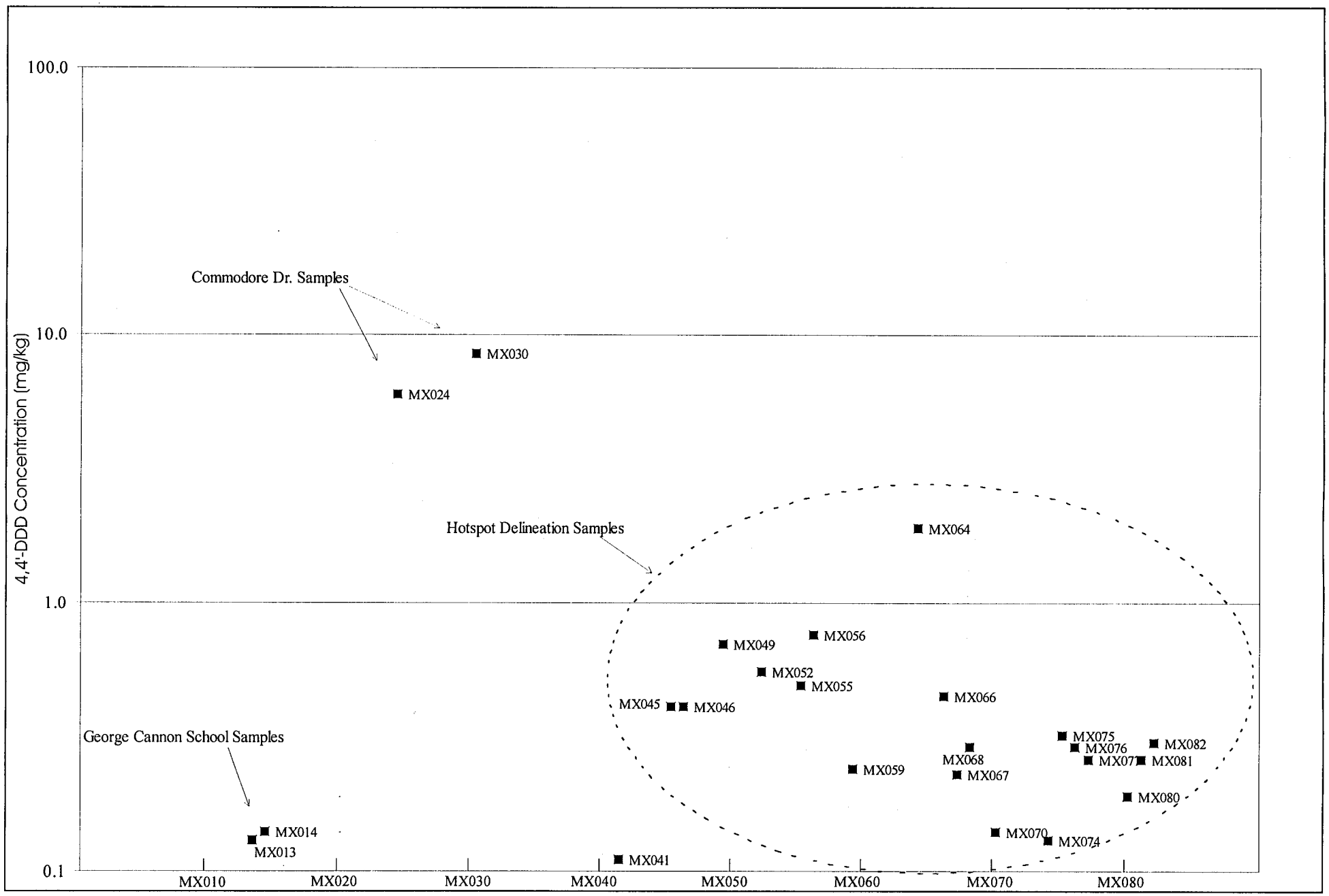
5-1



DETECTED CONCENTRATIONS OF 4,4'-DDE
HOUSING AREA
NAF MIDWAY ISLAND

FIGURE

5-2



DETECTED CONCENTRATIONS OF 4,4'-DDD
HOUSING AREA
NAF MIDWAY ISLAND

FIGURE

5-3

These data indicate that aerobic degradation of the DDT is occurring in the sandy, permeable, coralline soil on Sand Island and that levels of DDE will slowly decline through time with no further action onsite.

5.2 Transport and Partitioning

Because DDT and metabolites are highly persistent in soil, they will undergo extensive adsorption to soil particles. The organic carbon partition coefficients (K_{oc}) for DDT, DDE, and DDD are 2.4×10^5, 4.4×10^6, and 7.8×10^5, respectively. DDT is only slightly soluble in water, with a solubility of 0.0034 mg/L at 25° C; therefore, migration of DDT through stormwater runoff or infiltration is primarily due to transport of soil particles to which DDT is bound (ATSDR 1994). Since DDT and metabolites are strongly bound to soil, they are not easily displaced, nor do they tend to leach to ground water. Therefore, appreciable amounts may remain in soil for extended periods of time.

A treatability study was performed using DDT-contaminated soil from soil from Midway to determine the suitability of stabilization and solidification as a remedial option for the soil (OHM 1996). During the treatability study, a composite soil sample was collected at an area on Midway where DDT and metabolites were detected. The soil sample was analyzed for total DDT/DDE/DDD by USEPA Method 8080 and subjected to the USEPA Toxicity Characteristic Leaching Procedure (TCLP); the resulting extract was also analyzed for total DDT/DDE/DDD by USEPA Method 8080 (OHM 1996).

4,4'-DDT was detected in the soil sample analyzed for total DDT/DDE/DDD at 3.63 mg/kg, 4,4'-DDE was detected at 3.12 mg/kg in the samples, and 4,4'-DDD was not detected (<0.033 mg/kg). Following TCLP extraction, analytical results indicated a concentration of 0.0004 mg/kg for 4,4'-DDT, 0.0002 mg/kg for 4,4'-DDE, and 0.0004 mg/kg for 4,4'-DDD in the extract from the soil sample (OHM 1996). These analytical results indicate that DDT and metabolites are not leachable from soil in significant quantities under normal conditions.

SECTION 6
APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) requires that remedial actions be protective of human health and the environment and comply with federal and state Applicable or Relevant and Appropriate Requirements (ARARs). ARARs are used to determine the extent of site cleanup, to formulate remedial action alternatives, and to govern the implementation and operation of the selected action. Published guidelines from regulatory agencies are used as To-Be-Considered Criteria (TBCs) to help determine the necessary protection required of a removal or remedial action. Because Midway is solely governed by federal agencies, and not by state government, only federal ARARs and TBCs apply.

Because there are no chemical-specific federal standards identified for pesticides in soil resulting from normal applications, no chemical-specific ARARs exist for this Abbreviated RI.

Location-specific ARARs are restrictions placed on the concentrations of hazardous substances or the conduct of activities solely because they are in a specific location with special characteristics. These ARARs were selected on the basis of (1) previous data indicating the presence of hazardous materials, and (2) knowledge of the special characteristics of Midway with regards to protected wildlife resources. Potential location-specific ARARs identified for this investigation are presented in Table 6-1.

Action-specific ARARs are technology- or activity-based requirements or limitations on actions involving the management of hazardous wastes. Because the presence of DDT and its metabolites in the soil on Midway is the result of normal application for control of pests, and not from releases or disposal of product, the soil is not considered a "listed" hazardous waste from a regulatory standpoint. Therefore, Resource Conservation and Recovery Act (RCRA) hazardous waste regulations do not apply. However, management of Investigation-derived Waste (IDW) generated by the Abbreviated RI must be in compliance with the substantive portions of the federal regulations as indicated in Table 6-1.

Table 6-1
IDENTIFIED FEDERAL ARARs FOR NAF MIDWAY ISLAND

Regulation	Issues and Requirements	Status (Chemical-, Location-, or Action-Specific)		Applicability to the RI
		Applicable	Relevant and Appropriate	
HABITAT AND WILDLIFE				
National Wildlife Refuge System Administration Act (16 USC 668dd *et seq.*; 40 CFR Part 27)	Only actions allowed under the provisions of 16 USC Section 668 dd(c) may be undertaken in areas that are part of the National Wildlife Refuge System	Yes (location-specific)	No	All RI activities followed substantive portions of the National Wildlife Refuge provisions.
Migratory Bird Treaty Act (16 USC 703 *et seq.*)	Action to prevent the taking of migratory birds.	Yes (location-specific)	No	All RI activities that may have impacted migratory birds required informal consultation with USFWS. Remedial alternatives shall consider effects on migratory birds.
Endangered Species Act of 1973 (16 USC 1531 *et seq.*; 50 CFR Parts 81, 200, 225, 402)	Action to conserve endangered or threatened species and their habitats.	Yes (location-specific)	No	All RI activities that may have impacted listed species and/or critical habitats required informal consultation with NOAA and USFWS. Remedial alternatives must consider restrictions in sensitive habitats.
CULTURAL RESOURCES				
National Historic Preservation Act (16 USC Section 469; 36 CFR Part 65; 40 CFR 6.301(b))	Action to recover and preserve artifacts if any exist in an area where action may cause their irreparable harm, loss, or destruction.	Yes (location-specific)	No	Informal consultation with the Advisory Council on Historic Preservation is required for activities that may impact sites with archeological or historical importance.
REMEDIATION WASTES				
RCRA Corrective Action Management Units (CAMU); 40 CFR Part 264.552	For the purpose of implementing corrective actions, one or more CAMUs may be designated at a facility . Landfills, surface impoundments, waste piles, etc. may be included within the CAMU.	No	Yes (action-specific)	Soils containing DDT/DDE resulting from releases at former or current pesticide storage facilities are hazardous waste. The CAMU will allow for streamlined handling and disposal of this waste; placement of wastes in the CAMU does not constitute "land disposal".
INVESTIGATION-DERIVED WASTES				
RCRA Hazardous Waste Management (Subtitle C) and Solid Waste Management (Subtitle D) (40 CFR Parts 240 - 280)	Regulates storage and disposal of Investigation-Derived Wastes (IDW).	No	Yes (action-specific)	If IDW are stored or disposed offsite, all substantive portions of RCRA regulations must be complied with. If IDW are stored and disposed onsite within a RCRA Corrective Action Management Unit, substantive portions of regulations must be complied with to the extent practicable.

ARARs	Applicable or Relevant and Appropriate Requirements
CERCLA	Comprehensive Enviornmental Restoration, Cleanup, and Liability Act
CFR	Code of Federal Regulations
CWA	Clean Water Act
NOAA	National Oceanic and Atmospheric Administration
RI	Remedial Investigation
USC	United States Code
USFWS	United States Fish and Wildlife Service

The final action-specific ARAR concerns long-term, on-island management of remediation wastes resulting from removal actions. Under RCRA subparts (40 CFR 264), the Navy may designate a Corrective Action Management Unit (CAMU) on Midway for disposal of the treated soil resulting from the removal action. The CAMU is a waste management tool which allows the Navy to streamline the handling and disposal of this remediation waste. Most significantly, placement of wastes in the CAMU does not constitute "land disposal" and trigger the need for rigorous pretreatment land disposal restrictions nor constitute creation of a unit subject to minimum technology requirements. Within the CAMU, the Navy may include landfills, surface impoundments, and waste piles as regulated units; however, these units must be managed and contained after closure so as to minimize future releases to the extent practicable. This action-specific standard is summarized in Table 6-1.

SECTION 7
SCREENING ECOLOGICAL RISK ASSESSMENT

This SERA was based on the risk assessment process defined in *Risk Assessment Guidance for Superfund (RAGS),* Volume II, the *Framework for Ecological Risk Assessment,* the 1996 draft guidelines, and other applicable USEPA guidance (USEPA 1989ab, 1992abc, 1994b).

The main objective of this screening-level assessment was to evaluate the potential risks posed to migratory bird species by DDT, DDE, and DDD in surface soils in the Housing Area. Specific objectives for this screening-level ecological assessment were to

- Determine the concentrations and spatial distribution of DDT, DDE, and DDD Contaminants of Potential Ecological Concern (CPECs) within the Housing Area
- Calculate the site-wide average and 95th percentile upper confidence limit (UCL) of the mean concentrations for these pesticides
- Identify hot spots (soil contaminant concentrations that may pose an imminent or near-term threat to migratory birds) in surface soils that will require removal
- Evaluate potential risks to special status migratory bird species due to the presence of these contaminants

This SERA includes the same components described in Section 4 of the SI Report, *Problem Formulation, Exposure Analysis, Ecological Response Analysis, and Risk Characterization* (Ogden 1996a).

7.1 PROBLEM FORMULATION

The results of the problem formulation completed during the SERA for SI Sites 44, 51, and 52 (Ogden 1996a), are also applicable for this site-specific SERA and can be summarized as follows:

- CPECs for the Housing Area are the organochlorine pesticide DDT and its metabolites, DDE and DDD. These are very persistent lipophilic compounds that have the potential to bioaccumulate through food webs and can cause toxic effects in ecological receptors at low concentrations.

- Target ecological receptors are ground-nesting birds, burrowing birds, and shorebirds that occur in the Housing Area.

This SERA evaluated exposure routes for ground-nesting and burrowing birds involving incidental ingestion of soil and dermal contact with soil. Inhalation was not evaluated in this SERA because inhalation exposure values estimated in the previous SERA were found to be 3 to 6 orders of magnitude lower than those from ingestion and dermal contact. Shorebirds were evaluated for ingestion of contaminated prey (invertebrates) only, because shorebirds do not burrow or display other behavior that could lead to significant dermal contact with soil.

7.2 ENDPOINTS

An important step in determining the significance or relevance of potential effects is evaluating whether or not the effects are observed in designated assessment endpoints and their associated measurement endpoints (Barnthouse et al. 1986; USEPA, 1989ab, 1992a, Norton et al. 1992; Suter 1993). This element is crucial because these endpoints must be specific, relevant, and limited to organisms that spend a significant portion of their lives or derive a significant portion of their diet or physiological needs from the Site. Selection of assessment endpoints is designed to focus the ecological risk assessment on those ecological features or resources that have substantial aesthetic, social, or economic value or are important in the biological functions or biodiversity of the system.

7.2.1 Assessment Endpoints

Assessment endpoints are formal expressions of the actual environmental values to be protected from risk (Suter 1993). The policy goal applicable to Midway Atoll is protection of special status species (threatened and endangered species, as well as migratory birds i.e., seabirds protected under the Migratory Bird Treaty Act) from chronic adverse impacts connected with Site-related CPECs. This goal was used as a basis for defining three assessment endpoints that apply specifically to the Housing Area, namely:

1. Protect burrowing bird species from reductions in abundance and/or reproductive success due to exposure, while nesting, to DDT, DDE, or DDD in surficial soils within the Housing Area.

2. Protect ground-nesting bird species from reductions in abundance and/or reproductive success due to exposure, while nesting, to DDT, DDE, or DDD in surficial soils within the Housing Area.

3. .Protect shorebird species from reductions in abundance and/or reproductive success due to exposure, while foraging, to DDT, DDE, or DDD in surficial soils within the Housing Area.

7.2.2 Measurement Endpoints

These are quantitative expressions of an observed or measured effect that correspond to or predict assessment endpoints. Measurement endpoints must be readily measurable phenomena and appropriate for the exposure pathways, temporal dynamics of exposure, and scale of the site being evaluated. For this assessment, two measurement endpoints were defined: one for Site-wide risk evaluation and the other for hot spot identification, as follows:

1. Area-wide: Upper-bound concentrations of DDT, DDE, and DDD in soil or prey items on a Housing Area-wide basis were used in exposure models to calculate a bird dose and were compared to concentrations reported in the scientific literature to be no observed adverse effect levels (NOAELs) for birds. This endpoint was not assessed directly but rather was evaluated during risk characterization (e.g., site-wide upper-bound concentration measured in soil → used to estimate concentration in invertebrates → used to calculate dose to shorebirds ingesting invertebrates → bird dosage known to induce no adverse effects → evaluation of measurement endpoint).

2. Hot spots: concentrations of DDT, DDE, and DDD in surface soil at specific (point) locations were used in exposure models and compared to levels 10 times greater than those reported in the scientific literature to be NOAELs for birds. This endpoint was not assessed directly but rather was evaluated during risk characterization (e.g., concentration measured in soil point location → dose to

seabirds ingesting soil and dermally exposed → bird dosage known to induce no adverse effects → evaluation of measurement endpoint).

7.3 EXPOSURE ANALYSIS

Assessing the potential for adverse effects in ecological receptors due to the presence of environmental contaminants requires the estimation of exposure. Exposure analysis attempts to quantify the magnitude or type of actual and/or potential exposures of ecological receptors to site-specific CPECs. Exposure estimates are also needed to quantitatively evaluate the relative importance of various CPEC sources or pathways when considering remediation strategies. This section briefly explains the rationale and methods used for quantification of CPECs, identification of target ecological receptors, and determination (by measurement) of exposure point values (either concentrations or doses). Exposure levels for higher trophic level receptors were estimated using exposure models, based on a site-specific food web.

7.3.1 CPEC Quantification

Chemical sampling and analysis provided raw data about the presence and concentrations of analytes in surface soil. The environmental concentration (EC) of DDT, DDE, and DDD in abiotic media was calculated for two purposes: (1) identification of hot spots and (2) estimation of Site-wide risks. For hot spots, the EC at a given sampling point (EC_{point}) was a single datum. For Site-wide risks, the EC was expressed as the lesser of either the maximum detected concentration or the 95th percentile UCL of the mean of the log transformed data (geometric mean) for the entire site (EC_{area}). If the contaminant was not detected in a particular sample, values below the sample quantitation limit (SQL) were included in the UCL calculations at one-half the SQL.

Table 7-1 summarizes the geometric mean and 95th percentile UCL for the initial 40 samples. These values were then used in the exposure analysis explained below. The Phase 2 and 3 sampling data were added to the data for the initial 40 samples and the site-wide geometric mean and UCL were recalculated for the new EC_{area}.

Table 7-1
SITE-WIDE EXPOSURE AND RISK ESTIMATES FOR THE INITIAL 40 SAMPLES

	DDE	DDD	DDT
Geometric Mean	0.323	0.068	0.123
95th UCL	0.720	0.100	0.250
$EPV_{area(gn)}$	0.008	0.001	0.003
$EPV_{area(bb)}$	0.022	0.003	0.008
$EPV_{area(sb)}$	0.023	0.005	0.011
TRV	0.040	8.500	0.300
$TQ_{area(gn)}$	0.200	0.000	0.010
$TQ_{area(bb)}$	0.550	0.000	0.027
$TQ_{area(sb)}$	0.575	0.001	0.037

gn = ground-nesting bird
bb = burrowing bird
sb = shorebird
EPV_{area} = Area-wide Exposure Point Value
TRV = Toxicity Reference Value
TQ_{area} = Area-wide Toxicity Quotient

7.3.2 Target Receptors

Burrowing birds, ground-nesting birds, and shorebirds were considered terrestrial target receptors at the Housing Area. Two different burrowing bird species occur on Sand Island, wedge-tailed shearwaters and Bonin petrels. Because Bonin petrels stay in their burrows for longer periods of time and are known to burrow in the Housing Area, they were selected as the target receptor representing the burrowing birds. Laysan albatross and red-tailed tropicbirds are both ground-nesting birds that nest in the Housing Area; Laysan albatross was selected as the target receptor representing ground-nesting birds because of their prevalence on Midway. Both the Pacific golden-plover and the ruddy turnstone are shorebirds that are frequently seen foraging in the Housing Area; the Pacific golden-plover was selected as the target receptor representing shorebirds because they spend nine months of the year on Midway.

7.3.3 Measures of Effects Models

A measure of effect model (MEM) illustrates how CPEC transport is traced from the primary source to subsequent sources, and from there through the food chain to a measurement endpoint that can affect the assessment endpoint. MEMs for each of the selected target ecological receptors have been identified, and these models are shown in Figures 7-1 through 7-3.

7.3.4 Exposure Estimation

Exposure models used in this analysis are the same as those used in the SI SERA. Information on receptor food webs is required to fully evaluate exposure pathways, particularly those leading to higher trophic level receptors. Data on target receptor life history parameters (dietary fraction, weight, home range, etc.) keyed to the food web are also required to make quantitative exposure estimates for these receptors. Table 7-2 lists parameters, description of parameter, values, and references for exposure calculations for target receptors. The same parameters were used in this analysis as in the SI SERA.

Exposure models were used to calculate exposure point values (EPVs) for ground-nesting birds, burrowing birds, and shorebirds, respectively. Modeling is particularly useful for higher trophic level species that may not be available for tissue sampling. Specific

Figure 7-1
MEASURES OF EFFECT MODEL #1
BURROWING BIRDS

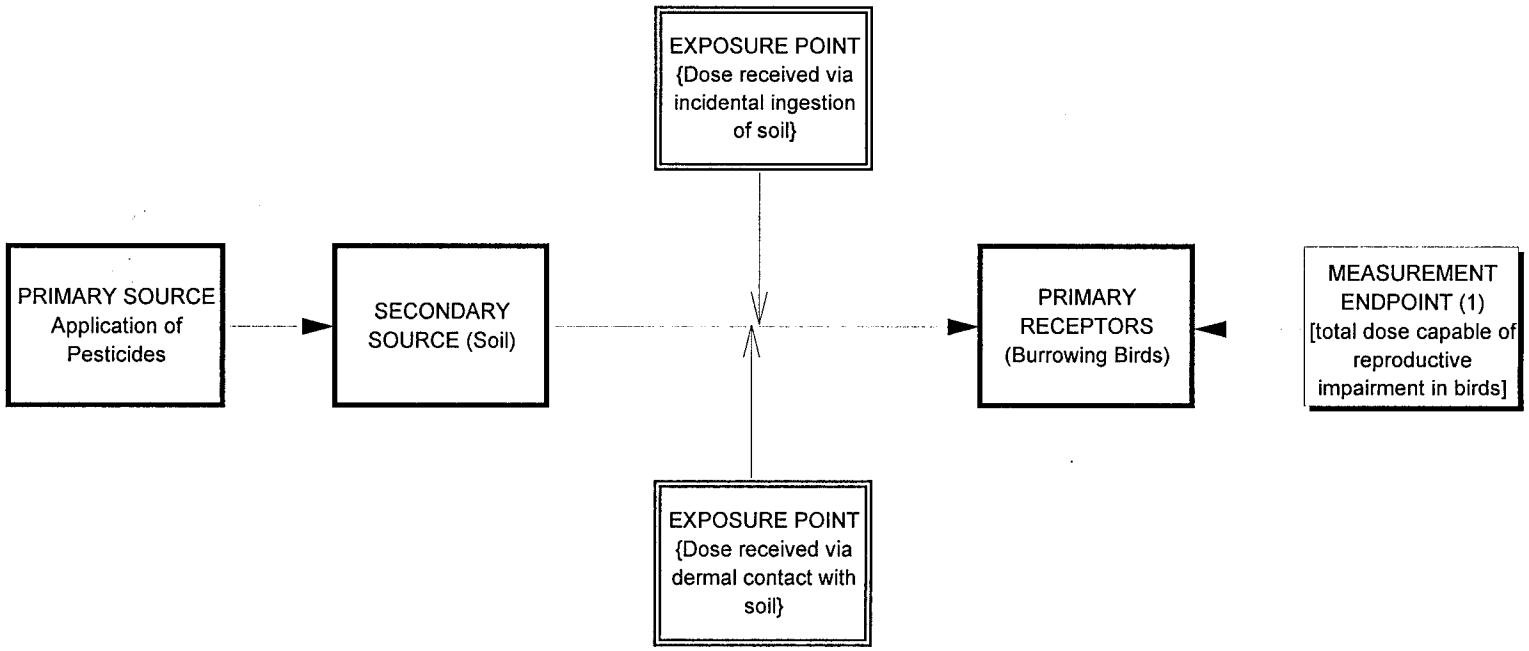


Figure 7-2
MEASURES OF EFFECT MODEL #2
GROUND NESTING BIRDS

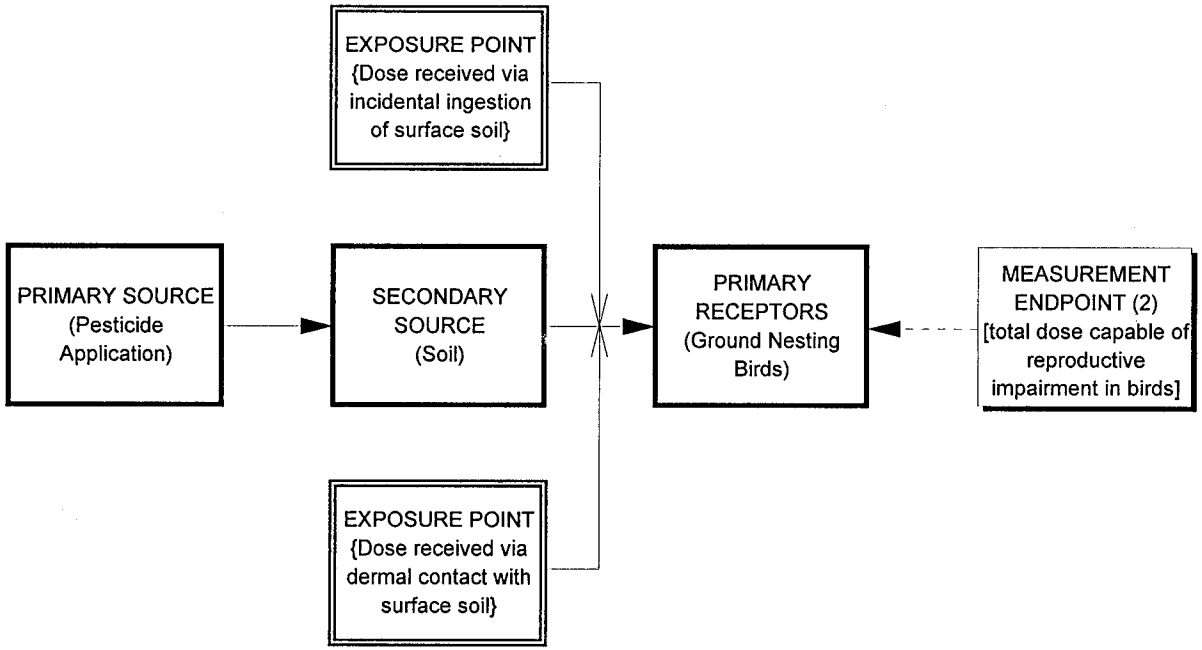


Figure 7-3
MEASURES OF EFFECT MODEL #3
SHOREBIRDS

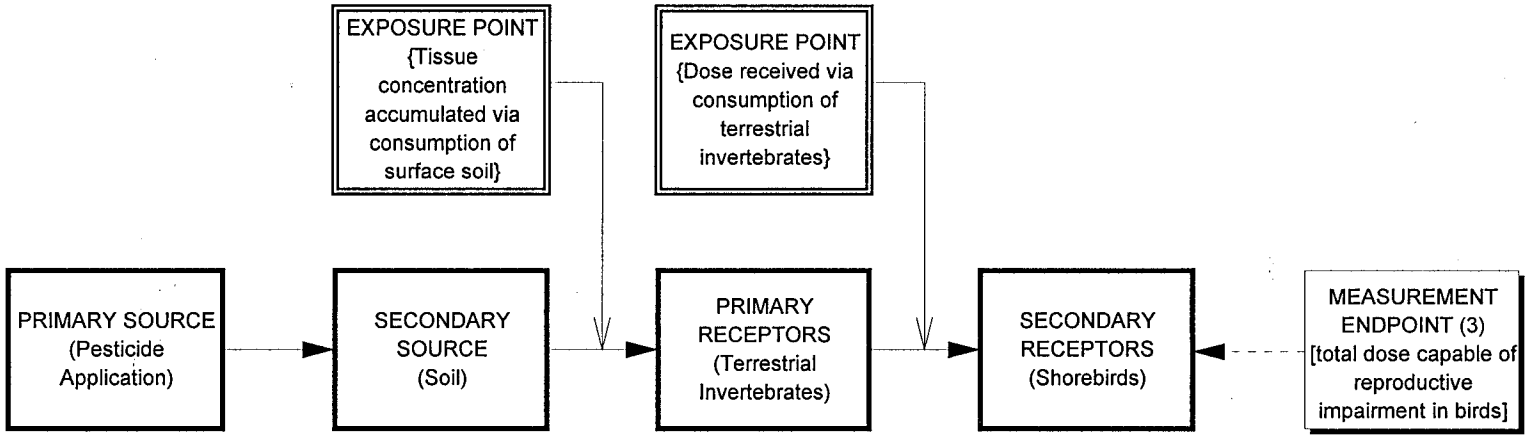


Table 7-2
PARAMETERS FOR TARGET RECEPTOR EXPOSURE ESTIMATION

Parameter	Description	Value	Units	Reference
LAYSAN ALBATROSS (Representative ground-nesting bird)				
W_{gn}	Mean weight of adult Laysan albatross	2.4	kg	Pettit et. al. 1984
R_{gn}	Calculated food intake rate for the adult Laysan albatross	0.103	kg/d	EPA 1993
SA_{gn}	Calculated surface area of the adult Laysan albatross	1795.2	cm^2	EPA 1993
Ψ_{gn}	Seasonality of the Laysan albatross (fraction of the year spent on Midway by any one adult)	0.375	unitless	USFWS 1991
θ_{gn}	Area use factor for the Laysan albatross (fraction of time on Midway spent onsite assumed to be 100%)	1.0	unitless	Professional Judgement
F_{gn}	Fraction of soil in Laysan albatross diet (assumed equivalent to fraction % soil in mallard diet, dry weight)	0.02	unitless	EPA 1993
BONIN PETREL (Representative burrowing bird)				
W_{bb}	Mean weight of adult Bonin petrel	0.176	kg	Pettit et. al. 1984
R_{bb}	Calculated food intake rate for adult Bonin petrel	0.0188	kg/d	EPA 1993
SA_{bb}	Calculated surface area of the adult Bonin petrel	314.6	cm^2	EPA 1993
Ψ_{bb}	Seasonality of adult Bonin petrel (fraction of the year spent on Midway by any one adult).	0.44	unitless	USFWS 1991
θ_{bb}	Area use factor for burrowing birds, both species (fraction of time on Midway spent onsite, assumed 100%)	1.0	unitless	Professional Judgement
F_{bb}	Fraction of soil in burrowing bird diet, both species (assumed equivalent to fraction % soil in mallard diet, dry weight))	0.02	unitless	Professional Judgement
B_{bb}	Fraction of day spent in burrow, both species (assumed all day)	1.0	unitless	Professional Judgement
PACIFIC GOLDEN PLOVER (Representative shorebird)				
W_{sb}	Mean weight of the adult Pacific golden-plover	0.14	kg	Berger 1981
R_{sb}	Calculated food intake rate for the adult Pacific golden-plover	0.103	kg/d	EPA 1993
Ψ_{sb}	Seasonality of the Pacific golden-plover (fraction of the year spent on Midway by any one adult)	0.375	unitless	USFWS 1991
θ_{sb}	Area use factor for the Pacific golden-plover (fraction of time on Midway spent onsite assumed 100%)	1.0	unitless	Professional Judgement
F_{sb}	Fraction of invertebrates in Pacific golden-plover diet (assume 100%)	1.0	unitless	Professional Judgement

models, described in detail below, were used to estimate EPVs at designated exposure points for higher trophic level species. The models were selected in part on the basis of the algorithms for surface area and rate of food intake, as provided in the *Wildlife Exposure Factors Handbook,* Volumes I and II (USEPA 1993ab). Two EPVs were calculated for each target receptor: one based on the EC_{point} (concentration at a single sampling location) and another on the EC_{area} (site-wide concentration) value. To identify hot spot exposures, the single EC_{point} value at each sampling location was put into, and propagated through the exposure models to produce a single estimate of exposure, EPV_{point}. To identify Site-wide exposures, the EC_{area} value was input, and propagated through, the exposure models to produce a single estimate of exposure for the entire Site (EPV_{area}).

The calculation of the two EPV values (area and point) and the subsequent risk estimation followed parallel analysis methods. The only difference in the calculations is the beginning EC value carried through the analysis. The process used to segregate the evaluation of Site-wide risk from the identification of hot spots, as well as its various key terms and parameters, are summarized in Figure 7-4.

Equations used to calculate exposure to target receptors via the primary exposure pathways were as follows:

7.3.5 Ground-Nesting Birds (Laysan Albatross)

7.3.5.1 Dermal Contact

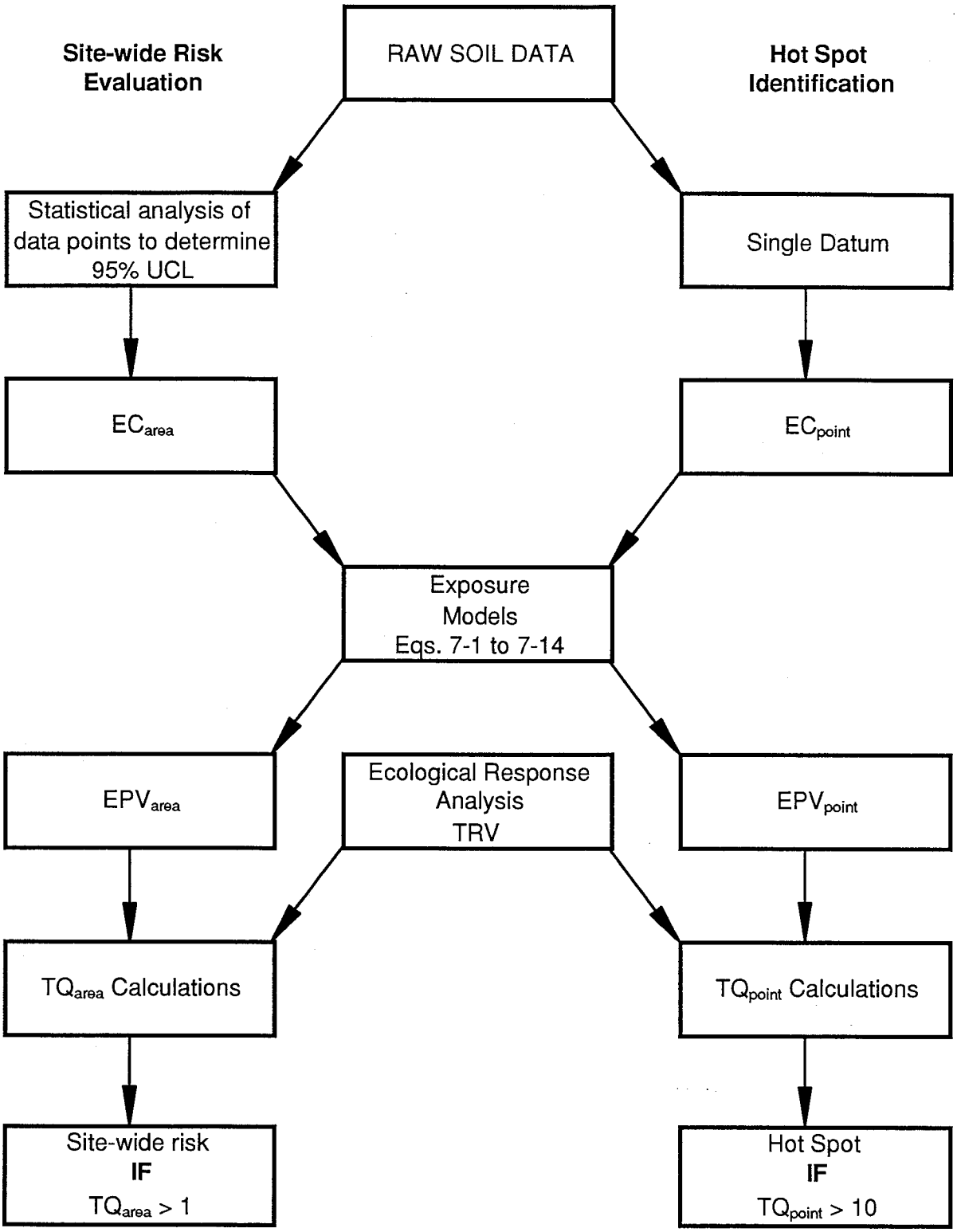
Dermal exposure could be a significant exposure route for animals that are in frequent contact with soil. The following model estimates exposure based on a terrestrial receptor's dermal contact with either contaminated soils, using a contact volume approach:

$$Dd_{gn(a)} = (SA_{gn} \times CD \times P_c \times EC_{area} \times CF_1 \times \rho_s \times \delta / W_{gn}) \times \Psi_{gn} \times \Theta_{gn} \qquad [7\text{-}1a]$$

$$Dd_{gn(p)} = (SA_{gn} \times CD \times P_c \times EC_{point} \times CF_1 \times \rho_s \times \delta / W_{gn}) \times \Psi_{gn} \times \Theta_{gn} \qquad [7\text{-}1b]$$

$$SA_{gn} = 10 \times (1000 \times W_{gn})^{0.667} \qquad [7\text{-}2]$$

Figure 7-4
PROCESS FOR EVALUATING SITE-WIDE RISK AND IDENTIFYING HOT SPOTS WITHIN THE HOUSING AREA



where:

$Dd_{gn(a)}$ Applied daily dose to ground-nesting birds from dermal contact area-wide, mg/kg-d

$Dd_{gn(p)}$ Applied daily dose to ground-nesting birds from dermal contact at a single point, mg/kg-d

SA_{gn} Receptor total body surface area, cm^2, Table 7-2

CD Contact depth, 1 cm

P_c Fraction of bird total surface area in contact with soil, 0.25 d^{-1}

EC_{area} Environmental concentration in surface soil site-wide, mg/kg

EC_{point} Environmental concentration in surface soil at a specific point, mg/kg

CF_1 Conversion factor, 1×10^{-6} kg/mg

ρ_s Site-specific bulk soil density, 1502.2 mg/cm^3 (kg/m^3)

δ Contaminant-specific dermal absorption factor, 0.1 unitless

W_{gn} Body weight, Table 7-2

Ψ_{gn} Seasonality, Table 7-2

Θ_{gn} Area use factor, Table 7-2

The proportion of total surface area located on the underside of an animal (P_c) has been estimated to be 0.22 for mammals, based on a *Peromyscus* mouse (Maughan 1993). Professional judgment was used to adjust this proportion upward to 0.25 for birds with brood patches or for unfledged or downy newborns.

The contaminant-specific dermal absorption factor (δ) describes the fraction of a chemical that will be absorbed from soil in direct contact with skin. Studies of application of DDT in soil to human skin and to the skin of Rhesus monkeys found that both humans and monkeys absorbed approximately 1 and 3 percent, respectively (Wester

et al. 1990). When the DDT in soil was dermally applied along with a solvent (acetone) the average percent of the applied dose absorbed to skin was 18.1 and 18.9 percent in human skin and monkeys, respectively (Wester et al. 1990). Body tissue concentrations after absorption were not determined. On the basis of the Wester et al. (1990) results and the additional barrier provided by the feathers, a dermal absorption factor of 0.1 for DDT and its metabolites was selected for use in this model.

When a terrestrial receptor's foraging area exceeds the area of contamination, an area use factor (Θ) is included to account for the effect of a receptor's foraging area on frequency and duration of contact with contaminated media or prey onsite (DeSesso and Price 1990). This factor is defined as the ratio of the contaminated area to foraging area for a given receptor species, so that $1 \geq \Theta > 0$. An animal whose total home or foraging range is equal to or less than the contaminated area will have a unitless default area use factor of 1.0. Conservative assumptions were made about the amount of time a target receptor would use or forage on a particular site. Values for each target receptor are given in Table 7-2.

Because these target receptors are migratory, and thus not continuously present or active throughout the year at a site, a seasonality factor (Ψ) was used to account for the effects of migration. This factor is defined as the fraction of the number of days per year a receptor spends at, or active on, the contaminated area. Year-round, non-hibernating, non-seasonal species will have a unitless default seasonality factor of 1.0 (= 365 days/year). Values for each target receptor are given in Table 7-2.

7.3.5.2 Incidental ingestion

Ingestion of contaminants is probably the most commonly exploited exposure route, in terms of both frequency and magnitude. For receptors above the primary producer trophic level, ingestion can include both secondary exposure, where contaminated forage or prey is consumed, and primary exposure, where contaminated water, sediments, or soil are consumed, so that:

$$Di_{gn(a)} = ((EC_{area} \times F_{gn} \times R_{gn}) / W_{gn}) \times \Psi_{gn} \times \Theta_{gn} \qquad [7\text{-}3a]$$

$$Di_{gn(p)} = ((EC_{point} \times F_{gn} \times R_{gn}) / W_{gn}) \times \Psi_{gn} \times \Theta_{gn} \qquad [7\text{-}3b]$$

$$R_{gn} = 0.0582 \times W_{gn}^{0.651} \quad [7\text{-}4]$$

where:

$Di_{gn(a)}$ Applied daily dose to ground-nesting birds from incidental soil ingestion area-wide, mg/kg-d

$Di_{gn(p)}$ Applied daily dose to ground-nesting birds from incidental soil ingestion at a single point, mg/kg-d

R_{gn} Food intake rate, Table 7-2

F_{gn} Fraction of soil in diet, Table 7-2

C. Total applied daily dose

$$EPV_{gn(area)} = Dd_{gn(a)} + Di_{gn(a)} \quad [7\text{-}5a]$$

$$EPV_{gn(point)} = Dd_{gn(p)} + Di_{gn(p)} \quad [7\text{-}5b]$$

where:

$EPV_{gn(area)}$ Exposure point value for the ground-nesting bird area-wide, mg/kg-d

$EPV_{gn(point)}$ Exposure point value for the ground-nesting bird at a single point, mg/kg-d

7.3.6 Burrowing birds (Bonin petrel)

Burrowing birds on Midway were evaluated for dermal contact and incidental ingestion using the same equations as those for the Laysan albatross, but different species-specific parameters.

7.3.6.1 Dermal Contact

$$Dd_{bb(a)} = (SA_{bb} \times CD \times P_c \times EC_{area} \times CF_1 \times \rho_s / W_{bb}) \times \Psi_{bb} \times \Theta_{bb} \quad [7\text{-}6a]$$

$$Dd_{bb(p)} = (SA_{bb} \times CD \times P_c \times EC_{point} \times CF_1 \times \rho_s / W_{bb}) \times \Psi_{bb} \times \Theta_{bb} \quad [7\text{-}6b]$$

$$SA_{bb} = 10 \times W_{bb}^{0.667} \quad [7\text{-}7]$$

where:

$Dd_{gn(a)}$ Applied daily dose to burrowing birds from dermal contact area-wide, mg/kg-d

$Dd_{gn(p)}$ Applied daily dose to burrowing birds from dermal contact at a single point, mg/kg-d

SA_{bb} Receptor surface area, Table 7-2

W_{bb} Body weight, Table 7-2

Ψ_{bb} Seasonality, Table 7-2

Θ_{bb} Area use factor, Table 7-2

7.3.6.2 Incidental Ingestion

$$Di_{bb(a)} = ((EC_{area} \times F_{bb} \times R_{bb}) / W_{bb}) \times \Psi_{bb} \times \Theta_{bb} \quad [7\text{-}8a]$$

$$Di_{bb(p)} = ((EC_{point} \times F_{bb} \times R_{bb}) / W_{bb}) \times \Psi_{bb} \times \Theta_{bb} \quad [7\text{-}8b]$$

$$R_{bb} = 0.0582 \times W_{bb}^{0.651} \quad [7\text{-}9]$$

where:

$Di_{bb(a)}$ Applied daily dose to burrowing birds from incidental soil ingestion area-wide, mg/kg-d

$Di_{bb(p)}$ Applied daily dose to burrowing birds from incidental soil ingestion at a single point, mg/kg-d

R_{bb} Food intake rate, Table 7-2

F_{bb} Fraction of soil in diet, Table 7-2

7.3.6.3 Total applied daily dose

$$EPV_{bb(area)} = Dd_{bb(a)} + Di_{bb(a)} \quad [7\text{-}10a]$$

$$EPV_{bb(point)} = Dd_{bb(p)} + Di_{bb(p)} \quad [7\text{-}10b]$$

where:

$EPV_{bb(area)}$ Exposure point value for the burrowing bird area-wide, mg/kg-d

$EPV_{bb(point)}$ Exposure point value for the burrowing bird at a single point, mg/kg-d

7.3.7 Shorebirds (Pacific Golden-Plover)

Shorebirds were evaluated for ingestion of prey species (invertebrates) that are exposed to contaminants in the soil. The following ingestion equation calculates a dose for the shorebird through ingestion.

7.3.7.1 Ingestion

$$Di_{sb(a)} = (C_{in(a)} \times R_{sb} \times F_{sb}) / W_{sb} \times \Psi_{sb} \times \Theta_{sb} \quad [7\text{-}11a]$$

$$Di_{sb(p)} = (C_{in(p)} \times R_{sb} \times F_{sb}) / W_{sb} \times \Psi_{sb} \times \Theta_{sb} \quad [7\text{-}11b]$$

$$R_{sb} = 0.0582 \times W_{sb}^{0.651} \quad [7\text{-}12]$$

$$C_{in(a)} = (EC_{area} \times BF) \quad [7\text{-}13a]$$

$$C_{in(p)} = (EC_{point} \times BF) \quad [7\text{-}13b]$$

$$\log BF = -3.849 + 0.617 \times \log K_{ow} \quad [7\text{-}14]$$

where:

$Di_{sb(a)}$ Applied daily dose to shorebirds ($EPV_{sb(area)}$) from consumption of invertebrates area-wide, mg/kg-d

$Di_{sb(p)}$ Applied daily dose to shorebirds ($EPV_{sb(point)}$) from consumption of invertebrates at a single point, mg/kg-d

R_{sb} Food intake rate, Table 7-2

F_{sb} Fraction of insects in diet, Table 7-2

W_{sb} Body weight, Table 7-2

Ψ_{sb} Seasonality, Table 7-2

Θ_{sb} Area use factor, Table 7-2

$C_{in(a)}$ Contaminant concentration in terrestrial insect tissue area-wide, mg/kg

$C_{in(a)}$ Contaminant concentration in terrestrial insect tissue at a single point, mg/kg

BF Organic contaminant-specific bioaccumulation factor for non-ruminant receptors, unitless (from Garten and Trabalka 1983)

7.4 ECOLOGICAL EFFECTS ANALYSIS

Toxicity reference values (TRVs) are concentrations or doses below which no long-term chronic effects, particularly with respect to reproductive endpoints, are expected for target receptor species. TRVs for DDT, DDE, and DDD used in this assessment are summarized in Table 7-3.

DDT and metabolites are organochlorine pesticides that are known to be lipophilic and to bioaccumulate in tissues of organisms. It is widely held that DDT burdens are accumulated in tissues of birds and other wildlife through ingestion of contaminated prey. DDT is transformed through microbial and enzymatic pathways in animal tissues to toxic metabolites, with the capacity for transformation varying from species to species (Dikshith 1991).

At high acute and chronic doses, DDT is a potent neurotoxin and has been implicated in population die-offs of wildlife, most notably in birds. (Blus 1995 and citations within). In high doses, DDT is a potent neurotoxin which affects ion permeability and axon polarity in nerve cells. LD_{50} values ranging from 430 to 4,000 mg/kg are reported for various avian wildlife species (Hudson 1984).

Table 7-3
TOXICITY REFERENCE VALUES FOR AVIAN TARGET RECEPTORS
HOUSING AREA, MIDWAY ATOLL

CPEC	Test Species	Exposure Route	Toxic Effect	Toxicity Endpoint Value	Endpoint Type	Endpoint Uncertaint Factor	Taxa Uncertaint Factor	Toxicity Reference Value	TRV Units	Reference
DDT	kestrel	oral	reproductive	3.0	LOAEL	10	1	0.3	mg/kg-d	Lincer 1975
DDE	owl	oral	reproductive	0.4	LOAEL	10	1	0.04	mg/kg-d	Mendenhall et al. 1983
DDD	rat	oral	systemic	85.0	NOAEL	1	10	8.5	mg/kg-d	ATSDR 1994; Table 2-1, item 67

ATSDR, 1994. *Toxilogical Profile for DDT, DDE, and DDE (Update).* TP-93/05. Agency for Toxic Substances and Disease Registry, U.S. Department of Health and Human Services, Atlanta, Georgia

Mendenhall, V.M., Klaas, E.E., & McLane, M.A.R. 1983. Breeding success of barn owls (*Tyto alba*) fed low levels of DDE and dieldrin. *Arch. Environ. Contam. Toxicol*. 12, 235-240

Lincer, J.L. 1975. DDE-induced eggshell thinning in American kestrel: A comparison of the field situation and laboratory results. *J. Appl. Ecol.* 12(3): 781-793.

In low-level, long-term exposures, DDT is implicated in reproductive failure leading to population decline in some wildlife species. DDD and DDE are separate analogs of DDT which are formed from DDT through metabolic pathways. Although toxicity from DDT and its metabolites has been recognized in bird and other wildlife populations since the early 1960s, high levels of DDE have been recently implicated in egg shell thinning in several different contaminated aquatic bird colonies (Kubiak et al. 1989; Harris et al. 1993). Chronic effects of organochlorine pesticide toxicity focuses primarily on reproductive impairment as a result of low-level, long term exposure. DDT and its metabolites have been implicated in reproductive impairments of two types, eggshell thinning and embryotoxicity. Eggshell thinning (which has been well-documented in wildlife bird species) is caused by an enzymatic alteration of calcium-mobilizing steroids induced by DDT and DDE. Significant declines in osprey (Henny et al. 1977), bald eagle (Wiemeyer et al. 1984) and falcon (Peakall et al. 1967) populations were attributed to egg DDE levels in the range of 15 to 30 ppm which resulted in eggshell thinning and breakage. Low level dietary dosage effects of DDT and DDT metabolites on reproductive impairment have been reported for the American kestrel; reduced reproductive success resulted from dietary doses as low as 3.0 mg/kg (Lincer 1975).

7.5 Risk Characterization

Risk characterization is the process of applying numerical methods and professional judgment to determine whether adverse effects are occurring or are reasonably likely to occur in target receptors linked to assessment endpoints as a result of exposure to site-related CPECs. Risk characterization addresses the following questions: (*a*) Are ecological receptors currently exposed to site-related chemical contaminants at levels capable of causing harm, or is future exposure likely? (*b*) If adverse ecological effects are observed or predicted, what are the types, extent, and severity of effects? and (*c*) What are the principle uncertainties associated with the risk characterization? Risk characterization involves two components: estimation and description.

7.5.1 Risk Estimation Methodology

For this site-specific SERA, risk estimation used a quotient methodology to identify potential hot spots and site-wide risks. EPV_{point} values, for hot spot identification, and

EPV_{ucl} values for site-wide analysis, for soils at the Housing Area will be divided by appropriate TRVs to calculate toxicity quotients (TQs), so that

$$TQ_{area(ij)} = (EPV_{area(ij)} / TRV_{ij}) \qquad [7\text{-}15a]$$

$$TQ_{point(ij)} = (EPV_{point(ij)} / TRV_{ij}) \qquad [7\text{-}15b]$$

where:

$TQ_{area(ij)}$ Area-wide toxicity quotient for the *i*th CPEC for the jth target receptor

$TQ_{point(ij)}$ Toxicity quotient for a single point for the *i*th CPEC for the jth target receptor

$EPV_{area(ij)}$ Area-wide exposure point value for the *i*th CPEC for the jth target receptor

$EPV_{point(ij)}$ Exposure point value at a single point for the *i*th CPEC for the jth target receptor

TRV_{ij} Toxicity reference value for the *i*th CPEC for the jth target receptor

A $TQ_{point\ (ij)}$ greater than 10 is considered an indicator of a hot spot, but not of a site-wide risk. A $TQ_{area\ (ij)}$ greater than 1 suggests that the potential for an unacceptable site-wide risk and that some remedial action is warranted.

7.5.2 Risk Description

Risk description combines the quantified risk estimate with a qualitative description of site-specific conditions to present a broader picture of the degree of risk associated with each assessment endpoint.

Initially 40 composite surface soil samples were collected from the 270-foot square grid nodes at the Housing Area. Two of these samples, MX024 and MX030, were significantly elevated for DDD, DDE, and DDT. While the site wide TQ_{area} values were all less than 1 for these initial samples, these two elevated samples did produce TQ_{point}

values greater than 10 for DDE and DDT for one or two of the target receptors (Tables 7-1 and 7-4).

The two hot spots are located 270 feet apart along Commodore Drive in the 400 Series Housing. Thirty-seven additional soil samples were collected around and between the two hot spots to define the extent of the contamination. Three of these additional samples had TQ_{point} values greater than 10 for DDE (Table 7-4). The DDE TQ_{area} values including these additional samples, for burrowing birds and shorebirds, were 1.43 and 1.48, respectively (Table 7-5).

The objective of this risk assessment was to identify risk posed by hot spot locations in relation to Site-wide risk estimates for special status birds. To determine how risks from hot spots and Site-wide levels could be lowered to acceptable levels, two rounds of remedial action simulations were performed. First, the soil concentrations at each of the identified hot spot locations were substituted with 1 ppm, and the Site-wide risk was recalculated using these substituted values (Table 7-6). This first round reduction in hot spot concentrations reduced Site-wide risks, but the TQ_{area} for DDE for burrowing birds and shorebirds remained greater than 1, i.e., 1.1 and 1.15, respectively. Based on the configuration of concentrations sampled around the hot spots, areas of elevated DDE concentrations larger than the hot spots were substituted with 1 ppm during the second round of remedial action simulations (Figure 7-5). With these larger areas of contamination reduced to 1 ppm, TQ_{area} values were less than 1 (Table 7-6).

7.6 Uncertainty Analysis

Estimates of the potential for adverse affects from exposure to CPECs must often be made with imperfect information (data gaps) and several sources of uncertainty. To ensure that conclusions protective of ecological receptors are reached despite these uncertainties, numerous assumptions are made that tend to overestimate rather than underestimate potential risks. The SERA conclusions are based on available data and assumptions specified and are intended to be conservative. The sources of uncertainty described below should be considered when evaluating these conclusions and when formulating risk management decisions for the Site.

Table 7-4
TQ_{point} VALUES FOR ALL SAMPLING LOCATIONS FOR EACH TARGET RECEPTOR
(page 1 of 3)

	Ground-nesting Bird Laysan Albatross			Burrowing Bird Bonin Petrel			Shorebird Pacific Golden-plover		
TRV	0.04	8.50	0.30	0.04	8.50	0.30	0.04	8.50	0.30
	Toxicity Quotients			Toxicity Quotients			Toxicity Quotients		
Sample	DDE	DDD	DDT	DDE	DDD	DDT	DDE	DDD	DDT
MX001	0.043	0.014	0.014	0.122	0.000	0.005	0.127	0.000	0.007
MX002	0.038	0.014	0.014	0.107	0.000	0.005	0.111	0.000	0.007
MX003	0.014	0.014	0.014	0.038	0.000	0.005	0.040	0.000	0.007
MX004	0.141	0.014	0.033	0.396	0.000	0.012	0.412	0.000	0.018
MX005	0.014	0.014	0.014	0.038	0.000	0.005	0.040	0.000	0.007
MX006	0.144	0.014	0.014	0.404	0.000	0.005	0.420	0.000	0.007
MX007	0.014	0.014	0.014	0.038	0.000	0.005	0.040	0.000	0.007
MX008	0.014	0.014	0.014	0.038	0.000	0.005	0.040	0.000	0.007
MX009	0.103	0.014	0.014	0.290	0.000	0.005	0.301	0.000	0.007
MX010	0.014	0.014	0.014	0.038	0.000	0.005	0.040	0.000	0.007
MX012	0.924	0.014	0.144	2.591	0.000	0.054	2.694	0.000	0.079
MX013	2.391	0.035	0.516	6.707	0.000	0.193	6.972	0.001	0.282
MX014	2.527	0.038	0.408	7.088	0.001	0.152	7.369	0.001	0.223
MX015	0.014	0.014	0.014	0.038	0.000	0.005	0.040	0.000	0.007
MX016	0.014	0.014	0.014	0.038	0.000	0.005	0.040	0.000	0.007
MX017	0.158	0.014	0.014	0.442	0.000	0.005	0.460	0.000	0.007
MX018	1.223	0.014	0.092	3.430	0.000	0.035	3.565	0.000	0.050
MX019	1.168	0.014	0.139	3.277	0.000	0.052	3.407	0.000	0.076
MX020	1.168	0.014	0.114	3.277	0.000	0.043	3.407	0.000	0.062
MX021	0.014	0.014	0.014	0.038	0.000	0.005	0.040	0.000	0.007
MX023	0.014	0.014	0.014	0.038	0.000	0.005	0.040	0.000	0.007
MX024	7.336	1.630	**17.660**	**20.579**	0.022	6.606	**21.393**	0.034	9.653
MX025	0.046	0.014	0.014	0.130	0.000	0.005	0.135	0.000	0.007
MX026	0.171	0.014	0.014	0.480	0.000	0.005	0.499	0.000	0.007
MX027	0.071	0.014	0.014	0.198	0.000	0.005	0.206	0.000	0.007
MX028	0.014	0.014	0.014	0.038	0.000	0.005	0.040	0.000	0.007
MX029	0.054	0.014	0.014	0.152	0.000	0.005	0.158	0.000	0.007
MX030	**12.226**	2.309	**19.834**	**34.298**	0.030	7.419	**35.654**	0.048	**10.841**

Table 7-4
TQ_{point} VALUES FOR ALL SAMPLE LOCATIONS FOR EACH TARGET RECEPTOR
(page 2 of 3)

	Ground-nesting Bird Laysan Albatross			Burrowing Bird Bonin Petrel			Shorebird Pacific Golden-plover			
TRV	0.04	8.50	0.30	0.04	8.50	0.30	0.04	8.50	0.30	
	Toxicity Quotients			Toxicity Quotients			Toxicity Quotients			
Sample	DDE	DDD	DDT	DDE	DDD	DDT	DDE	DDD	DDT	
MX031	0.014	0.014	0.014	0.038	0.000	0.005	0.040	0.000	0.007	
MX032	0.177	0.014	0.043	0.495	0.000	0.016	0.515	0.000	0.024	
MX034	0.062	0.014	0.014	0.175	0.000	0.005	0.182	0.000	0.007	
MX035	0.014	0.014	0.014	0.038	0.000	0.005	0.040	0.000	0.007	
MX036	0.014	0.014	0.014	0.038	0.000	0.005	0.040	0.000	0.007	
MX037	0.408	0.014	0.049	1.143	0.000	0.018	1.188	0.000	0.027	
MX038	0.103	0.014	0.014	0.290	0.000	0.005	0.301	0.000	0.007	
MX039	0.014	0.014	0.014	0.038	0.000	0.005	0.040	0.000	0.007	
MX040	0.014	0.014	0.014	0.038	0.000	0.005	0.040	0.000	0.007	
MX041	1.005	0.030	0.171	2.820	0.000	0.064	2.932	0.001	0.094	
MX042	0.060	0.014	0.014	0.168	0.000	0.005	0.174	0.000	0.007	
MX043	0.014	0.014	0.014	0.038	0.000	0.005	0.040	0.000	0.007	Initial Samples
MX046	2.255	0.111	0.353	6.326	0.001	0.132	6.576	0.002	0.193	
MX047	1.087	0.014	0.117	3.049	0.000	0.044	3.169	0.000	0.064	
MX048	1.983	0.014	0.226	5.564	0.000	0.084	5.784	0.000	0.123	
MX049	2.608	0.190	0.571	7.317	0.003	0.213	7.606	0.004	0.312	
MX050	1.087	0.014	0.215	3.049	0.000	0.080	3.169	0.000	0.117	
MX051	0.353	0.014	0.014	0.991	0.000	0.005	1.030	0.000	0.007	
MX052	1.875	0.149	0.652	5.259	0.002	0.244	5.467	0.003	0.356	
MX053	0.220	0.014	0.014	0.617	0.000	0.005	0.642	0.000	0.007	
MX054	0.706	0.014	0.209	1.982	0.000	0.078	2.060	0.000	0.114	
MX055	0.027	0.133	0.062	0.076	0.002	0.023	0.079	0.003	0.034	
MX056	3.804	0.206	0.543	**10.670**	0.003	0.203	**11.093**	0.004	0.297	
MX057	1.739	0.014	0.130	4.878	0.000	0.049	5.071	0.000	0.071	
MX058	0.951	0.014	0.014	2.668	0.000	0.005	2.773	0.000	0.007	
MX059	2.527	0.065	0.269	7.088	0.001	0.101	7.369	0.001	0.147	
MX060	0.706	0.014	0.014	1.982	0.000	0.005	2.060	0.000	0.007	
MX061	0.117	0.014	0.014	0.328	0.000	0.005	0.341	0.000	0.007	

Table 7-4
TQ_{point} VALUES FOR ALL SAMPLE LOCATIONS FOR EACH TARGET RECEPTOR
(page 3 of 3)

	Ground-nesting Bird Laysan Albatross			Burrowing Bird Bonin Petrel			Shorebird Pacific Golden-plover		
TRV	0.04	8.50	0.30	0.04	8.50	0.30	0.04	8.50	0.30
	Toxicity Quotients			Toxicity Quotients			Toxicity Quotients		
Sample	DDE	DDD	DDT	DDE	DDD	DDT	DDE	DDD	DDT
MX062	1.522	0.014	0.149	4.268	0.000	0.056	4.437	0.000	0.082
MX063	1.141	0.014	0.136	3.201	0.000	0.051	3.328	0.000	0.074
MX064	0.380	0.516	0.084	1.067	0.007	0.032	1.109	0.011	0.046
MX065	1.032	0.014	0.103	2.896	0.000	0.039	3.011	0.000	0.056
MX066	3.532	0.122	1.168	9.908	0.002	0.437	**10.300**	0.003	0.639
MX067	2.554	0.062	0.261	7.164	0.001	0.098	7.448	0.001	0.143
MX068	2.011	0.079	0.196	5.640	0.001	0.073	5.863	0.002	0.107
MX069	1.253	0.014	0.364	3.514	0.000	0.136	3.653	0.000	0.199
MX070	1.307	0.038	0.572	3.666	0.001	0.214	3.811	0.001	0.313
MX071	0.331	0.014	0.039	0.930	0.000	0.015	0.967	0.000	0.021
MX072	0.690	0.014	0.057	1.936	0.000	0.021	2.012	0.000	0.031
MX074	1.360	0.036	0.325	3.815	0.000	0.121	3.966	0.001	0.177
MX075	2.235	0.084	0.833	6.270	0.001	0.311	6.518	0.002	0.455
MX076	3.417	0.078	0.400	9.586	0.001	0.149	9.965	0.002	0.218
MX077	2.009	0.071	0.285	5.637	0.001	0.107	5.860	0.001	0.156
MX078	1.420	0.027	0.104	3.983	0.000	0.039	4.141	0.001	0.057
MX079	0.720	0.014	0.123	2.021	0.000	0.046	2.100	0.000	0.067
MX080	1.577	0.052	0.375	4.425	0.001	0.140	4.600	0.001	0.205
MX081	2.496	0.069	0.497	7.002	0.001	0.186	7.279	0.001	0.272
MX082	4.759	0.082	0.553	**13.349**	0.001	0.207	**13.877**	0.002	0.302
MX083	0.334	0.014	0.014	0.938	0.000	0.005	0.975	0.000	0.007

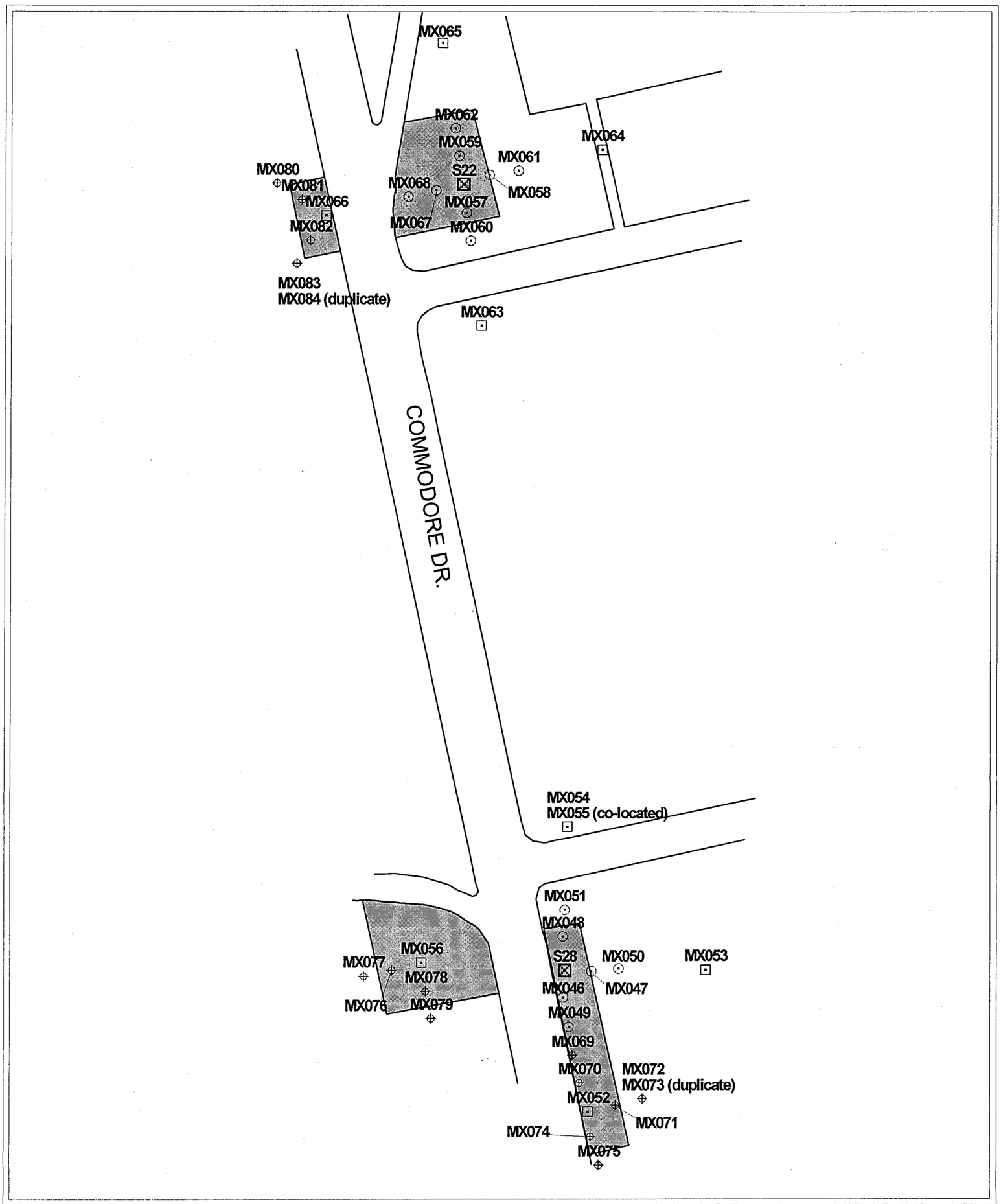
TRV = Toxicity Reference Value
TQ = Toxicity Quotient
TQpoint = TQ at each sampling point
TQpoint = Values in **BOLD** are > 10

Table 7-5
SITE-WIDE EXPOSURE AND RISK ESTIMATES FOR ALL SAMPLES AND ALL RECEPTORS

Exposure	Ground-nesting Bird Exposure (gn)			Exposure	Burrowing Bird Exposure (bb)			Exposure	Shorebird Exposure (sb)		
Parameter	DDE	DDD	DDT	Parameter	DDE	DDD	DDT	Parameter	DDE	DDD	DDT
ECarea	1.870	0.130	0.400	ECarea	1.870	0.130	0.400	ECarea	1.870	0.130	0.400
Wgn	2.4	2.4	2.4	Wbb	0.176	0.176	0.176	BF	0.493	0.744	0.693
Rgn	0.103	0.103	0.103	Rbb	0.019	0.019	0.019	Cin	0.882	0.092	0.265
SAgn	1797.22	1797.22	1797.22	SAbb	314.6	314.6	314.6	Rsb	0.016	0.016	0.016
Ygn	0.375	0.375	0.375	Ybb	0.44	0.44	0.44	Fsb	1	1	1
Ogn	1	1	1	Obb	1	1	1	Wsb	0.14	0.14	0.14
Fgn	0.02	0.02	0.02	Fbb	0.02	0.02	0.02	Ysb	0.75	0.75	0.75
Pc	0.25	0.25	0.25	Pc	0.25	0.25	0.25	Osb	0.75	0.75	0.75
Ps	1502.2	1502.2	1502.2	Ps	1502.2	1502.2	1502.2				
CF1	0.000001	0.000001	0.000001	CF1	0.000001	0.000001	0.000001				
DAF	0.1	0.1	0.1	DAF	0.1	0.1	0.1				
EPVarea	0.020	0.001	0.004	EPVarea	0.057	0.004	0.012	EPVarea	0.059	0.006	0.018
TRV	0.04	8.5	0.3	TRV	0.04	8.5	0.3	TRV	0.04	8.5	0.3
TQarea	0.508	0.000	0.014	TQarea	1.425	0.000	0.041	TQarea	1.478	0.001	0.059

Key:

ECarea = Site Wide Environmental Concentration calculated from the 95% UCL
W = Body Weight
R = Food Intake Rate
SA = Total Surface Area
Y = Seasonality
O = Area Use Factor
F = Fraction of Soil in Diet
Pc = Bulk Soil Density
Ps = Fraction of total body surface area in contact with soil
CF1 = Conversion Factor
DAF = Dermal Absorption Factor
BF = Bioaccumulation Factor
Cin = Contaminant Concentration in Terrestrial Insect Tissue
EPVucl = Site wide Exposure Point Value (mg/kg-d)
TRV = Toxicity Reference Value (mg/kg-d)
TQarea = Site Wide Toxicity Quotient



LEGEND

SAMPLES
- FIRST PHASE COMPOSITE SAMPLE
- SECOND PHASE COMPOSITE SAMPLE
- SECOND PHASE DISCRETE SAMPLE
- THIRD PHASE DISCRETE SAMPLE
- ROAD
- AREAS TO BE EXCAVATED TO 2 FEET

NOTES

1. THE ACCURACY OF THIS DOCUMENT IS LIMITED TO THE QUALITY OF THE SOURCE INFORMATION AND IS NOT A LEGAL REPRESENTATION OF THE ORIGINAL SURVEY
2. HORIZONTAL CONTROL POINT ESTABLISHED BY USNS ON SITE, WAS USED AS BASIS OF DRAWING
3. VERTICAL CONTROL WAS BASED ON BM#11 WITH AN ELEVATION OF 8.52 FEET (MLLW)
4. PLANE COORDINATE SYSTEM FOR SAND AND EASTERN ISLANDS, ES-217, DRAWING NO.: SUR-6, USNS MIDWAY ISLAND
5. PROJECT NUMBER 314790001
6. FILE :g:\midway\ri_plan\sampling\housing\abrev_ri.apr 11-20-96

SOURCES

PERRY ASSOCIATES INC., HOWARD LAWSON & ASSOC.
US S. NAVAL STATION, MIDWAY ISLAND, DWG NO.: #1038656, #1038657

N

30 0 30 60 90 Feet

FIGURE

7-5

DATE	REV	DRWN	INT	CHKD	INT	APPR	INT
12/02/96		HFP		BW			

TITLE

AREAS TO BE EXCAVATED TO REMOVE DDT/DDE CONTAMINATION

Table 7-6
REMEDIAL ACTION SCENARIOS FOR RISK MANAGEMENT OF DDE/DDT

RISK ESTIMATE	Ground-nesting bird			Burrowing bird			Shorebird		
	DDE	DDD	DDT	DDE	DDD	DDT	DDE	DDD	DDT
Round 1 - simulation									
Site-wide Risk after removing hot spots (TQ_{point}>10)									
EPVarea	0.016	0.001	0.003	0.044	0.003	0.01	0.046	0.005	0.014
TRV	0.04	8.5	0.3	0.04	8.5	0.3	0.04	8.5	0.3
TQarea	0.400	0.0001	0.010	**1.100**	0.0004	0.033	**1.150**	0.0006	0.047
Round 2									
Site-wide Risk after removing area delineated for excavation (Figure 7-5)									
EPVarea	0.01	0.001	0.003	0.027	0.003	0.009	0.028	0.005	0.014
TRV	0.04	8.5	0.3	0.04	8.5	0.3	0.04	8.5	0.3
TQarea	0.250	0.0001	0.010	0.675	0.0004	0.030	0.700	0.0006	0.047

Key:

EPVarea = Area-wideExposure Point Value
TRV = Toxicity Reference Value
TQarea = Toxicity Quotient based on site-wide exposure

The uncertainty analysis summarizes assumptions made for each element of the assessment and evaluates the validity and strengths and weaknesses of the analyses, and quantifies to the greatest extent possible the uncertainties associated with each identified risk. This analysis addresses uncertainty associated with each component of the screening assessment: CPEC selection and quantification, receptor selection, exposure estimation, effects estimation, and risk estimation. It is important that the screening assessment identify data gaps that may have hindered or prevented the determination of potential risk and which need to be filled so as to facilitate such a determination.

7.6.1 CPEC Selection and Quantification

The CPECs were identified in the SI SERA, and detection limits for the surface soil samples were adequate to register DDD, DDE, and DDT concentrations capable of inducing long-term chronic adverse effects in ecological receptors. Since the CPECs were previously identified, the level of uncertainty associated with CPEC selection is low. The variability and log normal distribution of onsite contaminant concentrations suggest uncertainty as to Site-wide concentrations. Use of the 95th UCL for calculation of Site-wide risks is intended to adequately compensate for this uncertainty and provide a conservative estimate of risk.

7.6.2 Receptor Selection

Relatively little uncertainty is associated with receptor selection, due to the highly visible nature of the bird species that occur on this Site. However, the structure of the food web itself is a source of uncertainty in that it may not completely represent ecological relationships among target receptors on the atoll.

7.6.3 Exposure Estimation

Relatively little uncertainty arises from the qualitative selection of exposure pathways, but considerable uncertainty arises from quantitative estimation of contaminant intakes. Factors that might reduce exposure values, such as bioavailability from soil, degradation rates in soil, metabolic transformation in invertebrates, receptor avoidance of contaminated soils, or frequency of receptor exposure to contaminated media, were not fully factored into this screening analysis. These conditions are expected to create an over-estimation of CPEC exposure concentrations.

Home ranges for some terrestrial species, and therefore exposures, were assumed to be completely within the contaminated areas of each study site. Thus, birds are conservatively assumed to be exposed at the upper range of media concentrations at all times.

Estimates of CPEC concentrations in lower trophic level prey and forage items (terrestrial invertebrates) are based on the simplest possible equilibrium partitioning models, which do not take into account either absorption or elimination factors and which could cause an overestimate of tissue residue levels and associated risk.

7.6.4 Effects Characterization

Applicability of literature-derived data depends upon types of results presented and methods used to arrive at these results. Test endpoints produced by laboratory and field tests may be reported as formally defined toxicological endpoints or as less stringently defined measures of mortality or sublethal effect; variations in format introduce a source of error when subsumed into a single TRV. Thus, seemingly equivalent TRVs may be significantly different owing to differences in test protocols, test conditions, or responses of individual organisms (Lewis et al. 1990).

Ecotoxicological chronic effects data (NOAEL) were not available for use as TRVs for all of the CPECs. Acceptable TRVs had to be linearly extrapolated from acute or chronic effects data (lowest observed adverse effect level [LOAEL]) through the use of uncertainty factors. The assumptions inherent in the selection and use of these factors can be a source of uncertainty and will, if the factors are large, provide an overestimated risk. Comparison of TRVs to exposure concentrations represented by the upper 95-percent confidence interval of the mean, is an inherently conservative method that tends to overestimate both exposure levels and risk.

Impacts to individual organisms are considered in this screening assessment, rather than impacts to populations. Generally, except for threatened and endangered species, assessments need only evaluate population effects (EPA 1989b). Evaluating risks to individual organisms tends to overestimate risks to both populations and communities. However, since the albatross nest in the same location each year, this would only overestimate risks to shorebirds, burrowing birds, and other ground-nesting species on Midway.

7.6.5 Risk Characterization

The quotient method compares two point estimates, one for exposure and one for effect, to determine their relative position. Each of these single points actually represents a population with a unique set of statistical characteristics; characteristics that strongly influence the assessment of actual risk and the quantification of uncertainty. Uncertainty also arises when the uncertainty of the exposure assessment is combined with the uncertainty of the effects assessment.

7.7 SERA Conclusions and Recommendations

Overall there is very little contamination over the entire Housing Area site. Low levels of DDT, DDE, and DDD were found, but most represent little or no risk. The two hot spots identified along Commodore Drive account for all the point risks over 10 for birds. Data from the entire Site also show that natural degradation of DDT is occurring onsite, with concentrations of DDE exceeding DDT in most cases. Half-lives for DDT, DDE, and DDD range from 2 to 15 years in surface soils (ATSDR 1994). DDT and DDE concentrations will continue to decrease over time as these compounds are broken down through natural processes.

The Site-wide and point estimations of low to moderate risk, respectively, indicate that assessment endpoints for special status bird species would not be met without remedial action. On the basis of the remedial action simulations, it is recommended that the areas identified in Figure 7-5 be excavated to 2 feet below ground surface. Using 1 ppm as a recommended remedial action goal is a conservative assumption, given that the area will be back-filled with clean soil. This removal action would reduce risks to special status bird species to acceptable levels, and allow the assessment endpoints to be met.

SECTION 8
CONCLUSIONS AND RECOMMENDATIONS

8.1 CONCLUSIONS

Eighty-four surface soil samples (including duplicates) were collected throughout the Housing Area during this Abbreviated RI. Approximately one-half of them (44) were composite samples collected on a 270-foot square grid; the remaining samples (excluding one PE sample) were collected in the vicinity of two hot spots identified along Commodore Drive.

Analytical data indicate that low levels of DDE, DDT, and DDD are present in surface soils throughout the Housing Area as a result of past pesticide application. The area along Commodore Drive appears to exhibit moderately higher levels of these compounds, likely related to increased application of pesticides in the vicinity of housing for senior officers. The analytical data also indicate that DDT is degrading naturally, since concentrations of DDE exceed those of DDT in the majority of samples.

On the basis of the results of the SERA, the detected concentrations of these compounds present a low risk to special status bird species on a Housing Area-wide basis. However, the identified hot spots near Commodore Drive present a moderate risk to bird species on a point basis.

8.2 RECOMMENDATIONS

The SERA performed for this investigation indicates that moderate risk to special status bird species will exist in the areas along Commodore Drive without remedial action. Therefore, removal of surface soils from the areas indicated in Figure 7-5 is recommended. The areas indicated should be excavated to a depth of 2 feet below grade and the excavations backfilled with clean soil and revegetated. This action will reduce risk to bird species to an acceptable level. Due to the extensive sampling conducted in the area to date, confirmation sampling following soil removal is not considered necessary.

The excavated soil will contain elevated levels of DDT and its metabolites, but is not considered a hazardous waste from a regulatory standpoint because the compounds are present due to past application of pesticides using best management practices and not due to a spill or release. The excavated soil should be treated by stabilization/solidification and placed in the existing CAMU established in the new Bulky Waste Landfill on Sand Island. Following implementation of this removal action, no further action or investigation is recommended.

SECTION 9
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APPENDIX A

OHM
DATA VALIDATION REPORTS

1. INTRODUCTION

Task Order Title:	Midway Housing Area
CLEAN Contract Task Order#:	0136
Batch #	070596S
CTO Manager:	Jeff Cotter
Project Contact:	Brian House
Matrix:	Soil
Analysis:	Pesticides
NEESA QC Level:	E
No. of Samples:	20
Reviewer:	Scott Lewis
Date of Review:	August 27, 1996

The samples listed in Table 1 were validated based on the guidelines outlined in the Ogden Project Procedures Manual, Comprehensive Long-Term Environmental Action Navy (CLEAN) Program data validation procedures (DVP-1, Rev. 2). Any deviations from these precedures are documented herein. These procedures are designed to meet the data quality objectives required by the Naval Facilities Engineering Service Center for all analysis at the requested QC level. Qualifiers were applied in cases where the data did not meet the required QC criteria or where special consideration by the data user is required. Data qualifiers were placed on the data spreadsheet with the associated qualification codes. Analytes that were rejected for any reason are denoted on the spreadsheet as having only the "R" data qualifier and associated qualification code(s) denoting the reason for rejection. Any additional problems with the data that may have resulted in an estimated value were not denoted by a qualification code since the data had already been rejected.

Table 1. Sample Identification

Ogden ID	EPA ID	Matrix	COC Method
MHASS01S01	MX001	soil	8080M
MHASS02S02	MX002	soil	8080M
MHASS03S03	MX003	soil	8080M
MHASS04S04	MX004	soil	8080M
MHASS05S05	MX005	soil	8080M
MHASS06S06	MX006	soil	8080M
MHASS07S07	MX007	soil	8080M
MHASS08S08	MX008	soil	8080M
MHASS09S09	MX009	soil	8080M
MHASS10S10	MX010	soil	8080M
MHASS10D10	MX011	soil	8080M
MHASS11S11	MX012	soil	8080M
MHASS12S12	MX013	soil	8080M
MHASS13S13	MX014	soil	8080M
MHASS14S14	MX015	soil	8080M
MHASS15S15	MX016	soil	8080M
MHASS16S16	MX017	soil	8080M
MHASS17S17	MX018	soil	8080M
MHASS18S18	MX019	soil	8080M
MHASS19S19	MX020	soil	8080M

2. DATA VALIDATION FINDINGS

2.1 SAMPLE MANAGEMENT

Following are findings associated with sample management.

2.1.1 Sample Preservation, Handling, and Transport

The samples received by the onsite laboratory did not have the temperature recorded. This is non-compliant with NEESA 20.2-047B, however because the samples were used for screening purposes only, no qualifications were given. The samples required no preservation. No other problems were noted and no qualificaitons were required.

2.1.2 Chain of Custody

All COCs were legible and complete. All COCs were signed, and no qualifications were required based on the chain of custody.

2.1.3 Holding Times

All samples were extracted and analyzed within the allowed holding times. No qualifications were required.

2.2 PESTICIDES INSTRUMENT PERFORMANCE

Pesticide instrument performance is not reviewed in Level E data validation.

2.3 CALIBRATION

2.3.1 Analytical Sequence

The analytical sequences were acceptable; therefore, no qualifications were required.

2.3.2 Initial Calibration

The initial calibration dated 7/9/96 had acceptable %RSDs (< 20%). No qualifications were required.

2.3.3 Continuing Calibration

The RPD values for the continuing calibration standards met the requirements; therefore, no qualifications were required.

2.4 BLANKS

2.4.1 Instrument Blanks

All of the associated instrument blanks had nondetects for the target compounds; therefore, no qualifications were required.

2.4.2. Method Blanks

The method blanks had nondetects for the target compounds; therefore, no qualifications were required.

2.5 BLANK SPIKES AND LABORATORY CONTROL SAMPLES

A soil laboratory control sample was analyzed with the samples. The %Rs and RPD values were within CLP QC limits; therefore, no qualifications were necessary.

2.6 SURROGATE RECOVERY

All samples, blanks, and spikes were noted to contain surrogate compounds. Surrogate recovery is not reviewed in Level E data validation

2.7 MATRIX SPIKE/MATRIX SPIKE DUPLICATE

No matrix spike/matrix spike duplicate were perfomed due to the screening nature of the analysis. No qualifications were given.

2.8 SAMPLE CLEANUP PERFORMANCE

Sample cleanup is not performed under 8080M for screening purposes; therefore no qualifications were given.

2.9 FIELD QC SAMPLES

Field QC samples are evaluated, and if necessary, qualified based only on method blanks. Any remaining detects are used to evaluate the associated samples. The following are findings associated with field QC samples:

2.9.1 Field Duplicates

Samples MX010 and MX011 were the field duplicates associated with this extraction batch. Both samples were free from target compounds detects at the method detection limit. Agreement between the two samples was acceptable. Qualifications were not required.

2.10 COMPOUND IDENTIFICATION

The onsite laboratory analyzed for DDE, DDT, and DDD using a field modified EPA SW-846 8080 method. Examination of chromatograms are not applicable at NFESC QC level E. No qualifications were required.

2.11 COMPOUND QUANTIFICATION AND REPORTED DETECTION LIMITS

Compound quantification is not evaluated at NFESC QC level E. It should be noted that the compound quantifications reported are not dry weight corrected. The reported detection limits were verified against the low level standard in the initial calibration and found to be acceptable. The spreadsheet reported non-detects as "ND". The "ND" was changed to the reported detection limit of 0.10 mg/kg and qualified with a "U". No additional qualifications were required. Sample MX010 was sent to APCL Analytical Laboratory for confirmational analysis. It should be noted that the onsite laboratory results are not dry weight corrected. The confirmation results are dry weight corrected. The following table displays the results.

	MX010 (Onsite Laboratory)*	MX010 Confirmation (APCL)**	MX10 Confirmation (APCL)** Wet Weight Concentration
4,4'-DDD (mg/kg)	0.1U	0.0009J	0.00086
4,4'-DDE (mg/kg)	0.1U	0.002U	0.002U
4,4'-DDT (mg/kg)	0.1U	0.006	0.0057

*PQL = 0.1 mg/kg **PQL = 0.002 mg/kg

MIDWAY FIELD ANALYTICAL UNIT

Screening Analytical Report
Modified EPA Method 8080

Date Sampled: 07/02/96
Date Received: 07/02/96
DDE/DDD/DDT Analyzed: 07/09/96
COC Number: 161139, 161140, 161141, 161142, 161143
Batch Number: 070596S

Project Manager: Scott Morris
Client: OHM Remediation Services
Project: 18156
Matrix: Soil
Units: mg/Kg

Sample ID No.	DDE	REV	QUAL	DDD	REV	QUAL	DDT	REV	QUAL
MX001	0.16			0.10 ~~ND~~	U		0.10 ~~ND~~	U	
MX002	0.14			0.10 ~~ND~~			0.10 ~~ND~~	U	
MX003	0.10 ~~ND~~	U		0.10 ~~ND~~			0.10 ~~ND~~	U	
MX004	0.52			0.10 ~~ND~~			0.12		
MX005	0.10 ~~ND~~	U		0.10 ~~ND~~			0.10 ~~ND~~	U	
MX006	0.53			0.10 ~~ND~~			~~ND~~	U	
MX007	0.10 ~~ND~~	U		0.10 ~~ND~~			~~ND~~	U	
MX008	0.10 ~~ND~~	U		0.10 ~~ND~~			~~ND~~	U	
MX009	0.38			0.10 ~~ND~~			~~ND~~	U	
MX0010	0.10 ~~ND~~	U		0.10 ~~ND~~			~~ND~~	U	
Action Level	**1.0**			**1.0**			**1.0**		

Notes:
NR - Not requested
COC - Chain of custody
ND - Analytes not detected at or above the stated detection limit (0.1 mg/Kg)

Procedures:
DDE/DDD/DDT analysis was performed following EPA method 8080.

MIDWAY FIELD ANALYTICAL UNIT

Screening Analytical Report
Modified EPA Method 8080

Date Sampled: 07/02/96
Date Received: 07/02/96
DDE/DDD/DDT Analyzed: 07/10/96
COC Number: 161144, 161145, 161146, 161147, 161148
Batch Number: 070596S

Project Manager: Scott Morris
Client: OHM Remediation Services
Project: 18156
Matrix: Soil
Units: mg/Kg

Sample ID No.	DDE	REV	QUAL	DDD	REV	QUAL	DDT	REV	QUAL
MX011	0.10 ~~ND~~	U		0.10 ~~ND~~	U		0.10 ~~ND~~	U	
MX012	3.4			0.10 ~~ND~~	↓		0.53		
MX013	8.8			0.13			1.9		
MX014	9.3			0.14			1.5		
MX015	0.10 ~~ND~~	U		0.10 ~~ND~~	U		0.10 ~~ND~~	U	
MX016	0.10 ~~ND~~	U		~~ND~~			~~ND~~		
MX017	0.58			~~ND~~			↓ ~~ND~~	↓	
MX018	4.5			~~ND~~			0.34		
MX019	4.3			~~ND~~			0.51		
MX020	4.3			↓ ~~ND~~	↓		0.42		
Action Level	1.0			1.0			1.0		

Notes:
NR - Not requested
COC - Chain of custody
ND - Analytes not detected at or above the stated detection limit (0.1 mg/Kg)

Procedures:
DDE/DDD/DDT analysis was performed following EPA method 8080.

1. INTRODUCTION

Task Order Title:	Midway Housing Area
CLEAN Contract Task Order#:	0136
Batch #	070596S1
CTO Manager:	Jeff Cotter
Project Contact:	Brian House
Matrix:	Soil
Analysis:	Pesticides
NEESA QC Level:	E
No. of Samples:	20
Reviewer:	Scott Lewis
Date of Review:	August 27, 1996

The samples listed in Table 1 were validated based on the guidelines outlined in the Ogden Project Procedures Manual, Comprehensive Long-Term Environmental Action Navy (CLEAN) Program data validation procedures (DVP-1, Rev. 2). Any deviations from these procedures are documented herein. These procedures are designed to meet the data quality objectives required by the Naval Facilities Engineering Service Center for all analysis at the requested QC level. Qualifiers were applied in cases where the data did not meet the required QC criteria or where special consideration by the data user is required. Data qualifiers were placed on the data spreadsheet with the associated qualification codes. Analytes that were rejected for any reason are denoted on the spreadsheet as having only the "R" data qualifier and associated qualification code(s) denoting the reason for rejection. Any additional problems with the data that may have resulted in an estimated value were not denoted by a qualification code since the data had already been rejected.

Table 1. Sample Identification

Ogden ID	EPA ID	Matrix	COC Method
MHASS20S20	MX021	soil	8080M
MHASS20D20	MX022	soil	8080M
MHASS21S21	MX023	soil	8080M
MHASS22S22	MX024	soil	8080M
MHASS23S23	MX025	soil	8080M
MHASS24S24	MX026	soil	8080M
MHASS25S25	MX027	soil	8080M
MHASS26S26	MX028	soil	8080M
MHASS27S27	MX029	soil	8080M
MHASS28S28	MX030	soil	8080M
MHASS29S29	MX031	soil	8080M
MHASS30S30	MX032	soil	8080M
MHASS30D30	MX033	soil	8080M
MHASS31S31	MX034	soil	8080M
MHASS32S32	MX035	soil	8080M
MHASS33S33	MX036	soil	8080M
MHASS34S34	MX037	soil	8080M
MHASS35S35	MX038	soil	8080M
MHASS36S36	MX039	soil	8080M
MHASS37S37	MX040	soil	8080M

2. DATA VALIDATION FINDINGS

2.1 SAMPLE MANAGEMENT

Following are findings associated with sample management.

2.1.1 Sample Preservation, Handling, and Transport

The samples received by the onsite laboratory did not have the temperature recorded. This is non-compliant with NEESA 20.2-047B, however because the samples were used for screening purposes only, no qualifications were given. The samples required no preservation. No other problems were noted and no qualifications were required.

2.1.2 Chain of Custody

All COCs were legible and complete. All COCs were signed, and no qualifications were required based on the chain of custody.

2.1.3 Holding Times

All samples were extracted and analyzed within the allowed holding times. No qualifications were required.

2.2 PESTICIDES INSTRUMENT PERFORMANCE

Pesticide instrument performance is not reviewed in Level E data validation.

2.3 CALIBRATION

2.3.1 Analytical Sequence

The analytical sequences were acceptable; therefore, no qualifications were required.

2.3.2 Initial Calibration

The initial calibration dated 7/9/96 had acceptable %RSDs (< 20%). No qualifications were required.

2.3.3 Continuing Calibration

The RPD values for the continuing calibration standards met the requirements of < 15% with the exception of TCMX at 16%. No qualifications were required.

2.4 BLANKS

2.4.1 Instrument Blanks

All of the associated instrument blanks had nondetects for the target compounds; therefore, no qualifications were required.

2.4.2. Method Blanks

The method blanks had nondetects for the target compounds; therefore, no qualifications were required.

2.5 BLANK SPIKES AND LABORATORY CONTROL SAMPLES

A soil laboratory control sample was analyzed with the samples. The %Rs and RPD values were within CLP QC limits; therefore, no qualifications were necessary.

2.6 SURROGATE RECOVERY

All samples, blanks, and spikes were noted to contain surrogate compounds. Surrogate recovery is not reviewed in Level E data validation

2.7 MATRIX SPIKE/MATRIX SPIKE DUPLICATE

No matrix spike/matrix spike duplicate were performed due to the screening nature of the analysis. No qualifications were given.

2.8 SAMPLE CLEANUP PERFORMANCE

Sample cleanup is not performed under 8080M for screening purposes; therefore no qualifications were given.

2.9 FIELD QC SAMPLES

Field QC samples are evaluated, and if necessary, qualified based only on method blanks. Any remaining detects are used to evaluate the associated samples. The following are findings associated with field QC samples:

2.9.1 Field Duplicates

Samples MX021 and MX022 were the field duplicates associated with this extraction batch. Both samples were free from target compounds detects at the method detection limit. Agreement between the two samples was acceptable. Qualifications were not required.

2.10 COMPOUND IDENTIFICATION

The onsite laboratory analyzed for DDE, DDT, and DDD using a field modified EPA SW-846 8080 method. Examination of chromatograms are not applicable at NFESC QC level E.

2.11 COMPOUND QUANTIFICATION AND REPORTED DETECTION LIMITS

Compound quantification is not evaluated at NFESC QC level E. The reported detection limits were verified against the low level standard in the initial calibration and found to be acceptable. The spreadsheet reported non-detects as

"ND". The "ND" was changed to the reported detection limit of 0.10 mg/kg and qualified with a "U". Samples MX021 and MX032 were sent to APCL Analytical Laboratory for conformational analysis. It should be noted that the onsite laboratory results are not dry weight corrected. The confirmation results are dry weight corrected. The following table displays the results.

	MX021 (Onsite Laboratory)*	MX021 Confirmation (APCL)**	MX021 Confirmation (APCL)** Wet Weight Concentration
4,4'-DDD (mg/kg)	0.1U	0.0009J	0.00086
4,4'-DDE (mg/kg)	0.1U	0.002U	0.002U
4,4'-DDT (mg/kg)	0.1U	0.006	0.0057

	MX032 (Onsite Laboratory)*	MX032 Confirmation (APCL)**	MX032 Confirmation (APCL) Wet Weight Concentration
4,4'-DDD (mg/kg)	0.1U	0.065	0.063
4,4'-DDE (mg/kg)	0.65	0.491	0.480
4,4'-DDT (mg/kg)	0.16	0.206	0.202

*Practical Quantitation Limit (PQL) = 0.1 mg/kg **PQL = 0.002 mg/kg

No qualifications were required.

MIDWAY FIELD ANALYTICAL UNIT

Screening Analytical Report
Modified EPA Method 8080

Date Sampled: 07/02/96
Date Received: 07/02/96
DDE/DDD/DDT Analyzed: 07/10/96
COC Number: 161149, 161150, 161152, 161153, 161154
Batch Number: 070596S1

Project Manager: Scott Morris
Client: OHM Remediation Services
Project: 18156
Matrix: Soil
Units: mg/Kg

Sample ID No.	DDE	REV	QUAL	DDD	REV	QUAL	DDT	REV	QUAL
MX021	0.10 ~~ND~~	U		0.10 ~~ND~~	U		0.10 ~~ND~~	U	
MX022	~~ND~~	↓		~~ND~~	↓		~~ND~~	↓	
MX023	↓ ~~ND~~	↓		↓ ~~ND~~	↓		↓ ~~ND~~	↓	
MX024	27			6.0			65		
MX025	0.17			0.10 ~~ND~~	U		0.10 ~~ND~~	U	
MX026	0.63			~~ND~~	↓		~~ND~~	↓	
MX027	0.26			~~ND~~	↓		~~ND~~	↓	
MX028	0.10 ~~ND~~	U		~~ND~~	↓		~~ND~~	↓	
MX029	0.20			↓ ~~ND~~	↓		↓ ~~ND~~	↓	
MX030	45			8.5			73		
Action Level	**1.0**			**1.0**			**1.0**		

Notes:
NR - Not requested
COC - Chain of custody
ND - Analytes not detected at or above the stated detection limit (0.1 mg/Kg)

Procedures:
DDE/DDD/DDT analysis was performed following EPA method 8080.

MIDWAY FIELD ANALYTICAL UNIT

Screening Analytical Report
Modified EPA Method 8080

Date Sampled: 07/02/96, 07/03/96
Date Received: 07/02/96, 07/03/96
DDE/DDD/DDT Analyzed: 07/11/96
COC Number: 161155, 161156, 161157, 161158, 161159, 161160
Batch Number: 070596S1

Project Manager: Scott Morris
Client: OHM Remediation Services
Project: 18156
Matrix: Soil
Units: mg/Kg

Sample ID No.	DDE	REV	QUAL	DDD	REV	QUAL	DDT	REV	QUAL
MX031	~~<0.01~~ 0.10 ~~ND~~	U		0.10 ~~ND~~	U		0.10 ~~ND~~	U	
MX032	0.65			~~ND~~			0.16		
MX033	0.73			~~ND~~			0.18		
MX034	0.23			~~ND~~			0.10 ~~ND~~	U	
MX035	0.10 ~~ND~~	U		~~ND~~			~~ND~~		
MX036	0.10 ~~ND~~	↓		~~ND~~			~~ND~~	↓	
MX037	1.5			~~ND~~			0.18		
MX038	0.38			~~ND~~			0.10 ~~ND~~	U	
MX039	0.10 ~~ND~~	U		~~ND~~			~~ND~~		
MX040	0.10 ~~ND~~	↓		↓ ~~ND~~	↓		↓ ~~ND~~	↓	
Action Level	1.0			1.0			1.0		

Notes:
NR - Not requested
COC - Chain of custody
ND - Analytes not detected at or above the stated detection limit (0.1 mg/Kg)

Procedures:
DDE/DDD/DDT analysis was performed following EPA method 8080.

1. INTRODUCTION

Task Order Title:	Midway Housing Area
CLEAN Contract Task Order#:	0136
Batch #	070596S2, 072796S
CTO Manager:	Jeff Cotter
Project Contact:	Brian House
Matrix:	Soil
Analysis:	Pesticides
NEESA QC Level:	E
No. of Samples:	5
Reviewer:	Scott Lewis
Date of Review:	August 27, 1996

The samples listed in Table 1 were validated based on the guidelines outlined in the Ogden Project Procedures Manual, Comprehensive Long-Term Environmental Action Navy (CLEAN) Program data validation procedures (DVP-1, Rev. 2). Any deviations from these procedures are documented herein. These procedures are designed to meet the data quality objectives required by the Naval Facilities Engineering Service Center for all analysis at the requested QC level. Qualifiers were applied in cases where the data did not meet the required QC criteria or where special consideration by the data user is required. Data qualifiers were placed on the data spreadsheet with the associated qualification codes. Analytes that were rejected for any reason are denoted on the spreadsheet as having only the "R" data qualifier and associated qualification code(s) denoting the reason for rejection. Any additional problems with the data that may have resulted in an estimated value were not denoted by a qualification code since the data had already been rejected.

Table 1. Sample Identification

Ogden ID	EPA ID	Matrix	COC Method
MHASS38S38	MX041	soil	8080M
MHASS39S39	MX042	soil	8080M
MHASS40S40	MX043	soil	8080M
MHASS40D40	MX044	soil	8080M
MHASS41K41	MX045	soil	8080M

2. DATA VALIDATION FINDINGS

2.1 SAMPLE MANAGEMENT

Following are findings associated with sample management.

2.1.1 Sample Preservation, Handling, and Transport

The samples received by the onsite laboratory did not have the temperature recorded. This is non-compliant with NEESA 20.2-047B, however because the samples were used for screening purposes only, no qualifications were given. The samples required no preservation. No other problems were noted and no qualifications were required.

2.1.2 Chain of Custody

All COCs were legible and complete. All COCs were signed, and no qualifications were required based on the chain of custody.

2.1.3 Holding Times

All samples were extracted and analyzed within the allowed holding times. No qualifications were required.

2.2 PESTICIDES INSTRUMENT PERFORMANCE

Pesticide instrument performance is not reviewed in Level E data validation.

2.3 CALIBRATION

2.3.1 Analytical Sequence

The analytical sequences were acceptable; therefore, no qualifications were required.

2.3.2 Initial Calibration

The initial calibration dated 7/9/96 had acceptable %RSDs (< 20%). No qualifications were required.

2.3.3 Continuing Calibration

The RPD values for the continuing calibration standards met the requirements of < 15% with the exception of TCMX at 17.8%. No qualifications were required.

2.4 BLANKS

2.4.1 Instrument Blanks

All of the associated instrument blanks had nondetects for the target compounds; therefore, no qualifications were required.

2.4.2. Method Blanks

The method blanks had nondetects for the target compounds; therefore, no qualifications were required.

2.5 BLANK SPIKES AND LABORATORY CONTROL SAMPLES

A soil laboratory control sample was analyzed with the samples. The %Rs and RPD values were within CLP QC limits; therefore, no qualifications were necessary.

2.6 SURROGATE RECOVERY

All samples, blanks, and spikes were noted to contain surrogate compounds. Surrogate recovery is not reviewed in Level E data validation

2.7 MATRIX SPIKE/MATRIX SPIKE DUPLICATE

No matrix spike/matrix spike duplicate were performed due to the screening nature of the analysis. No qualifications were given.

2.8 SAMPLE CLEANUP PERFORMANCE

Sample cleanup is not performed under 8080M for screening purposes; therefore no qualifications were given.

2.9 FIELD QC SAMPLES

Field QC samples are evaluated, and if necessary, qualified based only on method blanks. Any remaining detects are used to evaluate the associated samples. The following are findings associated with field QC samples:

2.9.1 Field Duplicates

Samples MX043 and MX044 were the field duplicates associated with this extraction batch. Both samples were free from target compounds detects at the method detection limit. Agreement between the two samples was acceptable. Qualifications were not required.

2.10 COMPOUND IDENTIFICATION

The onsite laboratory analyzed for DDE, DDT, and DDD using a field modified EPA SW-846 8080 method. Examination of chromatograms are not applicable at NFESC QC level E.

2.11 COMPOUND QUANTIFICATION AND REPORTED DETECTION LIMITS

Compound quantification is not evaluated at NFESC QC level E. The reported detection limits were verified against the low level standard in the initial calibration and found to be acceptable. The spreadsheet reported non-detects as

"ND". The "ND" was changed to the reported detection limit of 0.10 mg/kg and qualified with a "U". No qualifications were required.

Sample MX043 was sent to APCL Analytical Laboratory for conformational analysis. It should be noted that the onsite laboratory results are not dry weight corrected. The confirmation results are dry weight corrected. The following table displays the results.

	MX043 (Onsite Laboratory)*	MX043 Confirmation (APCL)**	MX043 Confirmation (APCL)** Wet Weight Concentration
4,4'-DDD (mg/kg)	0.1U	0.0009J	0.00084
4,4'-DDE (mg/kg)	0.1U	0.009	0.0084
4,4'-DDT (mg/kg)	0.1U	0.004	0.0037

*Practical Quantitation Limit (PQL) = 0.1 mg/kg **PQL = 0.002 mg/kg

Sample MX045 was identified as a performance evaluation sample. The results are summarized in the following table.

Analyte	Certified Value (mg/kg)	Advisory Range (mg/kg)	Onsite Laboratory Results	Confirmation Laboratory Results
4,4'-DDD (mg/kg)	1.52	0.623 - 1.87	1.10	1.24
4,4'-DDE (mg/kg)	1.01	0.517 - 1.19	1.03	0.768
4,4'-DDT (mg/kg)	0.502	0.130 - 0.597	0.360	0.338

MIDWAY FIELD ANALYTICAL UNIT

Screening Analytical Report
Modified EPA Method 8080

Date Sampled: 07/03/96
Date Received: 07/03/96
DDE/DDD/DDT Analyzed: 07/11/96
COC Number: 161160, 161161, 161162
Batch Number: 070596S2

Project Manager: Scott Morris
Client: OHM Remediation Services
Project: 18156
Matrix: Soil
Units: mg/Kg

Sample ID No.	DDE	REV	QUAL	DDD	REV	QUAL	DDT	REV	QUAL
MX041	3.7			0.11			0.63		
MX042	0.22			0.10 ~~ND~~	U		0.10 ~~ND~~	U	
MX043	0.10 ~~ND~~	U		~~ND~~			ND		
MX044	~~ND~~			~~ND~~			~~ND~~		
Action Level	1.0			1.0			1.0		

Notes:
NR - Not requested
COC - Chain of custody
ND - Analytes not detected at or above the stated detection limit (0.1 mg/Kg)

Procedures:
DDE/DDD/DDT analysis was performed following EPA method 8080.

MIDWAY FIELD ANALYTICAL UNIT

Screening Analytical Report
Modified EPA Method 8080

Date Sampled: 07/24/96
Date Received: 07/25/96
DDE/DDD/DDT Analyzed: 08/02/96
COC Number: 184408
Batch Number: 072796S

Project Manager: Scott Morris
Client: OHM Remediation Services
Project: 18156
Matrix: Soil
Units: mg/Kg

Sample ID No.	DDE	DDD	DDT
MX045	1.03	1.10	0.36
Action Level	**1.0**	**1.0**	**1.0**

Notes:
NR - Not requested
COC - Chain of custody
ND - Analytes not detected at or above the stated detection limit (0.1 mg/Kg)

Procedures:
DDE/DDD/DDT analysis was performed following EPA method 8080.

1. INTRODUCTION

Task Order Title:	Midway Housing Area
CLEAN Contract Task Order#:	0136
Batch #	090396S-1
CTO Manager:	Jeff Cotter
Project Contact:	Brian House
Matrix:	Soil
Analysis:	Pesticides
NEESA QC Level:	E
No. of Samples:	20
Reviewer:	Scott Lewis
Date of Review:	November 21, 1996

The samples listed in Table 1 were validated based on the guidelines outlined in the Ogden Project Procedures Manual, Comprehensive Long-Term Environmental Action Navy (CLEAN) Program data validation procedures (DVP-1, Rev. 2). Any deviations from these precedures are documented herein. These procedures are designed to meet the data quality objectives required by the Naval Facilities Engineering Service Center for all analysis at the requested QC level. Qualifiers were applied in cases where the data did not meet the required QC criteria or where special consideration by the data user is required. Data qualifiers were placed on the data spreadsheet with the associated qualification codes. Analytes that were rejected for any reason are denoted on the spreadsheet as having only the "R" data qualifier and associated qualification code(s) denoting the reason for rejection. Any additional problems with the data that may have resulted in an estimated value were not denoted by a qualification code since the data had already been rejected.

Table 1. Sample Identification

Ogden ID	EPA ID	Matrix	COC Method
MHASS41S01	MX046	soil	8080M
MHASS42S01	MX047	soil	8080M
MHASS43S01	MX048	soil	8080M
MHASS44S01	MX049	soil	8080M
MHASS45S01	MX050	soil	8080M
MHASS46S01	MX051	soil	8080M
MHASS47S01	MX052	soil	8080M
MHASS48S01	MX053	soil	8080M
MHASS49S01	MX054	soil	8080M
MHASS49D01	MX055	soil	8080
MHASS50D01	MX056	soil	8080M
MHASS51S01	MX057	soil	8080M
MHASS52S01	MX058	soil	8080M
MHASS53S01	MX059	soil	8080M
MHASS54S01	MX060	soil	8080M
MHASS55S01	MX061	soil	8080M
MHASS56S01	MX062	soil	8080M
MHASS57S01	MX063	soil	8080M
MHASS58S01	MX064	soil	8080M
MHASS59S01	MX065	soil	8080M

2. DATA VALIDATION FINDINGS

2.1 SAMPLE MANAGEMENT

Following are findings associated with sample management.

2.1.1 Sample Preservation, Handling, and Transport

The samples received by the onsite laboratory did not have the temperature recorded. This is non-compliant with NEESA 20.2-047B, however because the samples were used for screening purposes only, no qualifications were given. The samples associated with this batch were collected in plastic bags. While this is not recommended EPA sampling protocol, no qualifications are required. Sample MX055 was shipped from Midway Island to Applied Physics and Chemistry Laboratory (APCL) for analysis. The sample arrived at the laboratory with a temperature of 23°C. This exceeds the recommended temperature range of 4 ± 2°C. Due to the nonvolatile nature of the constitutents analyzed, no qualifications were required. No other problems were noted and no qualificaitons were required.

2.1.2 Chain of Custody

All COCs were legible and complete. All COCs were signed, and no qualifications were required based on the chain of custody.

2.1.3 Holding Times

All samples were extracted and analyzed within the allowed holding times. No qualifications were required.

2.2 PESTICIDES INSTRUMENT PERFORMANCE

Pesticide instrument performance is not reviewed in Level E data validation.

2.3 CALIBRATION

2.3.1 Analytical Sequence

The analytical sequences were acceptable; therefore, no qualifications were required.

2.3.2 Initial Calibration

The initial calibration dated 8/02/96 had acceptable %RSDs (< 20%). No qualifications were required.

2.3.3 Continuing Calibration

The RPD values for the continuing calibration standards met the requirements (RPD < 15%); therefore, no qualifications were required.

2.4 BLANKS

2.4.1 Instrument Blanks

All of the associated instrument blanks had nondetects for the target compounds; therefore, no qualifications were required.

2.4.2. Method Blanks

The method blanks had nondetects for the target compounds; therefore, no qualifications were required.

2.5 BLANK SPIKES AND LABORATORY CONTROL SAMPLES

A soil laboratory control sample was analyzed with the samples. The %Rs and RPD values were within the internal laboratory control limits of 30-160% and 25% respectively. No qualifications were necessary.

2.6 SURROGATE RECOVERY

All samples, blanks, and spikes were noted to contain surrogate compounds. Surrogate recovery is not reviewed in Level E data validation

2.7 MATRIX SPIKE/MATRIX SPIKE DUPLICATE

No matrix spike/matrix spike duplicate were perfomed due to the screening nature of the analysis. No qualifications were given.

2.8 SAMPLE CLEANUP PERFORMANCE

Sample cleanup is not performed under 8080M for screening purposes; therefore no qualifications were given.

2.9 FIELD QC SAMPLES

Field QC samples are evaluated, and if necessary, qualified based only on method blanks. Any remaining detects are used to evaluate the associated samples. The following are findings associated with field QC samples:

2.9.1 Field Duplicates

Samples MX054 and MX055 were the field duplicates associated with this extraction batch. MX054 was analyzed at the onsite laboratory and MX055 was analyzed at the offsite laboratory. The following table summarizes the results.

Sample ID	4,4'-DDE (mg/kg)	RPD (%)	4,4'-DDD (mg/kg)	RPD (%)	4,4'DDT (mg/kg)	RPD (%)
MX054♣	2.6	143.23	0.1U	NA	0.77	117.12
MX055♦	0.43		0.09		0.21	
	(0.49)*		(0.1)*		(0.23)*	

* indicates the dry weight corrected concentration.

♣PQL = 0.1 mg/kg ♦PQL = 0.002 mg/kg

The RPD for 4,4'-DDE and 4,4'-DDT exceed the 100 percent control limit for soil. The RPD exceedance is most likey due to the difference in extraction procedures between the onsite and offsite laboratory. The onsite laboratory is performing a waste dilution extraction procedure whereas the offsite laboratory is performing a sonication extraction. Qualifications were not assigned for the field duplicate samples due to the screening nature of the onsite analysis.

2.10 COMPOUND IDENTIFICATION

The onsite laboratory analyzed for DDE, DDT, and DDD using a field modified EPA SW-846 8080 method. The offsite laboratory analyzed the same constitutents using the standard 8080 method. Examination of chromatograms are not applicable at NFESC QC level E. No qualifications were required.

2.11 COMPOUND QUANTIFICATION AND REPORTED DETECTION LIMITS

Compound quantification is not evaluated at NFESC QC level E. It should be noted that the compound quantifications reported from the onsite laboratory are not dry weight corrected. The reported detection limits were verified against the low level standard in the initial calibration and found to be acceptable. No additional qualifications were required. Sample MX055 was sent to APCL Analytical Laboratory for confirmational analysis. The confirmation results are dry weight corrected. The table in Section 2.9.1 displays the results. A corrective action report accompaning the data package stated that sample MX064 had an interfering PCB pattern and therefore could not accurately quantify DDD,DDT and DDE. A review of the raw data confirmed the presence of a PCB-like pattern. As a result, the data validator used professional judgement and "J" qualified the concentrations for DDD, DDT, and DDE.

MIDWAY FIELD ANALYTICAL UNIT

Screening Analytical Report
Modified EPA Method 8080

Date Sampled: 08/28/96
Date Received: 08/28/96
DDE/DDD/DDT Analyzed: 09/03/96
COC Number: 161127
Batch Number: 090396S-1

Project Manager: Scott Morris
Client: OHM Remediation Services
Project: 18156
Matrix: Soil
Units: mg/kg

Sample ID No.	DDE	REV QUAL	DDD	REV QUAL	DDT	REV QUAL
MX046	8.3		0.41		1.3	
MX047	4.0		0.1U	U	0.43	
MX048	7.3		0.1U	U	0.83	
MX049	9.6		0.70		2.1	
MX050	4.0		0.1U	U	0.79	
MX051	1.3		0.1U	U	0.1U	U
MX052	6.9		0.55		2.4	
Action Level	**1.0**		**1.0**		**1.0**	

Notes:
NR - Not requested
COC - Chain of custody
U - Analytes not detected at or above the stated detection limit (0.1 mg/Kg)

Procedures:
DDE/DDD/DDT analysis was performed following EPA method 8080.

MIDWAY FIELD ANALYTICAL UNIT

Screening Analytical Report
Modified EPA Method 8080

Date Sampled: 08/28/96
Date Received: 08/28/96
DDE/DDD/DDT Analyzed: 09/03/96
COC Number: 161128
Batch Number: 090396S-1

Project Manager: Scott Morris
Client: OHM Remediation Services
Project: 18156
Matrix: Soil
Units: mg/kg

Sample ID No.	DDE	REV	QUAL	DDD	REV	QUAL	DDT	REV	QUAL
MX053	0.81			0.1U	U		0.1U	U	
MX054	2.6			0.1U	U		0.77		
Action Level	**1.0**			**1.0**			**1.0**		

Notes:
NR - Not requested
COC - Chain of custody
U - Analytes not detected at or above the stated detection limit (0.1 mg/Kg)

Procedures:
DDE/DDD/DDT analysis was performed following EPA method 8080.

MIDWAY FIELD ANALYTICAL UNIT

Screening Analytical Report
Modified EPA Method 8080

Date Sampled: 08/28/96
Date Received: 08/28/96
DDE/DDD/DDT Analyzed: 09/03/96, 09/04/96
COC Number: 161129
Batch Number: 090396S-1

Project Manager: Scott Morris
Client: OHM Remediation Services
Project: 18156
Matrix: Soil
Units: mg/kg

Sample ID No.	DDE	REV	QUAL	DDD	REV	QUAL	DDT	REV	QUAL
MX056	14			0.76			2.0		
Action Level	**1.0**			**1.0**			**1.0**		

Notes:
NR - Not requested
COC - Chain of custody
U - Analytes not detected at or above the stated detection limit (0.1 mg/Kg)

Procedures:
DDE/DDD/DDT analysis was performed following EPA method 8080.

MIDWAY FIELD ANALYTICAL UNIT

Screening Analytical Report
Modified EPA Method 8080

Date Sampled: 08/28/96
Date Received: 08/28/96
DDE/DDD/DDT Analyzed: 09/03/96
COC Number: 161125
Batch Number: 090396S-1

Project Manager: Scott Morris
Client: OHM Remediation Services
Project: 18156
Matrix: Soil
Units: mg/kg

Sample ID No.	DDE	REV	QUAL	DDD	REV	QUAL	DDT	REV	QUAL
MX057	6.4			0.1U	U		0.48		
MX058	3.5			0.1U	U		0.1U	U	
MX059	9.3			0.24			0.99		
MX060	2.6			0.1U	U		0.1U	U	
MX061	0.43			0.1U	U		0.1U	U	
MX062	5.6			0.1U	U		0.55		
MX063	4.2			0.1U	U		0.50		
Action Level	**1.0**			**1.0**			**1.0**		

Notes:
NR - Not requested
COC - Chain of custody
U - Analytes not detected at or above the stated detection limit (0.1 mg/Kg)

Procedures:
DDE/DDD/DDT analysis was performed following EPA method 8080.

MIDWAY FIELD ANALYTICAL UNIT

Screening Analytical Report
Modified EPA Method 8080

Date Sampled: 08/28/96
Date Received: 08/28/96
DDE/DDD/DDT Analyzed: 09/03/96
COC Number: 161126
Batch Number: 090396S-1

Project Manager: Scott Morris
Client: OHM Remediation Services
Project: 18156
Matrix: Soil
Units: mg/kg

Sample ID No.	DDE	REV	QUAL	DDD	REV	QUAL	DDT	REV	QUAL
MX064	1.4	J	*11	1.9	J	*11	0.31	J	*11
MX065	3.8			0.1U	U		0.38		
Action Level	1.0			1.0			1.0		

Notes:
NR - Not requested
COC - Chain of custody
U - Analytes not detected at or above the stated detection limit (0.1 mg/Kg)

Procedures:
DDE/DDD/DDT analysis was performed following EPA method 8080.

MIDWAY FIELD ANALYTICAL UNIT
Quality Control Report
Modified EPA Method 8080

DDE/DDD/DDT Analyzed: 09/03/96
QC Batch Number: 090396S-1

Project Manager: Scott Morris
Client: OHM Remediation
Project: 18156
Matrix: soil

Sample ID No.	DDE	DDD	DDT
Blank	0.1U	0.1U	0.1U
LCS REC %	116	84.5	117
LCD REC %	131	93.5	130
% RPD	12.1	10.1	10.5

Notes:
U - Analytes not detected at or above the stated detection limit (0.1 mg/kg).
LCS,LCD-Laboratory Control Sample and Duplicate
RPD-Relative Percent Difference

Procedures:
DDE/DDD/DDT - This analysis was performed using modified EPA Method 8080.

$$\text{Recovery \%} = \frac{\text{Spiked Sample Result - Sample Result}}{\text{Amount of Spike Added}} \times 100$$

$$\text{RPD \%} = \frac{[\text{Result - Duplicate Result}]}{[\text{Result + Duplicate Result}]/2} \times 100$$

1. INTRODUCTION

Task Order Title:	Midway Housing Area
CLEAN Contract Task Order#:	0136
Batch #	090396S-2
CTO Manager:	Jeff Cotter
Project Contact:	Brian House
Matrix:	Soil
Analysis:	Pesticides
NEESA QC Level:	E
No. of Samples:	3
Reviewer:	Scott Lewis
Date of Review:	November 22, 1996

The samples listed in Table 1 were validated based on the guidelines outlined in the Ogden Project Procedures Manual, Comprehensive Long-Term Environmental Action Navy (CLEAN) Program data validation procedures (DVP-1, Rev. 2). Any deviations from these precedures are documented herein. These procedures are designed to meet the data quality objectives required by the Naval Facilities Engineering Service Center for all analysis at the requested QC level. Qualifiers were applied in cases where the data did not meet the required QC criteria or where special consideration by the data user is required. Data qualifiers were placed on the data spreadsheet with the associated qualification codes. Analytes that were rejected for any reason are denoted on the spreadsheet as having only the "R" data qualifier and associated qualification code(s) denoting the reason for rejection. Any additional problems with the data that may have resulted in an estimated value were not denoted by a qualification code since the data had already been rejected.

Table 1. Sample Identification

Ogden ID	EPA ID	Matrix	COC Method
MHASS60S01	MX066	soil	8080M
MHASS61S01	MX067	soil	8080M
MHASS62S01	MX068	soil	8080M

2. DATA VALIDATION FINDINGS

2.1 SAMPLE MANAGEMENT

Following are findings associated with sample management.

2.1.1 Sample Preservation, Handling, and Transport

The samples received by the onsite laboratory did not have the temperature recorded. This is non-compliant with NEESA 20.2-047B, however because the samples were used for screening purposes only, no qualifications were given. Sample MX066 was a composite sample collected in a plastic bag. While this is not recommended EPA sampling protocol, no qualifications are required. The remaining samples were discrete samples, sampled in 8 oz. jars. No other problems were noted and no qualificaitons were required.

2.1.2 Chain of Custody

All COCs were legible and complete. All COCs were signed, and no qualifications were required based on the chain of custody.

2.1.3 Holding Times

All samples were extracted and analyzed within the allowed holding times. No qualifications were required.

2.2 PESTICIDES INSTRUMENT PERFORMANCE

Pesticide instrument performance is not reviewed in Level E data validation.

2.3 CALIBRATION

2.3.1 Analytical Sequence

The analytical sequences were acceptable; therefore, no qualifications were required.

2.3.2 Initial Calibration

The initial calibration dated 8/02/96 had acceptable %RSDs (< 20%). No qualifications were required.

2.3.3 Continuing Calibration

The RPD values for the continuing calibration standards met the requirements (RPD < 15%); therefore, no qualifications were required.

2.4 BLANKS

2.4.1 Instrument Blanks

All of the associated instrument blanks had nondetects for the target compounds; therefore, no qualifications were required.

2.4.2. Method Blanks

The method blanks had nondetects for the target compounds; therefore, no qualifications were required.

2.5 BLANK SPIKES AND LABORATORY CONTROL SAMPLES

A soil laboratory control sample was analyzed with the samples. The %Rs and RPD values were within the internal laboratory control limits of 30-160% and 25% respectively. No qualifications were necessary.

2.6 SURROGATE RECOVERY

All samples, blanks, and spikes were noted to contain surrogate compounds. Surrogate recovery is not reviewed in Level E data validation

2.7 MATRIX SPIKE/MATRIX SPIKE DUPLICATE

No matrix spike/matrix spike duplicate were perfomed due to the screening nature of the analysis. No qualifications were given.

2.8 SAMPLE CLEANUP PERFORMANCE

Sample cleanup is not performed under 8080M for screening purposes; therefore no qualifications were given.

2.9 FIELD QC SAMPLES

Field QC samples are evaluated, and if necessary, qualified based only on method blanks. Any remaining detects are used to evaluate the associated samples. The following are findings associated with field QC samples:

2.9.1 Field Duplicates

No field duplicates are associated with this extraction batch.

2.10 COMPOUND IDENTIFICATION

The onsite laboratory analyzed for DDE, DDT, and DDD using a field modified EPA SW-846 8080 method. Examination of chromatograms are not applicable at NFESC QC Level E.

2.11 COMPOUND QUANTIFICATION AND REPORTED DETECTION LIMITS

The compound quantifications reported from the onsite laboratory are not dry weight corrected. The reported detection limits were verified against the low level standard in the initial calibration and found to be acceptable. No additional qualifications were required.

MIDWAY FIELD ANALYTICAL UNIT
Screening Analytical Report
Modified EPA Method 8080

Date Sampled: 08/28/96
Date Received: 08/28/96
DDE/DDD/DDT Analyzed: 09/04/96
COC Number: 161134
Batch Number: 090396S-1, 090396S-2

Project Manager: Scott Morris
Client: OHM Remediation Services
Project: 18156
Matrix: Soil
Units: mg/kg

Sample ID No.	DDE	REV	QUAL	DDD	REV	QUAL	DDT	REV	QUAL
MX066	13			0.45			4.3		
MX067	9.4			0.23			0.96		
MX068	7.4			0.29			0.72		
Action Level	**1.0**			**1.0**			**1.0**		

Notes:
NR - Not requested
COC - Chain of custody
U - Analytes not detected at or above the stated detection limit (0.1 mg/Kg)

Procedures:
DDE/DDD/DDT analysis was performed following EPA method 8080.

MIDWAY FIELD ANALYTICAL UNIT
Quality Control Report
Modified EPA Method 8080

DDE/DDD/DDT Analyzed: 09/04/96
QC Batch Number: 090396S-2

Project Manager: Scott Morris
Client: OHM Remediation
Project: 18156
Matrix: soil

Sample ID No.	DDE	DDD	DDT
Blank	0.1U	0.1U	0.1U
LCS REC %	123	93.5	104
LCD REC %	115	90.0	96.0
% RPD	6.7	3.8	8.0

Notes:
U - Analytes not detected at or above the stated detection limit (0.1 mg/kg).
LCS,LCD-Laboratory Control Sample and Duplicate
RPD-Relative Percent Difference

Procedures:
DDE/DDD/DDT - This analysis was performed using modified EPA Method 8080.

$$\text{Recovery \%} = \frac{\text{Spiked Sample Result - Sample Result}}{\text{Amount of Spike Added}} \times 100$$

$$\text{RPD \%} = \frac{[\text{Result - Duplicate Result}]}{[\text{Result + Duplicate Result}]/2} \times 100$$

1. INTRODUCTION

Task Order Title:	Midway Housing Area
CLEAN Contract Task Order#:	0136
Batch #	101696S
CTO Manager:	Jeff Cotter
Project Contact:	Brian House
Matrix:	Soil
Analysis:	Pesticides
NEESA QC Level:	E
No. of Samples:	16
Reviewer:	Scott Lewis
Date of Review:	November 22, 1996

The samples listed in Table 1 were validated based on the guidelines outlined in the Ogden Project Procedures Manual, Comprehensive Long-Term Environmental Action Navy (CLEAN) Program data validation procedures (DVP-1, Rev. 2). Any deviations from these procedures are documented herein. These procedures are designed to meet the data quality objectives required by the Naval Facilities Engineering Service Center for all analysis at the requested QC level. Qualifiers were applied in cases where the data did not meet the required QC criteria or where special consideration by the data user is required. Data qualifiers were placed on the data spreadsheet with the associated qualification codes. Analytes that were rejected for any reason are denoted on the spreadsheet as having only the "R" data qualifier and associated qualification code(s) denoting the reason for rejection. Any additional problems with the data that may have resulted in an estimated value were not denoted by a qualification code since the data had already been rejected.

Table 1. Sample Identification

Ogden ID	EPA ID	Matrix	COC Method
MHASS63S01	MX069	soil	8080M
MHASS64S01	MX070	soil	8080M
MHASS65S01	MX071	soil	8080M
MHASS66S01	MX072	soil	8080M
MHASS66D01	MX073	soil	8080M
MHASS67S01	MX074	soil	8080M
MHASS68S01	MX075	soil	8080M
MHASS69S01	MX076	soil	8080M
MHASS70S01	MX077	soil	8080M
MHASS71S01	MX078	soil	8080M
MHASS72S01	MX079	soil	8080M
MHASS73S01	MX080	soil	8080M
MHASS74S01	MX081	soil	8080M
MHASS75S01	MX082	soil	8080M
MHASS76S01	MX083	soil	8080M
MHASS76D01	MX084	soil	8080M

2. DATA VALIDATION FINDINGS

2.1 SAMPLE MANAGEMENT

Following are findings associated with sample management.

2.1.1 Sample Preservation, Handling, and Transport

The samples received by the onsite laboratory did not have the temperature recorded. This is non-compliant with NEESA 20.2-047B, however because the samples were used for screening purposes only, no qualifications were given. No other problems were noted and no qualifications were required.

2.1.2 Chain of Custody

All COCs were legible and complete. All COCs were signed, and no qualifications were required based on the chain of custody.

2.1.3 Holding Times

All samples were extracted and analyzed within the allowed holding times. No qualifications were required.

2.2 PESTICIDES INSTRUMENT PERFORMANCE

Pesticide instrument performance is not reviewed in Level E data validation.

2.3 CALIBRATION

2.3.1 Analytical Sequence

The analytical sequences were acceptable; therefore, no qualifications were required.

2.3.2 Initial Calibration

The initial calibration dated 8/02/96 had acceptable %RSDs (< 20%). No qualifications were required.

2.3.3 Continuing Calibration

The RPD values for the continuing calibration standards met the requirements (RPD < 15%); therefore, no qualifications were required.

2.4 BLANKS

2.4.1 Instrument Blanks

All of the associated instrument blanks had nondetects for the target compounds; therefore, no qualifications were required.

2.4.2. Method Blanks

The method blanks had nondetects for the target compounds; therefore, no qualifications were required.

2.5 BLANK SPIKES AND LABORATORY CONTROL SAMPLES

A soil laboratory control sample was analyzed with the samples. The %Rs and RPD values were within the internal laboratory control limits of 30-160% and 25% respectively. No qualifications were necessary.

2.6 SURROGATE RECOVERY

All samples, blanks, and spikes were noted to contain surrogate compounds. Surrogate recovery is not reviewed in Level E data validation

2.7 MATRIX SPIKE/MATRIX SPIKE DUPLICATE

No matrix spike/matrix spike duplicate were performed due to the screening nature of the analysis. No qualifications were given.

2.8 SAMPLE CLEANUP PERFORMANCE

Sample cleanup is not performed under 8080M for screening purposes; therefore no qualifications were given.

2.9 FIELD QC SAMPLES

Field QC samples are evaluated, and if necessary, qualified based only on method blanks. Any remaining detects are used to evaluate the associated samples. The following are findings associated with field QC samples:

2.9.1 Field Duplicates

Samples MX072, MX073 and MX083, MX084 were the two pairs of field duplicates associated with this extraction batch. Both pairs of field duplicates were analyzed at the onsite laboratory. The following table summarizes the results.

Sample ID	4,4'-DDE (mg/kg)	RPD (%)	4,4'-DDD (mg/kg)	RPD (%)	4,4'DDT (mg/kg)	RPD (%)
MX072	2.54	40.20	0.1U	0	0.21	47.06
MX073	1.69		0.1U		0.13	
MX083	1.23	1.61	0.1U	0	0.1U	0
MX084	1.25		0.1U		0.1U	

PQL = 0.1 mg/kg

The RPDs associated with the two pairs of field duplicates are within the 100 percent control limit for 4,4'-DDE, 4,4'-DDD, and 4,4'-DDT. No qualifications were assigned.

2.10 COMPOUND IDENTIFICATION

The onsite laboratory analyzed for DDE, DDT, and DDD using a field modified EPA SW-846 8080 method. Examination of chromatograms are not applicable at NFESC QC Level E.

2.11 COMPOUND QUANTIFICATION AND REPORTED DETECTION LIMITS

A cursory review of the raw quantitation reports indicated that the concentration for 4,4'-DDE, 4,4'-DDD, and 4,4'-DDT for all the samples in this extraction batch were dry weight reported. The values were converted back to wet weight concentrations for consistency with the data reported from all other extraction batches. The reported detection limits were verified against the low level standard in the initial calibration and found to be acceptable. No additional qualifications were required.

MIDWAY FIELD ANALYTICAL UNIT

Screening Analytical Report
Modified EPA Method 8080

Date Sampled: 10/15/96
Date Received: 10/15/96
DDE/DDD/DDT Analyzed: 10/16/96
COC Number: 162923
Batch Number: 101696s

Project Manager: Scott Morris
Client: OHM Remediation Services
Project: 18156
Matrix: Soil
Units: mg/kg

Sample ID No.	DDE	REV	QUAL	DDD	REV	QUAL	DDT	REV	QUAL
MX069	4.61	~~5.5~~		0.1 U	U		1.34	~~1.6~~	
MX070	4.81	~~5.7~~		0.14	~~0.17~~		2.11	~~2.5~~	
MX071	1.22	~~1.8~~		0.1 U	U		0.14	~~0.19~~	
MX072	2.54	~~3.1~~		0.1 U	U		0.21	~~0.25~~	
MX073	1.69	~~2.0~~		0.1 U	U		0.13	~~0.16~~	
MX074	5.01	~~6.4~~		0.13	~~0.17~~		1.19	~~1.5~~	
MX075	8.23	~~9.6~~		0.32	~~0.37~~		3.06	~~3.6~~	
MX076	12.58	~~15~~		0.29	~~0.35~~		1.47	~~1.8~~	
MX077	7.40	~~8.5~~		0.26	~~0.30~~		1.05	~~1.2~~	
MX078	5.23	~~6.9~~		0.10	~~0.13~~		0.38	~~0.51~~	
Action Level	**1.0**			**1.0**			**1.0**		

Notes:
COC - Chain of custody
U - Analytes not detected at or above the stated detection limit (0.1 mg/Kg)

Procedures:
DDE/DDD/DDT analysis was performed following EPA method 8080.

MIDWAY FIELD ANALYTICAL UNIT

Screening Analytical Report
Modified EPA Method 8080

Date Sampled: 10/15/96
Date Received: 10/15/96
DDE/DDD/DDT Analyzed: 10/16/96, 10/17/96
COC Number: 162924
Batch Number: 101696s

Project Manager: Scott Morris
Client: OHM Remediation Services
Project: 18156
Matrix: Soil
Units: mg/kg

Sample ID No.	DDE	REV	QUAL	DDD	REV	QUAL	DDT	REV	QUAL
MX079	2.65 ~~2.5~~			0.1 U	U		0.45 ~~0.45~~		
MX080	5.81 ~~2.5~~			0.19 ~~0.26~~			1.38 ~~1.5~~		
MX081	9.19 ~~14~~			0.26 ~~0.40~~			1.83 ~~2.5~~		
MX082	17.51 ~~21~~			0.30 ~~0.36~~			2.03 ~~2.4~~		
MX083	1.23 ~~1.5~~			0.1 U	U		0.1 U	U	
MX084	1.25 ~~1.5~~			0.1 U	U		0.1 U	U	
Action Level	**1.0**			**1.0**			**1.0**		

Notes:
COC - Chain of custody
U - Analytes not detected at or above the stated detection limit (0.1 mg/Kg)

Procedures:
DDE/DDD/DDT analysis was performed following EPA method 8080.

MIDWAY FIELD ANALYTICAL UNIT
Quality Control Report
Modified EPA Method 8080

DDE/DDD/DDT Analyzed: 10/16/96, 10/17/96
QC Batch Number: 101696s

Project Manager: Scott Morris
Client: OHM Remediation
Project: 18156
Matrix: soil

Sample ID No.	DDE	DDD	DDT
Blank	0.1U	0.1U	0.1U
LCS REC %	116	78.2	102
LCD REC %	122	82.3	106
% RPD	5.0	5.1	3.8

Notes:
U - Analytes not detected at or above the stated detection limit (0.1 mg/kg).
LCS,LCD-Laboratory Control Sample and Duplicate
RPD-Relative Percent Difference

Procedures:
DDE/DDD/DDT - This analysis was performed using modified EPA Method 8080.

$$\text{Recovery \%} = \frac{\text{Spiked Sample Result - Sample Result}}{\text{Amount of Spike Added}} \times 100$$

$$\text{RPD \%} = \frac{[\text{Result - Duplicate Result}]}{[\text{Result + Duplicate Result}]/2} \times 100$$

APPENDIX B

APPLIED PHYSICS AND CHEMISTRY LABORATORY DATA

1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

MX043

Lab Name:	Applied P & Ch Lab	Contract:	
Lab Code:	Case No.:	SAS No.:	SDG No.: 96-3144
Matrix:(soil/water)	SOIL	Lab Sample ID :	96-3144-4
Sample wt/vol :	30g (g/ml)	Lab File ID :	3144.704
% Moisture :	7.0 decanted : (Y/N) N	Date Received :	7/8/96
Extraction : (SepF/Cont/Sonc)	Sonc	Date Extracted :	7/10/96
Concentrated Extract Volume :	10,000 (u L)	Date Analyzed :	7/10/96
Injection Volume :	1.0 (uL)	Dilution Factor :	1.0
GPC Cleanup : (Y/N)	N pH : 7.59	Sulfur Cleanup : (Y/N)	N

CAS NO.	COMPOUND	Concentration Units (ug/L or ug/Kg) ug/Kg	Q
72-55-9	4,4'-DDE	9	
72-54-8	4,4'-DDD	0.9	JP
50-29-3	4,4'-DDT	4	

1D

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

MX032

Lab Name:	Applied P & Ch Lab	Contract:	
Lab Code:	Case No.:	SAS No.:	SDG No.: 96-3144
Matrix:(soil/water)	SOIL	Lab Sample ID :	96-3144-3
Sample wt/vol : 30g	(g/ml)	Lab File ID :	3144.703
% Moisture : 2.1	decanted : (Y/N) N	Date Received :	7/8/96
Extraction : (SepF/Cont/Sonc)	Sonc	Date Extracted :	7/10/96
Concentrated Extract Volume :	10,000 (u L)	Date Analyzed :	7/10/96
Injection Volume :	1.0 (uL)	Dilution Factor :	20.0
GPC Cleanup : (Y/N)	N pH : 7.37	Sulfur Cleanup : (Y/N)	N

CAS NO.	COMPOUND	Concentration Units (ug/L or ug/Kg) ug/Kg	Q
72-55-9	4,4'-DDE	491	D
72-54-8	4,4'-DDD	65.0	D
50-29-3	4,4'-DDT	206	D

1D

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

MX021

Lab Name:	Applied P & Ch Lab	Contract:	
Lab Code:	Case No.:	SAS No.:	SDG No.: 96-3144
Matrix:(soil/water)	SOIL	Lab Sample ID :	96-3144-2
Sample wt/vol : 30g	(g/ml)	Lab File ID :	3144.802
% Moisture : 4.2	decanted : (Y/N) N	Date Received :	7/8/96
Extraction : (SepF/Cont/Sonc)	Sonc	Date Extracted :	7/10/96
Concentrated Extract Volume :	10,000 (u L)	Date Analyzed :	7/11/96
Injection Volume :	1.0 (uL)	Dilution Factor :	1.0
GPC Cleanup : (Y/N)	N pH : 7.39	Sulfur Cleanup : (Y/N)	N

CAS NO.	COMPOUND	Concentration Units (ug/L or ug/Kg) ug/Kg	Q
72-55-9	4,4'-DDE	2	U
72-54-8	4,4'-DDD	0.9	J
50-29-3	4,4'-DDT	6	

1D

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

MX010

Lab Name:	Applied P & Ch Lab	Contract:	
Lab Code:	Case No.:	SAS No.:	SDG No.: 96-3144
Matrix:(soil/water)	SOIL	Lab Sample ID :	96-3144-1
Sample wt/vol : 30g	(g/ml)	Lab File ID :	3144.701
% Moisture : 3.8	decanted : (Y/N) N	Date Received :	7/8/96
Extraction : (SepF/Cont/Sonc)	Sonc	Date Extracted :	7/10/96
Concentrated Extract Volume :	10,000 (u L)	Date Analyzed :	7/10/96
Injection Volume :	1.0 (uL)	Dilution Factor :	1.0
GPC Cleanup : (Y/N)	N pH : 7.40	Sulfur Cleanup : (Y/N)	N

CAS NO.	COMPOUND	Concentration Units (ug/L or ug/Kg) ug/Kg	Q
72-55-9	4,4'-DDE	7	
72-54-8	4,4'-DDD	1	J
50-29-3	4,4'-DDT	5	

1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

MX055

Lab Name:	Applied P & Ch Lab	Contract:	
Lab Code:	Case No.:	SAS No.:	SDG No.: 96-3744
Matrix:(soil/water)	SOIL	Lab Sample ID :	96-3744-1
Sample wt/vol : 30g	(g/ml)	Lab File ID :	3744.701
% Moisture : 12.5	decanted : (Y/N) N	Date Received :	9/3/96
Extraction : (SepF/Cont/Sonc)	Sonc	Date Extracted :	9/4/96
Concentrated Extract Volume :	10,000 (u L)	Date Analyzed :	9/5/96
Injection Volume :	1.0 (uL)	Dilution Factor :	40.0
GPC Cleanup : (Y/N)	N pH : 7.21	Sulfur Cleanup : (Y/N)	N

CAS NO.	COMPOUND	Concentration Units (ug/L or ug/Kg) ug/Kg	Q
72-55-9	4,4'-DDE	491	D
72-54-8	4,4'-DDD	73	D
50-29-3	4,4'-DDT	147	D

FORM I PEST

3744B111.F1D

1D

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

MX055DL

Lab Name:	Applied P & Ch Lab	Contract:	
Lab Code:	Case No.:	SAS No.:	SDG No.: 96-3744
Matrix:(soil/water)	SOIL	Lab Sample ID :	96-3744-1
Sample wt/vol :	30g (g/ml)	Lab File ID :	3744.801
% Moisture :	12.5 decanted : (Y/N) N	Date Received :	9/3/96
Extraction : (SepF/Cont/Sonc)	Sonc	Date Extracted :	9/4/96
Concentrated Extract Volume :	10,000 (u L)	Date Analyzed :	9/5/96
Injection Volume :	1.0 (uL)	Dilution Factor :	10.0
GPC Cleanup : (Y/N)	N pH : 7.21	Sulfur Cleanup : (Y/N)	N

CAS NO.	COMPOUND	Concentration Units (ug/L or ug/Kg) ug/Kg	Q
72-55-9	4,4'-DDE	846	EP
72-54-8	4,4'-DDD	102	D
50-29-3	4,4'-DDT	226	D

FORM I PEST

3744B112.F1D

APPENDIX C

OGDEN DATA VALIDATION AND ASSESSMENT

APPENDIX C
DATA VALIDATION AND DATA ASSESSMENT

C.1 DATA VALIDATION SUMMARY

Analytical results were validated to evaluate compliance with the specified analytical methods and the data quality objectives outlined in the *Draft Abbriviated RI Quality Assurance Project Plan (QAPjP) Midway Island* (Ogden 1996). As specified in the QAPjP, all analytical data obtained under CTO 0136 were validated according to Ogden Level E data validation procedures. In general, Level E data validation procedures require the review of Form I summaries only.

Where the analytical data do not meet the required QC criteria or where special consideration by the data user is required, standard "data qualifiers" are applied to the specific analytical results. Data qualifiers are defined in the *USEPA Contract Laboratory Program National Functional Guidelines For Organic Data Review* (USEPA 1994) and are presented in Table C-1. In addition, standard "qualification codes" are applied that indicate why data qualifiers are applied and identify possible limitations of data use. Qualification codes are defined in SOP Number DVP-1 and are presented here.

TABLE C-1
DATA QUALIFIERS

Lab/Rev Qual Code	Organics
U	The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
J	The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
N	The analysis indicates the presence of an analyte for which there is presumptive evidence to make a "tentative identification."
NJ	The analysis indicates the presence of an analyte that has been "tentatively identified" and the associated numerical value represents its approximate concentration.
UJ	The analyte was not deemed above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
R	The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

C.2 Data Quality Assessment

This section presents a summary of the data validation methodology and results in terms of data precision, accuracy, representativeness, completeness, and comparability. Each of these data quality parameters is evaluated through review of associated field and/or laboratory QC sample results. The overall usability of the analytical data is discussed with regards to each of the data quality parameters. A thorough discussion of the data quality assesment is discussed below.

C.2.1 Precision

Precision is a quantitative measure of the variability between two duplicate samples. Precision is expressed as the relative percent difference (RPD) in concentration between duplicate and original sample analyses, as calculated from the following formula (USEPA 1994a):

$$RPD = \left[\left(\frac{(S-D)}{\left(\frac{(S+D)}{2}\right)}\right)\right] \times 100$$

where:

RPD = Relative percent difference (percent);

S = Concentration of analyte in first (original) sample (mg/kg or µg/l); and

D = Concentration of analyte in second (duplicate) sample (mg/kg or µg/l).

The precision of the analytical data is evaluated by calculating RPD values for two types of duplicate samples: field duplicates and laboratory control duplicates (LCDs) [blank spike duplicates]. For each type of duplicate sample, all RPD values for a given analyte are averaged to produce a single, analyte-specific average RPD value which is then compared against an established QC criterion. Data qualifiers may be applied to certain analytical results where RPD values do not meet the established QC criteria.

C.2.1.1 Field Duplicates

Collocated field duplicates are discrete samples collected from a location or liner adjacent to the original sample. Analysis of collocated field duplicates provides information on the entire sample measurement system, including sample collection, sample analysis, and nonhomogeneities of the media sampled. As specified in the QAPjP, approximately 10 percent of soil samples analyzed were field duplicate samples. In addition, 5 duplicate samples were submitted to an off site laboratory for confirmation analysis. A comparison between the onsite and offsite laboratory concentration values is presented in Table C-2.

Table C-2
FIELD DUPLICATE PRECISION

Sample ID	4,4'-DDE (mg/Kg)	RPD (%)	4,4'-DDD (mg/Kg)	RPD (%)	4,4'-DDT (mg/Kg)	RPD (%)
MX010 MX011	0.1U (0.002U) 0.1U	0	0.1U (0.002U) 0.1U	0	0.1U (0.006) 0.1U	0
MX021 MX022	0.1U (0.002U) 0.1	0	0.1 (0.002U) 0.1	0	0.1 (0.006) 0.1	0
MX032 MX033	0.65 (0.480)		0.1U (0.063)		0.16 (0.202)	
MX043 MX044	0.1U (0.009) 0.1U	0	0.1U (0.009) 0.1U	0	0.1U (0.004) 0.1U	0
MX054 MX055	2.6 (0.43)	143.23	0.1U (0.09)	NA	0.77 (0.21)	117.12
MX072 MX073	2.54 1.69	40.20	0.1U 0.1U	0	0.21 0.13	47.06
MX083 MX084	1.23 1.35	1.61	0.1U 0.1U	0	0.1U 0.1U	0

PQL = 0.1 mg/Kg
( ) indicates concentration determined by the offsite laboratory, PQL = 0.002 mg/Kg

The soil field duplicate RPD values are compared against the goals of 100 percent. The RPD between results in the sample and the duplicate are performed in accordance with data validation SOP Numbers DVP-1, DVP-3, and DVP-4. Because field duplicate RPD values are not representative of any single component of the sampling and analysis process, they are not typically used as a basis for the application of data qualifiers.

Analyte-specific average RPD values for soil field duplicate samples are presented in Table C-2. The average RPD value for all analytes (overall precision) meets the goal of 100 percent. While samples MX054 and MX055 are listed on the COCs as field

duplicates, conversations with the field sampling team indicate that these samples are not true field duplicates. These two samples were not collected, homogenized, then split. The high RPD between these two samples can be attributed to the different locations from which these samples were collected. Therefore, the exceedance of the 100 percent criterion is not indicative of poor overall performance with respect to the stated data quality objective (DQO).

C.2.1.2 Laboratory Control Duplicates

Laboratory control sample duplicate (LCD) analyses were conducted by the laboratory to assess the precision of organic analytical methods. Precision is reported as the RPD between the laboratory control sample (LCS) and LCD results (see Section C.2.2.1 for discussion of laboratory control samples). LCD analysis is required by the 8080M field SOP and was performed in lieu of MS/MSD analysis Analyte-specific average RPD values for soil LCD samples are presented in Table C-3. The average RPD value for all analytes (overall precision) meets the goal of 100 percent.

Table C-3
LABORATORY CONTROL SAMPLE/LABORATORY CONTROL DUPLICATE ACCURACY AND PRECISON

BATCH	4,4'-DDE (mg/Kg)	RPD (%)	4,4'-DDD (mg/Kg)	RPD (%)	4,4'-DDT (mg/Kg)	RPD (%)
070596S						
LCS (%R)	93	6.1	72.5	5.7	69.5	9.0
LCD (%R)	87.5		68.5		63.5	
070596S1						
LCS (%R)	93	7.3	75	9.5	73.5	2.1
LCD (%R)	100		82.5		72	
072796S						
LCS (%R)	95.5	4.6	74.5	2.6	108	2.7
LCD (%R)	100		76.5		111	
090396S-1						
LCS (%R)	116	12.1	84.5	10.1	117	10.5
LCD (%R)	131		93.5		130	
090396S-2						
LCS (%R)	123	6.7	93.5	3.8	104	8.0
LCD (%R)	115		90.0		96.0	
101696S						
LCS (%R)	116	5.0	78.2	5.1	102	3.8
LCD (%R)	122		82.3		106	

C.2.1.3 Summary

The precision results from the field duplicates and the LCDs are within the QC criteria established by the field laboratory and the QAPjP (Ogden 1995e) and considered acceptable. The instance where precision data did not meet QC criteria is attributable to nonhomogeneity of the sample.

C.2.2 Accuracy

Laboratory control sample (LCS) analyses are conducted by the laboratory to assess the accuracy of specific analytical methods. LCS sample analyses are performed by adding known amounts ("spikes") of representative target compounds to a blank sample aliquot that is subjected to the entire analytical procedure. The original blank sample (non-fortified) and the LCS results are compared. Accuracy is reported as percent recovery (%R) of the spike, as calculated from the following equation (USEPA 1994):

$$\%R = \frac{(SSR - SR)}{SA} \times 100$$

here:

%R = Percent recovery (percent);

SSR = Spike sample result (LCS) (concentration units);

SR = Original sample result (blank sample) (concentration units); and

SA = Spike added (concentration units).

The accuracy of the analytical data is evaluated by calculating %R values for blank spike samples. All %R values for a given analyte are averaged to produce a single, analyte-specific average %R value which is then compared against an established QC criterion. Data qualifiers may be applied to certain analytical results where the %R values in an SDG do not meet the established QC criteria.

C.2.2.1 Laboratoy Control Samples

LCS analyses are performed by the laboratory to demonstrate that the laboratory process for sample preparation and analysis is in control. LCS consist of silica sand with known

amounts of specific analytes and subjected to the entire analytical procedure with the Site samples. A minimum of one LCS was analyzed for each matrix and for each method preparatory batch of samples. Soil LCS average %R values are compared against analyte-specific control limits, which were stated in the QAPjP or were subsequently established by internal laboratory QC procedures.

Pesticide analyte-specific blank spike average %R values are presented in Table C-3. The overall LCS accuracy data are acceptable for all target compounds. The QC criteria stated in the QAPjP is 85 to 115 percent for soil. Review of the data, including the summary forms, indicated that the laboratory used the laboratory established limits of 30 to 160 percent in soil in the evaluation of the LCS/LCD. The reported %R values for all constitutents are well within these limits; therefore, the data are acceptable.

C.2.2.2 Summary

The overall usability of the data is acceptable with respect to accuracy. No qualifications were assigned to the data for LCS deficiencies.

C.2.3 Representativeness

Representativeness expresses the extent to which the analytical data reflect the actual media at the Site. In general, the data are representative of the Site conditions and characteristics. Acceptable representativeness is achieved by proper sampling and sample management procedures. Section C.2.3.1 presents a discussion of representativeness with respect to general sample management issues including sample documentation, preservation, handling, and transport. Section C.2.3.2 presents a discussion of representativeness with respect to analytical-method specific issues including method deviations, presence of potential laboratory or field artifacts, indications of sample nonhomogeneity, internal standard recovery deficiencies, and surrogate recovery deficiencies.

C.2.3.1 Overall Sample Management

Sample collection, handling, documentation, and transport were generally performed as specified in the QAPjP and according to NFESC protocol. Based on data from the 40 composite samples specified in the QAPjP, Nine additional composite samples and 29

additional discrete samples were collected. The soil samples arrived at both the onsite and offsite laboratory properly labeled and with properly completed, legible chain-of-custody (COC) forms. No sample containers were noted to be broken; therefore, no data qualifiers are assigned.

C.2.3.2 Method-Specific Representativeness Issues

C.2.3.2.1 Pesticides

Eighty four soil samples were analyzed at the OHM onsite laboratory by *Test Methods for Evaluating Solid Wastes, Physical/Chemical Methods (SW-846)* modified Method 8080 (EPA 1996) for 4,4'DDE, 4,4'DDT, and 4,4'DDD. Five duplicate samples were analyzed offsite at APCL Laboratory in Chino, California.

None of the calibration standards associated with sample results have target compounds with RSD values greater than the 20-percent criterion. No target compounds were detected in method blank or instrument blank samples; therefore, no data qualifiers are assigned.

No samples have surrogate recovery deficiencies. Therefore, no data are qualified for surrogate deficiencies.

C.2.3.3 Summary

The overall usability of the data is acceptable with respect to representativeness. No qualifications are assigned to the data for method or field blank contaminants, surrogate recoveries, and calibration deficiencies.

C.2.4 Completeness

Completeness is a measure of the amount of usable data resulting from the sampling and analysis program. Completeness of the sampling and analytical programs are evaluated separately.

C.2.4.1 Sampling Program

Sampling completeness is generally defined as the number of samples collected divided by the number of samples required to adequately assess Site conditions. The sampling completeness for this abbriviated RI is 90 percent.

A summary of the sampling completeness goals are summarized in Table C-4 The 90 percent completeness goal was exceeded due to an additional 38 sample locations added during this abbreviated RI.

TABLE C-4
SAMPLING COMPLETENESS RESULTS

Sample Type	Total Proposed Analyses	Total Actual Analyses	Total Sampling Completeness (%)
Surface Soil	120	252	210

C.2.4.2 Analytical Program

Analytical completeness is defined as the percentage of acceptable (i.e., not rejected) data points. Analytical completeness is calculated on a method basis. The completeness objective for the analytical program is 90 percent, as specified in the QAPjP (Ogden 1996).

The completeness of the analytical program is summarized in Table C-5. None of the data was rejected at a Level E data validation, therefore, the analytical program exceeds the 90-percent completeness goal for all analytical parameters.

TABLE C-5
ANALYTICAL COMPLETENESS RESULTS

Analyte	Number of Samples	Number of Samples Rejected	Completeness Percentage
Modified EPA Method 8080			
4,4'-DDE	84	0	100
4,4'-DDT	84	0	100
4,4'-DDD	84	0	100

C.2.4.3 Summary

The sampling program exceeds the 90 percent completeness goal for the overall soil sampling events due to the additional samples collected.

Based on the Level E data validation, the analytical program exceeds the 90-percent completeness goal for the pesticide analysis.

C.2.5 Comparability

Comparability is a qualitative parameter that expresses the confidence with which one data set can be compared to another. Comparability of the sampling and analytical programs are evaluated separately.

Sampling comparability is considered acceptable based upon the following:

- A consistent approach to sampling was applied throughout the program;
- Samples were consistently preserved; and
- Sampling was performed during the same time of the year and under similar physical conditions.

Analytical comparability is considered acceptable based upon the following:

- The investigation consistently utilized the same analytical laboratory, sample preparation routine, and analytical methods; and
- The analytical results for a given analysis were reported with consistent detection limits and consistent units of measure.

C.3 Performance Evaluation Samples

PE samples are sample aliquots spiked with certified amounts of specific target compounds at an independent laboratory and submitted to the analytical laboratory for "blind" analysis. Accuracy is evaluated by comparing analytical results with "performance acceptance limits," which are supplied by the independent laboratory and

are based on statistical analysis of the historical performance of a group of analytical laboratories.

The soil PE sample was prepared by ERA with a non-Site-specific soil matrix in a standard sampling container. The soil PE sample was subjected to onsite laboratory analysis for 4,4'-DDE, 4,4'-DDD, and 4,4'-DDT by modified EPA Method 8080. Performance acceptance limits were supplied by ERA in July 1996 for all soil spiked analytes.

C.3.1 Performance Evaluation Sample Results

Results of analyses of the soil PE samples are presented in Table C-6. Recoveries of spiked analytes were generally marginally lower than the certified concentrations. All three of the spiked compounds were detected by the analytical laboratory within the performance acceptance limits (Table C-6); therefore, the onsite laboratory demonstrated acceptable performance.

TABLE C-6
PERFORMANCE EVALUATION SAMPLE RESULTS

SAMPLE ID: MX045

Parameter	Laboratory Value (mg/Kg)	Certified Value (mg/Kg)	Performance Acceptance Limits
4,4'-DDE	1.03 (0.77)	1.01	0.517-1.19
4,4'-DDT	0.36 (0.34)	0.502	0.130-0.597
4,4'-DDD	1.10 (1.24)	1.52	0.623-1.87

( ) indicate values from offsite laboratory (Applied Physics and Chemistry Laboratory)

C.3.2 Summary

When considered in conjunction with other data quality indicators, such as field duplicate results, and laboratory control sample results, the soil PE sample analytical results indicate good overall analytical data quality.

C.4 CONCLUSIONS

The overall usability of the data is acceptable with respect to the precision, accuracy, representativeness, completeness, and comparability data results. No individual samples and/or target compounds failed to meet established QC criteria, therefore no data qualifiers were applied to the data.

DEPARTMENT OF THE NAVY
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NAVAL FACILITIES ENGINEERING COMMAND
(MAKALAPA, HI)
PEARL HARBOR, HAWAII 96860-7300

5090.D18
Ser 1824/ 793
15 MAR 1997

To: Distribution

Subj: BASE REALIGNMENT AND CLOSURE (BRAC) ENVIRONMENTAL STUDIES AT NAVAL AIR FACILITY (NAF), MIDWAY ISLAND

The enclosed draft Abbreviated Remedial Investigation (RI) Report for the Active and Abandoned Housing Areas, NAF Midway Island is forwarded for your information, review and comment.

We respectfully request that you forward your comments to us within 30 calendar days of your receipt of our letter. A timely response is necessary to ensure that we will be able to begin the next phase of work on schedule. If we do not receive a written response from you within the 30-day review period, we will assume that you concur with the contents of the documents.

Any comments or input which you may have on these documents should be forwarded to the Pacific Division, Naval Facilities Engineering Command, Attention: Code 1824RK, Pearl Harbor, Hawaii 96860-7300.

Should you have any questions, please contact Mr. Robert Kaito of our Environmental Restoration Branch at (808) 474-5967.

Sincerely,

ERIC W. TORNGREN, P.E.
Director
Environmental Division

Encl: (1 cy)
(1) Abbreviated Remedial Investigation (RI) Report (Draft) for Naval Air Facility (NAF), Midway Island of May 1996

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15 MAR 1997

To: Distribution

Subj: BASE REALIGNMENT AND CLOSURE (BRAC) ENVIRONMENTAL STUDIES AT NAVAL AIR FACILITY (NAF), MIDWAY ISLAND

The enclosed draft Abbreviated Remedial Investigation (RI) Report for the Active and Abandoned Housing Areas, NAF Midway Island is forwarded for your information, review and comment.

We respectfully request that you forward your comments to us within 30 calendar days of your receipt of our letter. A timely response is necessary to ensure that we will be able to begin the next phase of work on schedule. If we do not receive a written response from you within the 30-day review period, we will assume that you concur with the contents of the documents.

Any comments or input which you may have on these documents should be forwarded to the Pacific Division, Naval Facilities Engineering Command, Attention: Code 1824RK, Pearl Harbor, Hawaii 96860-7300.

Should you have any questions, please contact Mr. Robert Kaito of our Environmental Restoration Branch at (808) 474-5967.

Sincerely,

ERIC W. TORNGREN, P.E.
Director
Environmental Division

Encl: (1 cy)
(1) Abbreviated Remedial Investigation (RI) Report (Draft) for Naval Air Facility (NAF), Midway Island of May 1996