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WORK PLAN FOR SITE 83 - FORMER PESTICIDE MIXING AREA AND SITE 84 - GOLF COURSE MAINTENANCE AREA

MARINE CORPS AIR STATION
CHERRY POINT, NORTH CAROLINA

COMPREHENSIVE LONG-TERM
ENVIRONMENTAL ACTION NAVY (CLEAN) CONTRACT

Submitted to:
Atlantic Division
Environmental Restoration Branch, Code 1823
Naval Facilities Engineering Command
1510 Gilbert Street
Norfolk, Virginia 23511-2699

Submitted by:
Brown & Root Environmental
600 Clark Avenue, Suite 3
King of Prussia, Pennsylvania 19406-1433

CONTRACT NUMBER N62472-90-D-1298
CONTRACT TASK ORDER 0247

DECEMBER 1997

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1.0 PROJECT DESCRIPTION

1.1 INTRODUCTION

This Work Plan for Marine Corps Air Station (MCAS) Cherry Point in Cherry Point, North Carolina, was prepared for the Atlantic Division (LANTDIV) Naval Facilities Engineering Command (NAVFAC) by Brown & Root (B&R) Environmental under the Comprehensive Long-Term Environmental Action Navy (CLEAN) Contract Number N62472-90-D-1298, Contract Task Order (CTO) 247. This Work Plan outlines the requirements and describes the procedures for performing investigations at the Building 96 Former Pesticide Mixing Area (Site 83) and the Golf Course Maintenance Area (Site 84).

This Work Plan references the Master Field Sampling Plan (FSP) (B&R Environmental, July 1997) and the Master Quality Assurance Plan (QAP) (B&R Environmental, August 1997) for MCAS Cherry Point, where appropriate. The FSP presents standard operating procedures and specifies requirements for all field work. The QAP defines and documents QA/QC requirements.

1.2 PURPOSE

The purpose of this Work Plan is to provide information to characterize the nature and extent of contamination at Site 83 (Building 96 Former Pesticide Mixing Area) and Site 84 (Golf Course Maintenance Area). The environmental data obtained during this investigation are intended to:

- Document any releases of hazardous substances that may be present at each site and make recommendations for further action, if required.

- Eliminate from further investigation those portions of the sites that may pose no definable threat to human health or the environment.

1.3 PROJECT ORGANIZATION AND RESPONSIBILITIES

B&R Environmental will be responsible for the overall management of the project, including the implementation of all field activities. Personnel from the Navy and MCAS Cherry Point will be actively involved in the investigation and will coordinate with personnel from B&R Environmental in a number of areas.

1.3.1 Project Organization

The key organizations and personnel involved in the investigation, as well as the chain of communication and responsibility of the project personnel are as follows:

- Navy Remedial Project Manager (RPM):

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  Atlantic Division
  Naval Facilities Engineering Command
  Code 1823
  1510 Gilbert Street
  Norfolk, VA 23511-2699
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The B&R Environmental Project Manager has the primary responsibility for fiscal and technical management of this project.. He is responsible for the coordination of all onsite personnel and for providing technical assistance for all activities that are directly related to the project. The Project Manager will also review all data collected for the sites. If quality assurance problems or deficiencies requiring special action are identified, the Project Manager and project QA/AC advisor will identify the appropriate corrective action.

1.3.2 Field Organization

The B&R Environmental field investigation team will be organized according to the activities planned. For onsite sampling, the sampling team members will be selected based upon the type and extent of effort required. The team will consist of a combination of the following personnel:

- Field Operations Leader (FOL)
- Field hydrogeologist/geologist
- Health and Safety specialist

The FOL will be responsible for the coordination of all onsite personnel and for providing technical assistance when required. The FOL, or his or her designee, will coordinate and be present during all sampling activities and will ensure the availability and maintenance of all sampling materials and equipment. The FOL will be responsible for the completion of all sampling and chain-of-custody documentation, assume custody of all samples, and ensure proper handling and shipping of samples.

The QA Manager, although not formally part of the field team, will be responsible for the adherence of all guidelines as defined in the Work Plan. Strict adherence to these procedures is critical to the collection of acceptable and representative data..

A site safety officer will be designated prior to field activities and will be responsible for ensuring that all team members adhere to the designated health and safety requirements.

2.0 BACKGROUND INFORMATION

The following sections describe general background conditions at MCAS Cherry Point followed by specific background information for each of the sites to be investigated.

2.1 GENERAL SITE BACKGROUND

2.1.1 Site Location and Description

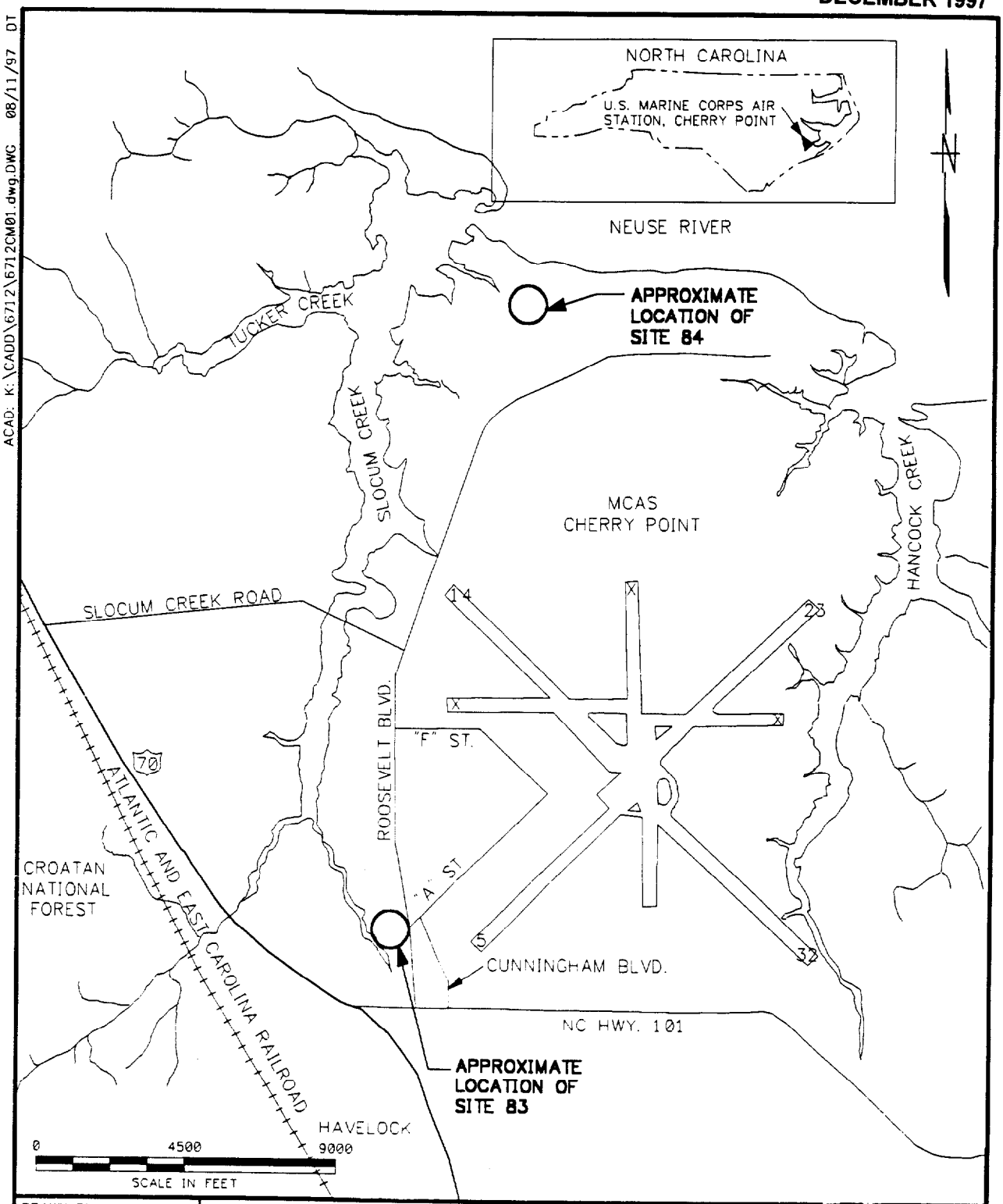
MCAS Cherry Point is part of a military installation located in southeastern Craven County, North Carolina, just north of the town of Havelock. The general location of the Air Station is shown on Figure 2-1. The Air Station is located on a 11,485-acre tract of land bounded on the north by the Neuse River, on the east by Hancock Creek, and on the south by North Carolina Highway 101. The irregular western boundary line lies approximately 0.75 miles west of Slocum Creek.

The mission of the Air Station is to maintain and operate support facilities, services, and materiel of the U.S. Marine Corps Aircraft Wing, or units thereof, and other units and activities as designated by the Commandant of the U.S. Marine Corps, in coordination with the Chief of Naval Operations. MCAS Cherry Point provides facilities for training and support of the Fleet Marine Force Atlantic Aviation Units. MCAS Cherry Point is also designated as a primary aviation supply point and is host to the Naval Aviation Depot (NADEP).

The Air Station was commissioned in 1942. Continuing construction in 1943 added a massive aircraft assembly and repair shop, which later became NADEP. During the 1950s and 1960s, the size of the Air Station increased to more than 11,000 acres (not including outlying facilities) as a result of land acquisitions. During the 1970s, commercial and residential development of the surrounding area grew substantially. In 1980, then City of Havelock annexed the Air Station.

2.1.2 Physiography

MCAS Cherry Point is located approximately 30 miles inland from Cape Lookout on the Atlantic Ocean and is located within the Atlantic Coastal Plan Physiographic Province. The province is characterized as an elevated sea bottom environment with low topographic relief and generally below 100 feet in elevation. Subsurface materials consist of Cretaceous, Tertiary, and Quaternary deposits. These deposits generally dip gently seaward.



DRAWN BY HJP DATE 4/9/97	Brown & Root Environmental	CONTRACT NO. 6712	OWNER NO. 0247
CHECKED BY DATE	LOCATION MAP MCAS CHERRY POINT, NORTH CAROLINA	APPROVED BY DATE	
COST/SCHED-AREA		APPROVED BY DATE	
SCALE AS NOTED		DRAWING NO. FIGURE 2-1	REV. 0

2.1.3 Surface Water

MCAS Cherry Point is bounded by the Neuse River to the north and Hancock Creek to the east. In addition, Slocum Creek flows from south to north near the western boundary of the Air Station. Drainage is directed toward these surface water bodies by a system of ditches, storm sewers, and local tributaries. Dominant drainage is toward Slocum Creek on the west and toward Hancock Creek on the east. Tributaries to Slocum Creek drain four sub-basins. These sub-basins are Sandy Branch, Schoolhouse Branch, Luke Rowes Gut, and Turkey Gut.

Slocum Creek is shallow, warm, and brackish. It serves as a recreational resource (e.g., boating) for military personnel and local residents. The North Carolina Department of Environment and Natural Resources (NCDENR) has classified Slocum Creek and Hancock Creek as Class SC estuarine waters. Class SC is defined as suitable for fish and wildlife propagation, secondary recreation (i.e., recreational activities not involving whole-body contact), and any other usage except primary recreation or shellfishing for marketing purposes.

2.1.4 Geology and Stratigraphy

The Air Station is underlain by approximately 3,000 feet of interbedded, unconsolidated to partially consolidated, sedimentary deposits of sand, silt, clay, shell, and limestone that range in age from Cretaceous to Holocene. These deposits are part of the Coastal Plain sediments of North Carolina that, in aggregate, form a wedge-shaped mass that thickens from a feather edge at the Fall Line to as much as 10,000 feet at Cape Hatteras. The Coastal Plain deposits are underlain by igneous and metamorphic basement rocks.

2.1.5 Hydrogeology

MCAS Cherry Point is underlain by five non-saline aquifers and four confining units to a depth of approximately 500 feet. These aquifers and confining units, from the youngest to the oldest, are the surficial aquifer, Yorktown confining unit, Yorktown aquifer, Pungo River confining unit, Pungo River aquifer, Upper Castle Hayne confining unit, Upper Castle Hayne aquifer, Lower Castle Hayne confining unit, and Lower Castle Hayne aquifer. The USGS has identified paleochannels and suspected stratigraphic breaks beneath and in the vicinity of the Air Station. The Castle Hayne aquifers are the principal water supply for many domestic, municipal, and industrial users in eastern North Carolina, including the Air Station and the nearby town of Havelock. Paleochannels filled with permeable material

could act as conduits for groundwater flow or movement of contaminants between the surficial and Castle Hayne aquifers.

2.1.6 Climatology

Proximity to the Atlantic Ocean significantly influences the climate of the study area. The climate is warm and humid with short, mild winters and long, hot summers. Winter temperatures average 46°F, and summer temperatures average 77°F. The average annual temperature is approximately 64°F. Periods of continuous freezing temperatures seldom last more than a few days. Precipitation is unevenly distributed, with the greatest monthly precipitation occurring during July, August, and September (6 to 8 inches per month). In the other months, rainfall averages 3 to 4 inches per month. Average annual precipitation in Craven County is 55 inches. During extreme dry years, precipitation may be as low as 35 inches. Rainfall may increase to 80 inches during very wet years. Tropical hurricanes pass offshore twice in an average year, but infrequently strike the coast with full force. Average annual evapotranspiration is 36.8 inches.

2.2 SITE-SPECIFIC BACKGROUND

2.2.1 Site 83 (Building 96 Former Pesticide Mixing Area)

Building 96 was used as a pesticide mixing and storage area from approximately 1965 to 1981. This use was discontinued in 1981 when a new pesticide storage building was constructed. Building 96 is constructed on a concrete slab. The floor is concrete, the walls are dry wall, and the roof bracing is wood. Until recently, the building was being utilized by the Facility Maintenance Department as administrative space and to store equipment and hazardous materials until the Naval Hospital's Industrial Hygiene office was notified to sample the walls, floor, and other interior materials after workers noticed a strong pesticide odor. The sampling revealed chlordane at a maximum concentration of 20.4 ppm in a dry wall sample. Results are provided in Appendix A. The building was vacated on June 23, 1997. Chlordane was also detected during OHMs removal action related to an overflow of a nearby oil-water separator. Pesticides were also reportedly stored in Building 3310. Site 83 is a newly-identified Solid Waste Management Unit (SWMU). There are no monitoring wells at the site, and no samples of environmental media have been collected.

2.2.2 Site 84 (Golf Course Maintenance Area)

Site 84 is a newly-identified SWMU within a wooded area located beside a fairway on the Air Station's golf course that is operated and maintained by the Morale, Welfare, and Recreation Department. The SWMU area is primarily composed of discarded solid waste materials (e.g., golf course signs, scrap mowers,

bowling pins, scrap and new tractor tires, scrap trailers, scrap wood, and yard debris). There were, however, approximately 50 lead-acid batteries identified. With the exception of one battery, all were found in an upright position and were in good conditions (i.e., no cracked casing or apparent leakage). The Air Station has already removed the batteries. There are no monitoring wells at the site, and no samples of environmental media have been collected.

3.0 SCOPE OF WORK

As part of the Data Quality Objectives process, a background review of all existing information was performed in conjunction with the preparation of this Work Plan. The primary sources of information that were examined were the SWMU discovery letters sent to the U.S. Environmental Protection Agency (USEPA) and NCDENR by the Air Station, a list of pesticides that were used at Building 96, and observations made during site visits.

3.1 SAMPLING RATIONALE

3.1.1 Site 83 (Building 96 Former Pesticide Mixing Area)

No previous investigations have been performed at the Building 96 Former Pesticide Mixing Area to determine whether there have been any releases of hazardous substances. Soil borings will be drilled, monitoring wells will be installed, and samples of surface soil, subsurface soil, groundwater, and sediment will be collected.

Three corings will be installed through the floor, and three soil samples will be collected from beneath the building floor. Three soil borings will be installed, and surface and subsurface soil samples will be collected, near a catch basin, wash pad, and oil/water separator to determine whether there has a been a release from any of these areas.

Six soil borings will be installed where pesticides and residues may have migrated. Soil samples from these borings will be visually observed and field screened for evidence of contamination. Surface soil and subsurface soil samples from the most apparent contaminated intervals will be analyzed. Two of these borings will be converted into downgradient monitoring wells, and groundwater samples will be collected. An upgradient monitoring well will also be installed.

Five sediment samples will be collected to evaluate whether contamination from the site is present as a result of discharges to sewer lines and/or surficial transport from disposal or spillage activities at Building 96.

The rationale for the sample locations is provided in Table 3-1.

TABLE 3-1

SAMPLE LOCATION RATIONALE - SITE 83
BUILDING 96 FORMER PESTICIDE MIXING AREA
MCAS CHERRY POINT, NORTH CAROLINA

Sample Location	Rationale
SB1	Collect 1 sample from beneath floor. Evaluate whether there has been a release through cracks in floor. Separation in concrete floor noted along northwest wall. Majority of pesticides stored in this area.
SB2 and SB3	Collect 2 samples from beneath floor. Evaluate whether there has been a release through cracks in floor. Staining noted on floor of large room from oozing material believed to be contaminant related.
SB4	Collect 1 surface soil and 1 subsurface soil sample. Evaluate whether there has been a release in the vicinity of the catch basin near the pesticide mixing shop.
SB5	Collect 1 surface and 1 subsurface soil sample. Evaluate whether there has been a release from the wash pad.
SB6	Collect 1 surface and 1 subsurface soil sample. Evaluate whether there has been a release from the oil-water separator.
SB7 to SB13	Collect 2 surface soil samples and 2 subsurface soil samples from worst locations based on visual evidence of contamination and field screening with headspace analyses using a PID. Evaluate contaminant migration from pesticide storage, sewer lines, and surficial transport. Evaluate whether there has been a release in the vicinity of Building 3310.
SS1 and SS2	Collect 1 surface soil sample at each location. Evaluate whether there has been a release from the wash pad.
MW1	Collect 1 groundwater sample to establish conditions upgradient of the site.
MW2 and MW3	Collect 1 groundwater sample from each well to determine whether there has been a release to shallow groundwater (surficial aquifer) downgradient of Building 96. These wells will be installed in the "worst" locations based on the field screening for SB5 through SB12.
SD1 through SD4	Collect 1 sediment/soil sample from each location. Evaluate whether contamination from site is present as a result of discharges to sewer lines and/or surficial transport from disposal or spillage activities at Building 96.
SD5	Collect 1 sediment sample from bottom of catch basin. Evaluate whether sediment is an ongoing source of contamination.

Surface soil and sediment samples will be collected from a depth interval of 0 to 1 foot.

Subsurface soil samples will be collected from the interval above the water table, unless there is evidence of contamination at another interval based on visual observations and/or field screening.

3.1.2 Site 84 (Golf Course Maintenance Area)

No previous investigations have been performed at Site 84 to determine whether have been any releases of hazardous substances. Soil borings will be drilled, and surface and subsurface soil samples will be collected. Two soil borings will adequately address the disposal areas of concern. The soil borings will be converted into monitoring wells to obtain groundwater samples from beneath the two disposal areas. A sediment sample will be collected to evaluate the impact of surface water runoff from the disposal areas. Samples will be collected as described in Section 4.0.

The rationale for the sample locations is provided in Table 3-2.

3.2 FIELD ACTIVITIES

3.2.1 Site 83 (Building 96 Former Pesticide Mixing Area)

Outdoor field activities to be performed at the Former Pesticide Mixing Area will consist of the following:

- Surface soil sampling
- Subsurface soil borings and subsurface soil sampling
- Monitoring well installation
- Groundwater sampling
- Sediment sampling

Indoor field activities to be performed at Site 83 will consist of the following:

- Concrete floor coring
- Soil sampling from beneath concrete floor

A total of 10 outdoor soil borings (Figure 3-1) will be drilled to the water table. Split barrel samples will be collected continuously for lithologic descriptions and field screening purposes.

Borings SB3, SB4, and SB5 will be installed near the catch basin, wash pad, and oil/water separator, respectively. A surface soil sample will be collected at each location at a depth of 0 to 1 foot. A subsurface soil sample will be collected at each location from the 2-foot interval above the water table or from areas with visual evidence of contamination. Two additional surface soil samples (SS1 and SS2) will be collected from near the wash pad.

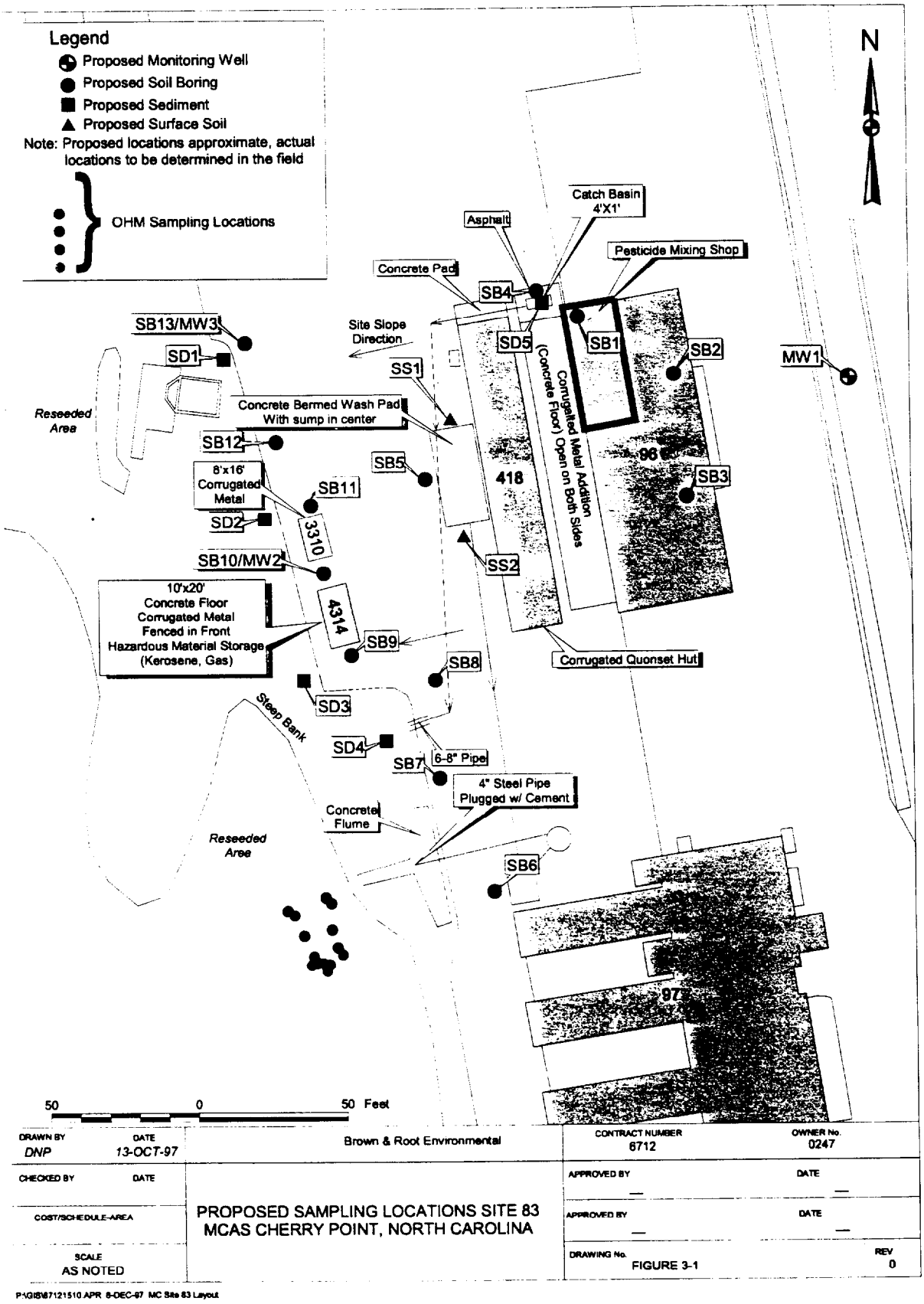
TABLE 3-2

SAMPLE LOCATION RATIONALE - SITE 84
MCAS CHERRY POINT, NORTH CAROLINA

Sample Location	Rationale
SB1	Collect 1 surface soil and 1 subsurface soil sample. Evaluate whether there has been a release from disposal of scrap wood and metal.
SB2	Collect 1 surface soil and 1 subsurface soil sample. Evaluate whether there has been a release from disposal of batteries.
GW1	Collect 1 groundwater sample. Evaluate whether there has been a release to shallow groundwater (surficial aquifer) from disposal of scrap wood and metal.
GW2	Collect 1groundwater sample. Evaluate whether there has been a release to shallow groundwater (surficial aquifer) from disposal of batteries.
SD1	Collect 1 sediment/soil sample. Evaluate potential impact of surface water runoff from the disposal areas.

Surface soil and sediment samples will be collected from a depth interval of 0 to 1 foot.

Subsurface soil samples will be collected from the interval above the water table, unless there is evidence of contamination at another interval based on visual observations and/or field screening.


Legend
Proposed Monitoring Well
Proposed Soil Boring
Proposed Sediment
Proposed Surface Soil
Note: Proposed locations approximate, actual locations to be determined in the field
OHM Sampling Locations
N
Catch Basin 4'X1'
Asphalt
Pesticide Mixing Shop
Concrete Pad
SB4
SB13/MW3
Site Slope Direction
SD5
SB1
SB2
MW1
SD1
SS1
Corrugated Metal Addition (Concrete Floor) Open on Both Sides
Reseeded Area
Concrete Bermed Wash Pad With sump in center
SB12
SB5
96
418
SB3
8'x16' Corrugated Metal
SB11
SD2
3310
SS2
SB10/MW2
10'x20' Concrete Floor Corrugated Metal Fenced in Front Hazardous Material Storage (Kerosene, Gas)
4314
SB9
Corrugated Quonset Hut
SB8
SD3
Steep Bank
SD4
SB7
6-8" Pipe
4" Steel Pipe Plugged w/ Cement
Concrete Flume
Reseeded Area
SB6
97
50 0 50 Feet
DRAWN BY DNP
DATE 13-OCT-97
Brown & Root Environmental
CONTRACT NUMBER 6712
OWNER No. 0247
CHECKED BY
DATE
APPROVED BY
DATE
COST/SCHEDULE-AREA
APPROVED BY
DATE
SCALE AS NOTED
PROPOSED SAMPLING LOCATIONS SITE 83
MCAS CHERRY POINT, NORTH CAROLINA
DRAWING No. FIGURE 3-1
REV 0
P:\GIS\67121510.APR 8-DEC-97 MC Site 83 Layout

Borings SB6 through SB12 will be installed in areas of potential contaminant migration from pesticide storage, surficial transport, and sewer lines. The split-barrel samples will be visually inspected and field screened with headspace analysis using a PID. Two surface soil samples and 2 subsurface soil samples, selected based on visual observance of contamination and field screening, will be submitted for laboratory analysis. Two of these borings with the highest potential for contamination based on visual observance and field screening will be converted into downgradient monitoring wells (MW2 and MW3). An upgradient monitoring well (MW1) will also be installed, and groundwater samples will be collected from all wells.

Four sediment/soil samples (SD1 through SD4) will be collected from areas that are suspected to have received discharges from sewer lines or have been impacted by surface runoff. One sediment sample (SD5) will be collected from the catch basin near Building 96.

All samples (soil, groundwater, and sediment) will be analyzed for TCL organics, TAL metals, and cyanide. In addition, soil and sediment samples will be analyzed for pesticides, herbicides, and insecticides that were reportedly used, can be identified, have an appropriate analytical method, and have a screening criteria (e.g., numerical state standard, RBC screening level) or are a hazardous constituent (RCRA Appendix VIII). The pesticides, herbicides, and insecticides and rationale for selection are provided in Table 3-3. Groundwater samples will be analyzed for pesticides, herbicides, and insecticides that were reportedly used, can be identified, and have an appropriate analytical method.

Three borings (SB1 through SB3) will be drilled through the floor in Building 96, and soil samples will be obtained to evaluate potential spills from inside the building. These soil samples will be analyzed for the same parameters as the outdoor samples. Confined space entry will be necessary for indoor sampling activities. The field activities and analytical testing are summarized in Table 3-4. Specific field operations are discussed in Section 4.0.

3.2.2 Site 84 (Golf Course Maintenance Area)

Field activities to be performed at the Golf Course Maintenance Area will consist of the following:

- Surface soil sampling
- Subsurface soil borings and subsurface soil sampling
- Monitoring well installation
- Groundwater sampling

TABLE 3-3

RATIONALE FOR ANALYSIS OF NON-TCL PESTICIDES, HERBICIDES, AND INSECTICIDES
SITE 83 - BUILDING 96 FORMER PESTICIDE MIXING AREA
MCAS CHERRY POINT, NORTH CAROLINA
PAGE 1 OF 2

Chemical[1]	Synonym	CAS No.	EPA Hazardous Waste No.	RCRA Appendix VIII List	NC Standard or Guidance	Region III RBC	Analysis Required[2]
Abate	Temephos	3383-96-8		no	no	yes	yes
Amitrol-T	Amitrole	61-82-5	U011	yes	no	no	yes
Avitrol	4-Aminopyridine	504-24-5	P088	yes	yes	yes	yes
Baygon	Propoxur	114-26-1	U411	yes	yes	yes	yes
Borociliv	?[3]	?					no
Chlordane		57-74-9	U036/D020	yes	yes	yes	yes
2,4-D		94-75-7	U240/D016	yes	yes	yes	yes
Dawpon	?	?					no
DDT		50-29-3	U061	yes	yes	yes	yes
Diazinon		331-41-5		no	yes	yes	yes
Diquat	Diquat dibromide	85-00-7		no	yes	yes	yes
DLP 787	Pyriminil	53558-25-1		no	no	no	no
Dursban TC	Chloropyrfos	2921-88-2		no	yes	yes	yes
Ficam-W	Bendiocarb	22781-23-3		yes	no	no	yes
Lasso	Alachlor	15972-60-8		no	yes	yes	yes
Lindane		58-89-9	U129/D030	yes	yes	yes	yes
Maintain CF		2536-31-4		no	no	no	no
Malathion		121-75-5		no	yes	yes	yes
Methyl bromide			U029	yes	yes	yes	yes
MH-30		5716-15-4		no	no	no	no
Mirex		2385-85-5		no	yes	yes	yes
Mocap Plus	Ethoprop	13194-48-4		no	no	no	no
Oftanol	Isfenphos	25311-71-1		no	no	no	no
Paraquat		4685-14-7		no	yes	yes	yes
Phostoxin	Aluminum phosphide	20859-73-8	P006	yes	yes	yes	yes
Pigeon Bait	?	?					no

TABLE 3-3

RATIONALE FOR ANALYSIS OF NON-TCL PESTICIDES, HERBICIDES, AND INSECTICIDES
SITE 83 - BUILDING 96 FORMER PESTICIDE MIXING AREA
MCAS CHERRY POINT, NORTH CAROLINA
PAGE 2 OF 2

Chemical[1]	Synonym	CAS No.	EPA Hazardous Waste No.	RCRA Appendix VIII List	NC Standard or Guidance	Region III RBC	Analysis Required[2]
2-Pivalyl-1,3-indandione	Pindone	83-26-1		no	no	no	no
Pramitol	Premeton	1610-18-0		no	no	yes	yes
Pyrethrin		97-11-0		no	no	no	no
Resmethrin		10453-86-8		no	yes	yes	yes
Sevin	Carbaryl	63-25-2		yes	yes	yes	yes
Silvex	2,4,5-TP	93-72-1	F027/D017	yes	yes	no	yes
2,4,5-T		93-76-5	F027	yes	yes	yes	yes
Ureabor	?	?					

1 Name as provided by MCAS Cherry Point.
2 Analysis required if chemical is a RCRA hazardous constituent or if comparison criteria are available.
3 Chemical not identified.

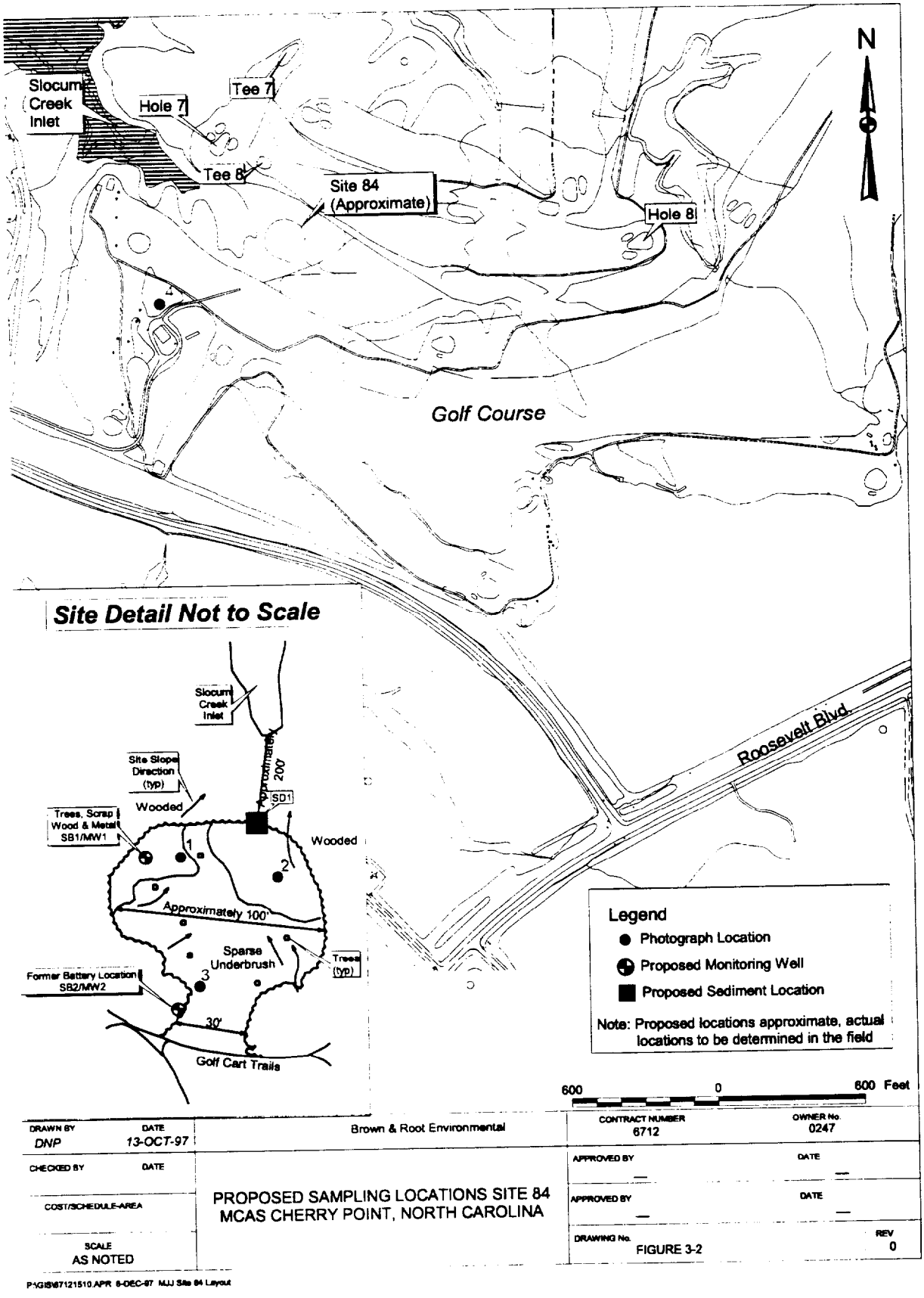
TABLE 3-4

SAMPLING AND ANALYSIS SUMMARY
SITES 83 AND 84
MCAS CHERRY POINT, NORTH CAROLINA

Site	Number of Samples[1]	Analysis
Site 83	7 Surface soil 5 Subsurface soil 3 Groundwater 5 Sediment 3 Soil (beneath floor)	TCL Volatiles TCL Semivolatiles TCL Pesticides/PCBs TAL Metals and Cyanide Pesticides/Herbicides/Insecticides
Site 84	2 Surface soil 2 Subsurface soil 2 Groundwater 1 Sediment	TCL Volatiles TCL Semivolatiles TCL Pesticides/PCBs TAL Metals and Cyanide

1 Not including field QA/QC samples

Two soil borings (SB1 and SB2) will be drilled to a depth sufficient to monitor local groundwater conditions. The borings are to be installed in areas where solid waste has been removed (suspected source areas). Split-barrel samples will be collected continuously for lithologic descriptions. A surface soil sample will be collected at each location at a depth of 0 to 1 foot. In addition, a subsurface soil sample will be collected from the 2-foot interval above the water table or from areas with visual evidence of contamination. The borings will be converted into monitoring wells (MW1 and MW2), and groundwater samples will be obtained. In addition, a sediment/soil sample (SD1) will be obtained to evaluate the potential impact of surface water runoff from the disposal areas. Sample locations are shown on Figure 3-2. The field activities and analytical testing are summarized in Table 3-4. Specific field operations are discussed in Section 4.0.


Slocum Creek Inlet
Hole 7
Tee 7
Tee 8
Site 84 (Approximate)
Hole 8
N
Golf Course
Roosevelt Blvd.
Site Detail Not to Scale
Slocum Creek Inlet
Site Slope Direction (typ)
Approximately 200'
SD1
Wooded
Trees, Scrap Wood & Metal SB1/MW1
Wooded
1
2
Approximately 100'
Sparse Underbrush
Trees (typ)
Former Battery Location SB2/MW2
3
30'
Golf Cart Trails
Legend
Photograph Location
Proposed Monitoring Well
Proposed Sediment Location
Note: Proposed locations approximate, actual locations to be determined in the field
600 0 600 Feet
DRAWN BY DNP
DATE 13-OCT-97
Brown & Root Environmental
CONTRACT NUMBER 6712
OWNER No. 0247
CHECKED BY
DATE
APPROVED BY
DATE
COST/SCHEDULE-AREA
PROPOSED SAMPLING LOCATIONS SITE 84
MCAS CHERRY POINT, NORTH CAROLINA
APPROVED BY
DATE
SCALE AS NOTED
DRAWING No. FIGURE 3-2
REV 0
P:\GIS\87121510.APR 8-DEC-97 MJJ Site 84 Layout

4.0 FIELD SAMPLING PLAN

4.1 FIELD OPERATIONS

The following sections detail the field activities to be performed during this investigation. The field work will be conducted in accordance with (Draft) Master Field Sampling Plan for MCAS Cherry Point (B&R Environmental, August 1997). The field work will include the following tasks:

- Mobilization/demobilization
- Soil boring and monitoring well installation
- Soil sampling
- Groundwater sampling
- Sediment sampling
- Survey of sample locations
- Water-level measurements
- Investigative-derived waste (IDW) disposal
- Decontamination

4.1.1 Mobilization/Demobilization

Following approval of this Work Plan, B&R Environmental will begin mobilization activities. All field team members will review this Work Plan and the Health and Safety Plan (HASP). In addition, a field team orientation meeting will be held to familiarize personnel with the scope of the field activities.

A discussion of mobilization/demobilization and site restoration activities can be found in Section 2.1 (General Field Operations) of the (Draft) Master FSP for MCAS Cherry Point (B&R Environmental, August 1997).

4.1.2 Soil Boring and Monitoring Well Installation

Twelve soil borings will be installed at Site 83. Two of these borings will be converted into downgradient monitoring wells. An upgradient well will also be installed at Site 83. Two soil borings will be installed at Site 84 and will be converted into monitoring wells.

Soil borings will be advanced using minimum 6-inch outside diameter hollow-stem augers with continuous split-spoon sampling according to ASTM methods. The split-spoon sampler is driven to the required depth

using a hammer (140 pounds with a 30-inch fall) mounted on the drill rig. The borings will be drilled to the water table or to a depth sufficient to position the top of the well screen approximately 1 to 2 feet above the water table of the surficial aquifer. Once the borings have been completed at each site, the wells will be installed in the surficial aquifer. Details on drilling and grouting of soil borings can be found in Section 2.2.1 (Soil Borings) of the (Draft) Master FSP for MCAS Cherry Point (B&R Environmental, August 1997).

Monitoring wells will be constructed of Schedule 40, flush-joint, 2-inch-diameter, National Science Foundation (NSF) approved PVC well screen and riser pipe. The well screens will be 10 feet long with a slot size of 0.02 inches and supplied with a PVC end cap. The top of the screen will be placed 2 feet above the water table. A 4-inch square black steel protective casing with a hinged locking cap will be cemented in place over the riser pipe of each well. Details on construction, installation, development, and protection of monitoring wells can be found in Section 2.4.1 (Permanent Monitoring Well) of the (Draft) Master FSP for MCAS Cherry Point (B&R Environmental, August 1997).

4.1.3 Soil Sampling

Surface and subsurface soil samples will be collected from the borings for chemical analysis. Surface soil samples will be collected from the 0 to 1 foot interval. Subsurface soil samples will be collected from the 2-foot interval above the water table or interval with evidence of contamination based on visual observations or field screening. Details on surface soil sampling, subsurface soil sampling, head-space soil sampling, and screening of soil samples can be found in Sections 2.9.3 through 2.9.6 of the (Draft) Master FSP for MCAS Cherry Point (B&R Environmental, August 1997).

4.1.4 Groundwater Sampling

Groundwater samples will be collected from all wells installed during the field activities. The wells will be developed no sooner than 24 hours after installation to remove fine materials from around the well screen. Wells will be developed as previously discussed in Section 4.1.2. Groundwater sampling procedures are described in Section 2.9.1 of the (Draft) Master FSP for MCAS Cherry Point (B&R Environmental, August 1997).

4.1.5 Sediment Sampling

Sediment samples will be collected from drainage ditches below areas that convey storm water from Building 96 and the Site 84 disposal areas. These samples will be collected from the 0 to 1 foot interval.

Details on sediment sampling can be found in Section 2.9.2 of the (Draft) Master FSP for MCAS Cherry Point (B&R Environmental, August 1997).

4.1.6 Surveying of Sample Locations

Soil boring locations, monitoring well locations, soil sampling locations, sediment sampling locations, building corners, and other pertinent features will be surveyed. Details on land surveying can be found in Section 2.13 of the (Draft) Master FSP for MCAS Cherry Point (B&R Environmental, August 1997).

4.1.7 Water-Level Measurements

One round of water-level measurements will be obtained from all of the monitoring wells installed at Sites 83 and 84. Details can be found in Section 2.5 of the (Draft) Master FSP for MCAS Cherry Point (B&R Environmental, August 1997).

4.1.8 Investigation-Derived Waste Handling and Disposal

Five types of potentially contaminated residues are expected to be generated during the field work. Personal protective equipment (PPE); drill rig, sampling equipment, and protective equipment decontamination fluids; drill cuttings; and purge water from well development and groundwater sampling will be generated. Details on handling and disposal of these materials can be found in Section 2.15 of the (Draft) Master FSP for MCAS Cherry Point (B&R Environmental, August 1997).

4.1.9 Decontamination

The equipment involved in field sampling activities will be decontaminated prior to and during drilling and sampling activities. This equipment includes drilling rigs, downhole tools, augers, PPE, and all non-dedicated reusable sampling equipment. Details on decontamination can be found in Section 2.14 of the (Draft) Master FSP for MCAS Cherry Point (B&R Environmental, August 1997).

4.2 SAMPLE HANDLING

Sample handling includes the field-related considerations concerning field sample documentation and the selection of sample containers, preservatives, allowable holding times, and analyses requested. In addition, sample identification, packaging, and shipping will be addressed. Sample handling and custody procedures are described in Sections 2.10 (Sample Handling) and 2.11 (Sample Custody) of the (Draft) Master FSP for MCAS Cherry Point (B&R Environmental, August 1997).

4.3 QUALITY CONTROL SAMPLES

In addition to regular calibration of field equipment and appropriate documentation, quality control (QC) samples will be collected or generated during environmental sampling activities. QC samples include field duplicates, field blanks, trip blanks, and equipment rinsate blanks. The type and number of required QC samples is presented in Section 5.0. Details on QC samples are provided in Section 3.0 of the (Draft) Master QAP for MCAS Cherry Point (B&R Environmental, July 1997).

5.0 SAMPLE MATRICES, PARAMETERS, AND FREQUENCY OF COLLECTION

As part of this investigation, environmental samples will be collected from the following matrices: surface and subsurface soil, groundwater, and sediment. A listing of the sample matrices, parameters, and frequency of collections, including QA/QC samples, is presented in Tables 5-1 and 5-2. Sampling procedures to be used during this study are provided in Section 4.0. Table 5-3 provides sample container requirements, preservation requirements, and holding times.

TABLE 5-1

ANALYTICAL PROGRAM
SITE 83 - BUILDING 96 FORMER PESTICIDE MIXING AREA
MCAS CHERRY POINT, NORTH CAROLINA
PAGE 1 OF 2

Parameter[1]	Method[2]	Sample Type	No. of Samples	Trip Blanks[3]	Equipment Rinsates[4]	Ambient Blanks[5]	Field Duplicates[6]	Total No. of Sample (including blanks)
TCL Volatile Organics (Low Concentration)	CLP SOW OLC02.0	Groundwater	3	1	1	1	1	7
TCL Volatile Organics	CLP SOW OLM03.1	Soil/Sediment	20	1	1	1	1	24
TCL Semivolatile Organics	CLP SOW OLM03.1	Groundwater	3	NA	1	1	1	6
		Soil/Sediment	20	NA	1	1	1	23
TCL Pesticides/PCBs	CLP SOW OLM03.1	Groundwater	3	NA	1	1	1	6
		Soil/Sediment	20	NA	1	1	1	23
Non-TCL Pesticides, Herbicides, Insecticides	SW-846 8141, 8151, 8318	Groundwater	3	NA	1	1	1	6
		Soil/Sediment	20	NA	1	1	1	23
TAL Metals/Cyanide	CLP SOW ILM04.0	Groundwater	3	NA	1	1	1	6
		Soil/Sediment	20	NA	1	1	1	23

1 TCL - Target Compound List; TAL - Target Analyte List
2 Methodology as per the latest upgrades or revisions to the Contract Laboratory Program Statement of Work or EPA SW-846 methods.
3 Trip blanks are samples that originate from analyte free water taken from the laboratory to the sampling site and returned to the laboratory with the VOC samples. One trip blank per cooler containing volatile organics. Trip blanks are analyzed only for VOCs.
4 Equipment rinsate blanks are obtained under representative field conditions by running analyte-free water through sample collection equipment after decontamination and prior to use. Collected at a frequency of one per matrix per day.

TABLE 5-1

ANALYTICAL PROGRAM
SITE 83 - BUILDING 96 FORMER PESTICIDE MIXING AREA
MCAS CHERRY POINT, NORTH CAROLINA
PAGE 2 OF 2

5 Ambient blanks are samples of contaminant-free media that are prepared at the site and handled in the same manner as all other field samples. Collected at a frequency of one per site per sampling event.

6 Field duplicates are single samples split into two portions during a single act of sampling. Collected at a frequency of 10 percent per medium or one per matrix per day, whichever is more frequent.

TABLE 5-2

ANALYTICAL PROGRAM
SITE 84 - GOLF COURSE MAINTENANCE AREA
MCAS CHERRY POINT, NORTH CAROLINA

Parameter[1]	Method[2]	Sample Type	No. of Samples	Trip Blanks[3]	Equipment Rinsates[4]	Ambient Blanks[5]	Field Duplicates[6]	Total No. of Samples (including blanks)
TCL Volatile Organics (Low Concentration)	CLP SOW OLC02.0	Groundwater	2	1	1	1	1	6
TCL Volatile Organics	CLP SOW OLM03.1	Soil/Sediment	5	1	1	1	1	9
TCL Semivolatile Organics (SVOCs)	CLP SOW OLM03.1	Groundwater	2	NA[6]	1	1	1	5
		Soil/Sediment	5	NA	1	1	1	8
TCL Pesticides/PCBs	CLP SOW OLM03.1	Groundwater	2	NA	1	1	1	5
		Soil/Sediment	5	NA	1	1	1	8
TAL Metals/Cyanide	CLP SOW ILM04.0	Groundwater	2	NA	1	1	1	5
		Soil/Sediment	5	NA	1	1	1	8

1 TCL - Target Compound List; TAL - Target Analyte List
2 Methodology as per the latest upgrades or revisions to the Contract Laboratory Program Statement of Work.
3 Trip blanks are samples that originate from analyte free water taken from the laboratory to the sampling site and returned to the laboratory with the VOC samples. One trip blank per cooler containing volatile organics. Trip blanks are analyzed only for VOCs.
4 Equipment rinsate blanks are obtained under representative field conditions by running analyte-free water through sample collection equipment after decontamination and prior to use. Collected at a frequency of one per matrix per day.
5 Ambient blanks are samples of contaminant-free media that are prepared at the site and handled in the same manner as all other field samples. Collected at a frequency of one per site per sampling event.
6 Field duplicates are single samples split into two portions during a single act of sampling. Collected at a frequency of 10 percent per medium or one per matrix per day, whichever is more frequent.

TABLE 5-3

SUMMARY OF ANALYSIS, BOTTLEWARE REQUIREMENTS, PRESERVATION REQUIREMENTS, AND HOLDING TIMES
SITES 83 AND 84
MCAS CHERRY POINT, NORTH CAROLINA

Media	Analysis	Container Type	Preservation Requirements	Holding Times
Groundwater (and aqueous blanks)	TCL Volatile Organic Compounds	(2) 40-mL glass VOA vials	HCl to pH < 2; Cool to 4°C	14 days
	TCL Semivolatile Organic Compounds	1/2-gallon glass amber jug	Cool to 4°C	7 days to extract; 40 days to analysis
	TCL Pesticide/PCB Compounds	1/2-gallon glass amber jug	Cool to 4°C	7 days to extract; 40 days to analysis
	Carbamate Pesticides	1/2-gallon glass amber jug	Chloroacetic acid to pH <4; Cool to 4°C	7 days to extract; 40 days to analysis
	Chlorinated Herbicides	1/2-gallon glass amber jug	HCl to pH <2; Cool to 4°C	7 days to extract; 40 days to analysis
	Organophosphorus Pesticides	1/2-gallon glass amber jug	Cool to 4°C	7 days to extract; 40 days to analysis
	TAL Metals	1-liter polyethylene bottle	HNO_3 to pH < 2; Cool to 4°C	6 months; 28 days for Hg
	Cyanide	1-liter polyethylene bottle	NaOH to pH > 12; Cool to 4°C	14 days
Soil and Sediment	TCL Volatile Organic Compounds	60-mL VOA vial	Cool to 4°C	14 days
	TCL Semivolatile and Pesticide/PCB Compounds	8-oz. wide mouth clear glass jar	Cool to 4°C	14 days to extract; 40 days to analysis
	Non-TCL Pesticide, Herbicide, and Insecticide Compounds	8-oz. wide mouth clear glass jar	Cool to 4°C	14 days to extract; 40 days to analysis
	TAL Metals and Cyanide	8-oz. wide mouth clear glass jar	Cool to 4°C	6 months; 28 days for Hg; 14 days for CN

6.0 DATA QUALITY REQUIREMENTS

The overall QA objective is to develop and implement procedures for field sampling, chain-of-custody, laboratory analysis, and reporting that will provide environmental monitoring data of known and acceptable quality. Specific procedures to be used for sampling, chain-of-custody, calibration of field instruments, laboratory analysis, reporting, internal quality control, audits, preventative maintenance, and corrective actions are described in other sections of this Work Plan. The purpose of this section is to address the data quality objectives in terms of precision, accuracy, representativeness, completeness, and comparability (the PARCC parameters); field blanks; rinsate blanks; trip blanks; duplicates; and bottleware requirements.

A discussion of these items can be found in Section 3.0 (Data Quality Requirements) of the (Draft) Master QAP for MCAS Cherry Point (B&R Environmental, July 1997).

7.0 SAMPLE CUSTODY AND SHIPMENT

Sample custody procedures are designed to provide the documentation of preparation, handling, storage, and shipping of samples collected. Full details are contained in Section 4.0 (Sample Custody and Shipment) in the Master QAP for MCAS Cherry Point (B&R Environmental, July 1997).

8.0 CALIBRATION PROCEDURES AND FREQUENCY

Certain field measurements, such as dissolved oxygen, temperature, pH, and specific conductance, will be recorded during sampling activities. All instruments used in the field will be calibrated according to the procedures described below. Several monitoring instruments may be used during field activities, including the following:

- Flame ionization detector (FID)
- Photoionization detector (PID)
- Temperature probe
- Specific conductance meter
- pH meter
- Electronic water level meter
- Dissolved oxygen meter
- Oxidation reduction potential meter
- Horiba combination meter (pH, temperature, specific conductance, dissolved oxygen)

Details on equipment calibration and maintenance are provided in Sections 2.6.1 and 2.6.2 of the (Draft) Master FSP for MCAS Cherry Point (B&R Environmental, August 1997).

9.0 ANALYTICAL PROCEDURES

Environmental samples collected for chemical analysis during this study will be analyzed using the appropriate analytical procedures outlined in Table 5-1 of this Work Plan.

10.0 DATA REDUCTION, VALIDATION, AND REPORTING

Data reduction, validation, and reporting are basic steps in the control and processing of field and laboratory generated data. Data validation procedures are described in Section 8.0 of the (Draft) Master QAP for MCAS Cherry Point (B&R Environmental, July 1997).

11.0 INTERNAL QUALITY CONTROL CHECKS

Field-related (i.e., external) QC checks were discussed in Section 4.3 of this Work Plan. This section further details internal QC checks and other laboratory QA/QC considerations. Details can be found in Section 6.0 of the (Draft) Master QAP for MCAS Cherry Point (B&R Environmental, July 1997).

12.0 PERFORMANCE AND SYSTEM AUDITS

System audits will be performed periodically to ensure that work is being implemented in accordance with the approved Project Plans and in an overall satisfactory manner. Details are provided in Section 9.0 of the (Draft) Master QAP for MCAS Cherry Point (B&R Environmental, July 1997).

13.0 PREVENTATIVE MAINTENANCE

B&R Environmental has established a program for maintenance of field equipment to ensure the availability of equipment if good working order when and where it is needed. This program consist of the following elements:

- The equipment manager keeps an inventory of the equipment in terms of items (model and serial number), quantity, and condition. Each item of equipment is signed out when in use, and its operating condition and cleanliness are checked upon return.

- The equipment manager conducts routine checks on the status of equipment and is responsible for the stocking of spare parts and equipment readiness.

- The equipment manager maintains the equipment manual library and trains field personnel in the proper use and care of equipment.

- The FOL is responsible for working with the equipment manager to make sure that the equipment is tested, cleaned, charged, and calibrated in accordance with the manufacturer's instructions and the B&R Environmental SOPs before being taken to a job site and during field activities.

14.0 DATA ASSESSMENT PROCEDURES

14.1 REPRESENTATIVENESS, ACCURACY, AND PRECISION

All data generated in the investigation will be assessed for its representativeness, accuracy, and precision. The completeness of the data will also be assessed by comparing the validated data to the project objectives to see that these objectives are being addressed and met. The specific procedures used to determine data precision, accuracy, and completeness will be provided in the analytical reports. Accuracy will be determined using laboratory spiked samples and laboratory blanks.

The representativeness of the data will be assessed by determining whether the data are consistent with known or anticipated hydrogeologic or chemical conditions and accepted principles. Field measurements will be checked for completeness of procedures and documentation of procedures and results.

The specific procedures for determining PARCC parameters are outlined in Section 6.0 of this Work Plan and Section 3.0 of the (Draft) Master QAP for MCAS Cherry Point (B&R Environmental, July 1997).

14.2 VALIDATION

One hundred percent of the analytical data packages for each media will be validated. Data validation procedures to be employed are detailed in Section 10.0 of this Work Plan and Section 8.0 of the (Draft) Master QAP for MCAS Cherry Point (B&R Environmental, July 1997).

14.3 DATA EVALUATION

The evaluation of the data collected during the field investigation will be a comparison of chemical concentrations in the hydraulically upgradient groundwater wells (and metal concentrations in Air Station background wells) versus the chemical concentrations in the downgradient groundwater wells; chemical concentrations in groundwater versus North Carolina groundwater standards, MCLs, the draft North Carolina Risk Analysis Framework concentrations, and EPA Region III Risk Based Concentrations (RBCs); and chemical concentrations in soil to Air Station background concentrations, the draft North Carolina Risk Analysis Framework concentrations, and EPA Region III RBCs. These concentrations are contained in Appendix B of the (Draft) Decision Process Document for MCAS Cherry Point (B&R Environmental, September 1997).

15.0 CORRECTIVE ACTION

Under the B&R Environmental QA/QC program, any and all personnel noting conditions adverse to quality are required to report these conditions immediately to the Project Manager and Quality Assurance Manager (QAM). These parties, in turn, are charged with performing root-cause analyses and implementing appropriate corrective action in a timely manner. It is ultimately the responsibility of the QAM to document all findings and corrective actions taken and to monitor the effectiveness of the corrective measures performed.

Details on corrective action for field, laboratory, data evaluation, and administrative activities are provided in Section 10.0 of the (Draft) Master QAP for MCAS Cherry Point (B&R Environmental, July 1997).

16.0 QUALITY ASSURANCE REPORTS

The QAM, or designee, will review all aspects of the implementation of this Work Plan on a regular basis and may prepare a summary report. Reviews will be performed at the completion of each field activity, and reports will be completed at this time. These reports will include an assessment of data quality and the results of system and/or performance audits. Any significant QA deficiencies will be reported and identified, and corrective action possibilities will be discussed. Other QA/QC reports are listed in Section 10.0.

REFERENCES

Brown & Root (B&R) Environmental, July 1997. Draft Quality Assurance Plan for Marine Corps Air Station Cherry Point, North Carolina. Pittsburgh, PA.

Brown & Root (B&R) Environmental, August 1997. Draft Field Sampling Plan for Marine Corps Air Station Cherry Point, North Carolina. Pittsburgh, PA.

Brown & Root (B&R) Environmental, September 1997. Draft Decision Process Document for Marine Corps Air Station Cherry Point, North Carolina. Pittsburgh, PA.

Naval Facilities Engineering Service Center (NFESC), February 1996. Naval Installation Restoration Laboratory Quality Assurance Guide (Interim Guidance). Port Hueneme, CA.

United States Environmental Protection Agency (USEPA) Region IV, May 1996. Environmental Investigations Standard Operating Procedures and Quality Assurance Manual. Athens, GA.

APPENDIX A

BUILDING 96 PESTICIDE RESULTS

OPTIONAL FORM 99 (7-90)

FAX TRANSMITTAL # of pages ▶ 11

To: OFFICER IN CHARGE
NEESU 2
IH ANALYTICAL LAB DEPT
NAVAL STATION BLDG X 336
NORFOLK VA 23511-6288

From: Rachel Johnson
Dept: B&E ENVR
Phone #: 919 466 4421
Fax #: 412 921 4040 / 11 11 2000

NSN 7540-01-317-7368 5099-101 GENERAL SERVICES ADMINISTRATION

INDUSTRIAL HYGIENE BULK/WIPE SAMPLING FORM

Date: 5-27-97

IH UIC: 66094 Activity: Facilities Maintenance Dept UIC: 00146

Building/Location: Bld 96 Worksite: Workbay Shop/Code: _____

Sample Class ☒ Bulk ☐ Wipe (100 cm²)

Associated Air Samples: _____

Collection Media: _____

Field ID	A-1	A-2	A-3	A-4
Source	Shop Wall Dry Wall Sample	Shop Wall Dry Wall Sample	Shop Floor Liquid Sample	Shop Floor Liq. Sample
Sample #	97-0176	97-0177	97-0178	97-0179
Laboratory #	A97G642	43	44	45
Suspected Stressor	Herbicide Pesticide	Herbicide Pesticide	Herbicide Pesticide	Herbicide Pesticide
Analysis	Chlordane	Chlordane	chlordane	Chlordane
Results/Units	20.4ppm	7.59ppm	0.82ppm	0.61ppm

Date Received: 29 MAY 1997 Analytical Method: OSHA 67

Comments: _____ LOD: 0.14ug/samp

Analysis Performed By: H. Penn, Chemist Date Analyzed: 6/5/97

Analysis Reviewed By: _____ Date Reported: _____

IHT/WPM: _____ Date: _____ IH: Dennis Bottle Date: 5-27-97

NEHC 5100/16 (REV 5/88)

QA. LINDSAY LAB DIR
BY direction

139 9

To: OFFICER IN CHARGE
NEESMI 2
IH ANALYTICAL LAB DEPT
NAVAL STATION, BLDG X 336
NORFOLK VA 23511-6288

From: COMMANDING OFFICER
INDUSTRIAL HYGIENE DIVISION
NAVAL HOSPITAL
PSC BOX 8023
CHERRY POINT NC 28533-0023
POC: Sc. H Sh, Hm Phone: 1-919-466-4555

INDUSTRIAL HYGIENE BULK/WIPE SAMPLING FORM

Date: 5-27-97

IH UIC: 66094 Activity: Facilities Maintenance Dept UIC: 00186

Building/Location: Bld 96 Worksite: Workbay Shop/Code: _____

Sample Class ☐ Bulk ☒ Wipe (100 cm²)

Associated Air Samples: _____

Collection Media: _____

Field ID	A-3	A-4			
Source	Shop Floor	Shop Floor			
Sample #	97-0180	97-0181			
Laboratory #	A97644	47			
Suspected Stressor	Herbicide Pesticide	Herbicide Pesticide			
Analysis	Chlordane	Chlordane			
Results/Units	ug/sample 0.80	ug/sample 0.91			

Date Received: 29 MAY 1997 Analytical Method: OSHA 67

Comments: _____ LOD: 0.14ug/sample

Analysis Performed By: H. Penn, Chemist Date Analyzed: 6/5/97

Analysis Reviewed By: _____ Date Reported: _____

IHT/WPM: _____ Date: _____ IH: Steven Bottle Date: 5-27-97

NEHC 5100/15 (REV 5/86)

QA LINDSAY LAB DIR
BY direction

OFFICER IN CHARGE
NEPMU 2
IH ANAL LAB DEPT
NAVAL STATION BLDG X 336
NORFOLK VA 23511-6288

COMMANDING OFFICER
INDUSTRIAL HYGIENE DIVISION
NAVAL HOSPITAL
PSC BOX 8023
CHERRY POINT NC 28533-0023

M. Smart DSN 582-3213

INDUSTRIAL HYGIENE BULK/WIPE SAMPLING FORM

21 Aug 97

Survey #: 97-060914 Activity: FMD UIC: 00146

Building: 96 Location: Mixing Room Shop: N/A

Sample Class: ~~Bulk~~ Wipe (100 cm²)

Associated Air Samples: Yes → IH Log #'s 97-0331 - 0338

Collection Media: Smear Tabs / Plastic bags

Field ID					
Source	Right Sink	Left Sink	Sink Wall Center	Sink Wall Right	Right Wall Wall
Sample #	97-0357	97-0358	97-0359	97-0360	97-0361
Laboratory #	B970703	04	05	06	07
Suspected Stressor	Chlordane Lindane Dursban Parathion Malathion Dieldrin	→	→	→	→
Analysis	Percentage	→	→	→	→
Results/Units Chlordane	<1.44ug	<1.44ug	<1.44ug	<1.44ug	<1.44ug
Dursban	<0.22ug	<0.22ug	<0.22ug	<0.22ug	<0.22ug
Malathion	<12.3ug	<12.3ug	<12.3ug	<12.3ug	<12.3ug
Dieldrin	<1.0ug	<1.0ug	<1.0ug	<1.0ug	<1.0ug

LOD 1.44ug
0.22ug
12.3ug
1.0ug

Date Received: 02 SEP 1997 PL Date Reported: 9-22-97

Analytical Method Used: OSHA 62 Limit of Detection: see above

Analysis Performed By: VG Broady, Chemist Date:

IH/WPM: Maurice H Smart Date: 9-21-97 PH: Date:

D.A. Lindsay
D.A. LINDSAY LAB DIR
BY direction

OFFICER IN CHARGE NEPMU 2 IH ANAL LAB DEPT NAVAL STATION BLDG X 336 NORFOLK VA 23511-6288	COMMANDING OFFICER INDUSTRIAL HYGIENE DIVISION NAVAL HOSPITAL PSC BOX 8023 CHERRY POINT NC 28533-0023
To:	From: M. Smart DSN 582-3213

INDUSTRIAL HYGIENE BULK/WIPE SAMPLING FORM

21 Aug 97

Survey #: 97-161-0914 Activity: FMD UIC: 00146

Building: 96 Location: Mixing Room Shop: N/A

Sample Class: ☐ Bulk ☒ Wipe (100 cm²)

Associated Air Sampler: Yes → IH Log #'s 97-0331 - 0338

Collection Media: Smear Tabs / Plastic bag

Field ID					
Source	left wrist (left) arm forearm hand				
Sample #	97-0362				
Laboratory #	B970708				
Suspected Stressor	Chlordane Dursban Malathion Diazinon Dieldrin				
Analysis	Pesticides				
Results: Chlordane	<1.44ug	LOD	1.44ug		
Dursban	<0.22ug		0.22ug		
Malathion	<12.3ug		12.3ug		
Dieldrin	<1.0ug		1.0ug		

Date Received: 02 SEP 1997 Date Reported: 9-22-97

Analytical Method Used: OSHA 62 Limit of Detection: see above

Analysis Performed By: VG Broady, Chemist Date:

IH/SNPM: Marie A Smart Date: 8-21-97 PM: Date:

G.A. LINDSAY LAB DIR
BY direction

NORFOLK VA 23511-6288

CHERRY POINT NC 28533-0023
POC LT Barrigan Phone (919) 466-3633

INDUSTRIAL HYGIENE BULK/WIPE SAMPLING FORM

Date 7-2-97

Survey #: ☐☐-☐☐☐☐ Activity: FH / M+R UIC: 00146

Building: Bldg 96 Location: _____ Shop: WC-45

Sample Class: ☐ Bulk ☒ Wipe (100 cm²)

Associated Air Samples: _____

Collection Media: _____

Field ID	# 1	# 2	# 3	# 4	# 5
Source	Ceiling Cross Beam	Shelf	Window Sill	Bulletin Board # 1	Bulletin Board # 2
Sample #	97-0245	97-0246	97-0247	97-0248	97-0249
Laboratory #	A978680	81	82	83	84
Suspected Stressor	Pesticides Chlordane	Chlordane	Chlordane	Chlordane	chlordane
Analysis					
Results/Units	<0.14ug	0.25ug	0.53ug	0.44ug	<0.14ug

Date Received: 08 JUL 1997 PL Date Reported: _____

Analytical Method Used: OSHA 67 Limit of Detection: 0.14ug/sample

Analysis Performed By: A. Maristela, Chemist Date: 7/17/97

IHT/WPM: _____ Date: _____ *IH: _____ Date: 7-3-97

BY MY SIGNATURE, I VERIFY THAT I HAVE REVIEWED THIS FORM FOR COMPLETENESS AND ACCURACY AND THAT THE WORK DOCUMENTED HEREON WAS CONDUCTED AND RECORDED IN ACCORDANCE WITH NAVY INSTRUCTIONS, FEDERAL/STATE/LOCAL AND/OR ACCEPTED INDUSTRIAL HYGIENE PROCEDURES.

NEHC 5100/10 (REV 7/88)

GAILINDSAY LAB DIR
BY direction

To: OFFICER IN CHARGE
NEPMU-2
IH ANALYTICAL LAB DEPT
NAVAL STATION, BLDG X-336
NORFOLK VA 23511-6288

From: COMMANDING OFFICER
ATTN: INDUSTRIAL HYGIENE DIVISION
NAVAL HOSPITAL
PSC BOX 8023
CHERRY POINT NC 28533-0023
POC: LT Pastican Phone: (919) 466-3833

INDUSTRIAL HYGIENE BULK/WIPE SAMPLING FORM

Date: 7-2-97

Survey #: ☐☐-☐☐☐☐ Activity: FM / M+R UIC: 00146

Building: 96 Location: _____ Shop: WC-45

Sample Class: ☐ Bulk ☒ Wipe (100 cm²)

Associated Air Samples: _____

Collection Media: _____

Field ID	#6	#7	#8	#9	#10
Source	microwave oven ~~#7 0250~~	stove	clerk's office	office window	office floor
Sample #	97-0250	97-0251	97-0252	97-0253	97-0254
Laboratory #	A978685	86	87	88	89
Suspected Stressor	Pesticides Chlordane	Chlordane	Chlordane	Chlordane	Chlordane
Analysis					
Results/Units	0.24ug	0.26ug	0.26ug	0.52ug	0.26ug

Date Received: 08 JUL 1997 DL Date Reported: _____

Analytical Method Used: OSHA 67 Limit of Detection: 0.14ug/sample

Analysis Performed By: A. Maristela, Chemist Date: 7/17/97

IHT/WPM: _____ Date: _____ *IH: _____ Date: 7-3-97

*BY MY SIGNATURE, I VERIFY THAT I HAVE REVIEWED THIS FORM FOR COMPLETENESS AND ACCURACY AND THAT THE WORK DOCUMENTED HEREON WAS CONDUCTED AND RECORDED IN ACCORDANCE WITH NAVY INSTRUCTIONS, FEDERAL REGULATIONS, AND/OR ACCEPTED INDUSTRIAL HYGIENE PROCEDURES.

NEHC 3100/18 (REV 7/92)

To: OFFICER IN CHARGE
NEPMU-2
IH ANALYTICAL LAB DEPT
NAVAL STATION, BLDG X-336
NORFOLK VA 23511-6288

From: COMMANDING OFFICER
ATTN: INDUSTRIAL HYGIENE DIVISION
NAVAL HOSPITAL
PSC BOX 8023
CHERRY POINT NC 28533-0023
POC: LT Gerken Phone: (919) 466-3833

INDUSTRIAL HYGIENE BULK/WIPE SAMPLING FORM

Survey #: ☐☐-☐☐☐☐ Activity: FM / M+R UIC: 00146

Building: 96 Location: _____ Shop: WC-45

Sample Class: ☐ Bulk ☒ Wipe (100 cm²)

Associated Air Samples: _____

Collection Media: _____

Field ID	# 11				
Source	Floor				
Sample #	97-0255				
Laboratory #	A978690				
Suspected Stressor	Chlordane Pesticides				
Analysis					
Results/Units	0.53ug				

Date Received: 08 JUL 1997 Date Reported: _____

Analytical Method Used: OSHA 67 [illegible] Limit of Detection: 0.14ug/sample

Analysis Performed By: A. Maristela, Chemist Date: 7/17/97

IHT/WPM: _____ Date: _____ *IH: _____ Date: 7-3-97

*BY MY SIGNATURE, I VERIFY THAT I HAVE REVIEWED THIS FORM FOR COMPLETENESS AND ACCURACY AND THAT THE WORK DOCUMENTED HEREON WAS CONDUCTED AND RECORDED IN ACCORDANCE WITH NAVY INSTRUCTIONS, FEDERAL REGULATIONS, AND/OR ACCEPTED INDUSTRIAL HYGIENE PROCEDURES.

GA LINDSAY LAB INC

WOHL Wisconsin Occupational Health Laboratory
979 Jonathon Drive
Madison, WI 53713-3228
Phone: (608) 263-8550
FAX: (608) 263-8551

Wisconsin State Laboratory of Hygiene University of Wisconsin

July 31, 1997

OFFICER IN CHARGE
NAVENPVNTMEDU TWO ATTN CIHL
UNIT 2
1887 POWHATAN ST
NORFOLK VA 23511-3394

Company #: 5259

The results for the samples received by the lab on 07/29/97 are as follows:

Lab#	Field#	ug/sample	MG/M3	Analyte
652599	A979175	<=4.0	<=0.016	2,4-D
		<=8.0	<=0.033	2,4,5-T
652600	A979176	<=4.0	<=0.016	2,4-D
		<=8.0	<=0.033	2,4,5-T
652601	A979177	<=4.0		2,4-D
		<=8.0		2,4,5-T

If you have any questions about these results, please call the lab at (800) 446-0403

Lyle Reichmann, CIH, Chemist Supervisor

LeRoy Dobson

WOHL Wisconsin Occupational Health Laboratory

979 Jonathon Drive
Madison, WI 53713-3226
Phone: (608) 263-6550
FAX: (608) 263-6551

Wisconsin State Laboratory of Hygiene

University of Wisconsin

September 23, 1997

LTJG RATICAN
NAVAL HOSPITAL
INDUSTRIAL HYGIENE
PSC BOX 8023
CHERRY POINT NC 28533-0023

Company #: 5563

PO N6609497M0990

The results for the samples received by the lab on 08/29/97 are as follows:

Lab#	Field#	ug/sample	MG/M3	Analyte
658449	970333	ND <2.0	ND <0.007	2,4-D
		ND <2.0	ND <0.007	2,4,5-T
658450	970334	ND <2.0		2,4-D
		ND <2.0		2,4,5-T
658452	970336	ND <2.0	ND <0.005	2,4-D
		ND <2.0	ND <0.005	2,4,5-T
658454	970356	ND <2.0	ND <0.015	2,4-D
		ND <2.0	ND <0.015	2,4,5-T

If you have any questions about these results, please call the lab at (800) 446-0403

Lyle Reichmann, CIH, Chemist Supervisor

John D Glowacki

WOHL Wisconsin Occupational Health Laboratory

979 Jonathon Drive
Madison, WI 53713-3228
Phone: (608) 263-6550
FAX: (608) 263-6551

Wisconsin State Laboratory of Hygiene University of Wisconsin

Pesticide Analysis
September 5, 1997

Four OVS-2 tubes were submitted to the Wisconsin Occupational Health Lab (WOHL) for Chlordane, Lindane, Dursban, Parathion, Malathion, Dieldrin, and Diazinon analysis. The samples were extracted with toluene, and the toluene extract was analyzed using gas chromatography with electron capture detection (GC-ECD). Results are as follows:

WOHL #	Field #	Pesticide	Concentration (ug/sample)	Concentration (mg/m3)
658447	97-0331	Chlordane	< 0.2	< 0.000340
		Lindane	< 0.2	< 0.000340
		Dursban	< 0.2	< 0.000340
		Parathion	< 0.2	< 0.000340
		Malathion	< 0.2	< 0.000340
		Dieldrin	< 0.2	< 0.000340
		Diazinon	< 0.2	< 0.000340
658448	97-0332	Chlordane	< 0.2	N/A
		Lindane	< 0.2	N/A
		Dursban	< 0.2	N/A
		Parathion	< 0.2	N/A
		Malathion	< 0.2	N/A
		Dieldrin	< 0.2	N/A
		Diazinon	< 0.2	N/A
658451	97-0338	Chlordane	0.843	0.00140
		Lindane	< 0.2	< 0.000332
		Dursban	< 0.2	< 0.000332
		Parathion	< 0.2	< 0.000332
		Malathion	< 0.2	< 0.000332
		Dieldrin	< 0.2	< 0.000332
		Diazinon	< 0.2	< 0.000332
658453	97-0335	Chlordane	0.221	0.000365
		Lindane	< 0.2	< 0.000330
		Dursban	< 0.2	< 0.000330
		Parathion	< 0.2	< 0.000330
		Malathion	< 0.2	< 0.000330
		Dieldrin	< 0.2	< 0.000330
		Diazinon	< 0.2	< 0.000330

WOHL Wisconsin Occupational Health Laboratory
979 Jonathon Drive
Madison, WI 53713-3248
Phone: (608) 263-6550
FAX: (608) 263-6551

Wisconsin State Laboratory of Hygiene
University of Wisconsin

Pesticide Analysis
August 1, 1997

Two OVS-2 tubes were submitted to the Wisconsin Occupational Health Lab (WOHL) for Chlordane, Lindane, Dursban, Parathion, Malathion, and Dieldrin analysis. The samples were extracted with toluene, and the toluene extract was analyzed using gas chromatography with electron capture detection (GC-ECD). Results are as follows:

WOHL #	Field #	Pesticide	Concentration (ug/sample)	Concentration (mg/m3)
652602	A979173	Lindane	< 0.2	< 0.0005
		Dursban	< 0.2	< 0.0005
		Parathion	< 0.2	< 0.0005
		Malathion	< 0.2	< 0.0005
		Dieldrin	< 0.2	< 0.0005
		Chlordane	< 0.5	< 0.001
652603	A979174	Lindane	< 0.2	
		Dursban	< 0.2	
		Parathion	< 0.2	
		Malathion	< 0.2	
		Dieldrin	< 0.2	
		Chlordane	< 0.5	

No quantifiable amounts of the above listed pesticides were present in the samples. The value to the right of the "<" sign is the minimum quantitation limit (MQL) for that pesticide based on the sample extraction volume and air volume sampled. Sample 652602 had trace amounts of Chlordane present at a level of 0.1 ug/sample. This concentration is below the MQL and should not be taken as reliable.

Mark Hodziak _____
(analyst)

Steve Strebel _____
(supervisor)