M00146.AR.005748
MCAS CHERRY POINT
5090.3a

FINAL SITE CLOSURE REQUEST REPORT SITE 491 WITH TRANSMITTAL MCAS CHERRY POINT NC

12/13/1999

CATLIN ENGINEERS AND SCIENTISTS

CATLIN LAW

ENVIRONMENTAL AND
ENGINEERING CONSULTANTS

WILMINGTON, N.C.
RALEIGH, N.C.

SITE CLOSURE REQUEST REPORT
SITE 491

FINAL

MARINE CORPS AIR STATION
CHERRY POINT, NORTH CAROLINA

December 13, 1999

CONTRACT No. N62470-95-D-6009
DELIVERY ORDER No. 0038
CATLIN Engineers and Scientists Project No. 98075

Prepared By:
CATLIN Engineers and Scientists
Wilmington, North Carolina
(910) 452-5861

CATLIN LAW

ENVIRONMENTAL AND
ENGINEERING CONSULTANTS

WILMINGTON, N.C.
RALEIGH, N.C.

December 13, 1999

Commander
NAVFACENGCOM
Attention: Mr. John G. Kresky, Code 18213
1510 Gilbert Street
Norfolk, Virginia 23511-6287

Re: **SITE CLOSURE REQUEST REPORT**
SITE 491
MCAS CHERRY POINT
CHERRY POINT, NORTH CAROLINA
CONTRACT NO. N62470-95-D-6009
DELIVERY ORDER NO. 0038
CATLIN Project No. 98075-M

Dear Mr. Kresky:

In accordance with Naval Facilities Engineering Command Order for Supplies and Services Contract No. N62470-95-6009, Delivery Order No. 0038, CATLIN Engineers and Scientists (CATLIN) is pleased to provide this Site Closure Request Report for Site 491 at Marine Corps Air Station (MCAS) Cherry Point. Our objective was to evaluate existing site data with respect to new Risk Based Corrective Action (RBCA) for Petroleum Underground Storage Tanks (USTs) rules. This report is intended to demonstrate that criteria for closure of the associated North Carolina Department of Water Quality (NCDWQ) incident file for this site have been satisfied.

Additional Risk Based Corrective Action (RBCA) soil sampling and analysis were conducted at the site under Delivery Order No. 0056. The results of this additional sampling and analysis were incorporated into this Site Closure Request Report.

We offer the following responses to comments on the Draft document:

Comment:

1. **Page 1, 1.0, 3rd Paragraph, 2nd Sentence - Although the site check did not reveal contaminated soil, the tanks closure report (at least my notes indicated the contamination was identified in the closure report) did identify soil contamination above the old 10, 40, 250 standard. This is why we collected the RBCA soil round. I tried to find the closure report...but couldn't locate the document. We need to include a statement about this contamination following the second sentence, so the DENR will understand why we collected the RBCA samples. Jeff Tyburski may be**

RICHARD CATLIN & ASSOC.
220 OLD DAIRY ROAD
P.O. BOX 10279
WILMINGTON, NC 28405-3755
(910) 452-5861

LAW ENVIRONMENTAL
3301 ATLANTIC AVENUE
P.O. BOX 18288
RALEIGH, NC 27619
(919) 876-0416

helpful in finding the closure report (or other documentation identifying the time and location the contamination was identified).

Report text modified as requested.

2. **Page 1, 1.0, 3rd paragraph, last sentence - Please identify the "Standards" ...2L? I think it may be to our advantage to include the groundwater analytical data in the report at the appropriate location.**

   Report text modified as requested.

3. **Page 2, 3.0, Source - Change tank size to 6,000 gallons.**

   Report text modified as requested.

4. **Page 3, 3.1, Summary...remedial activities - Please add a sentence that states the fact that no groundwater contaminants above the Standard (please state the standard) has been detected in previous groundwater sampling events. We may want to add a section of the report called Groundwater to make this statement prominent, instead of adding it to the above location.**

   A Groundwater Section was added and discussion was expanded.

5. **Page 3, 4.2 - Following the third sentence add a sentence which identified the fact of the soil contamination identified during the tank closure. Then we can say, something to the effect...That due to these detection's, and complete the paragraph beginning on Page 4.**

   Report text modified as requested.

6. **Page 9, 6.0, 2nd paragraph, 1st sentence - Following "site" remove the remainder of the sentence and add in its place: can be ranked as low risk.**

   Report text modified as requested.

7. **Page 9, 6.0, 2nd paragraph, 2nd sentence - Please change "closure" to: NFA.**

   Report text modified as requested.

This report is intended for the exclusive property of Atlantic Division Naval Facilities Engineering Command. The contents should not be relied upon by any other parties without the consent of Atlantic Division Naval Facilities Command. The findings are relevant to the dates of our site work and should not be relied upon to represent site conditions on other dates.

We appreciate the opportunity to provide environmental services on this project. If any questions arise, please contact us at (910) 452-5861.

Sincerely,

Teri M. Piver
Project Geologist

Gary McSmith, EIT
Project Manager

TMP/GM/kns
Enclosure
cc: John Myers, MCAS Cherry Point (w/encs.)
Christine Foskey, LANTNAVFACENGCOM, Code 02134 (letter only)

8075tp01.491

SITE CLOSURE REQUEST REPORT
SITE 491
MCAS CHERRY POINT
CHERRY POINT, NORTH CAROLINA

DECEMBER 13, 1999

Contract No. N62470-95-D-6009
Delivery Order No. 0038
CATLIN Engineers and Scientists Project No. 98075

NORTH CAROLINA
LICENSED
SEAL
1466
GEOLOGIST
TERESA M. PAVIA

Teresa M. Pavia 12/17/99

Prepared by:

CATLIN Engineers and Scientists
220 Old Dairy Road
P.O. Box 10279
Wilmington, North Carolina 28404-0279
(910) 452-5861

TABLE OF CONTENTS

1.0 PURPOSE AND INTRODUCTION 1

2.0 CURRENT SITE REGULATORY STATUS 2

3.0 SITE CHARACTERIZATION 2
- *3.1 Background Information* 2
- *3.2 List of Previous Environmental Reports* 3

4.0 SECONDARY CONTAMINANT SOURCES 3
- *4.1 Free Product* 3
- *4.2 Vadose Zone Soil* 4

5.0 GROUND WATER 5

6.0 RISK CHARACTERIZATION 7
- *6.1 Part I - Ground Water, Surface Water, and Subsurface Vapor Migration Impacts* 7
- *6.2 Part II - Current Land Use* 10

7.0 EVALUATION AND CONCLUSIONS 12

TABLES

TABLE 1 LIST OF PREVIOUS ENVIRONMENTAL REPORTS
TABLE 2 SUMMARY OF LABORATORY RESULTS - SOIL
TABLE 3 SUMMARY OF HISTORICAL LABORATORY ANALYTICAL RESULTS - GROUND WATER

FIGURES

FIGURE 1.1 AIR STATION (MCAS), AUXILIARY LANDING (MCALF), AND OUTLYING LANDING (MCOLF) FIELD LOCATIONS
FIGURE 1.2 MCAS CHERRY POINT SITE 491 LOCATION
FIGURE 1.3 MCAS CHERRY POINT SITE 491 PLAN

APPENDIX

APPENDIX A LABORATORY REPORT AND CHAIN-OF-CUSTODY DOCUMENTATION

SITE CLOSURE REQUEST REPORT - SITE 491
MARINE CORPS AIR STATION
CHERRY POINT, NORTH CAROLINA

CONTRACT NO. N62470-95-D-6009
DELIVERY ORDER NO. 0038
CATLIN PROJECT NO. 98075-M

DECEMBER 13, 1999

1.0 PURPOSE AND INTRODUCTION

(Refer to Figures 1.1 through 1.3)

In accordance with Naval Facilities Engineering Command Order for Supplies and Services Contract No. N62470-95-6009, Delivery Order No. 0038, CATLIN Engineers and Scientists (CATLIN) prepared this draft site closure request report for Site 491 at Marine Corps Air Station (MCAS) Cherry Point. Additional Risk-Based Corrective Action (RBCA) soil sampling and analysis were conducted at the site under Delivery Order No. 0056. The results of that Limited Site Assessment were incorporated into the Site Closure Request Report. The objective of this report is to evaluate existing site data with respect to new RBCA for Petroleum Underground Storage Tanks (USTs) rules. This report demonstrates that criteria for closure of the associated North Carolina Department of Water Quality (NCDWQ) incident file for this site have been satisfied.

The site designated as Building 491 is located at MCAS in Cherry Point, North Carolina (Figures 1.1 through 1.3). Tank 491 was formerly located adjacent to the northwestern corner of Building 491 which is also referred to as the Officers Club. The 6,000 gallon capacity tank was installed in 1947 and was utilized to store No. 2 fuel oil. Tightness tests on the tank on December 18, 1991 indicated that the UST failed the tightness requirements. The tank was temporarily closed until its removal on August 10, 1994.

No soil contamination in excess of the existing standards was discovered during the initial site check in 1992. However, during tank closure activities, soil contamination was detected above the existing standards for Total Petroleum Hydrocarbon (TPH) by EPA Methods 5030/3550. For this reason, additional sampling was performed in May 1999 to determine if soil contamination was present in excess of the 1998 Residential or Commercial/Industrial Risk-Based Corrective Action Maximum Soil Contaminant Concentration (MSCC) cleanup levels.

Ground water was sampled and analyzed during the initial site check and during 10 subsequent quarterly monitoring events that occurred between March 1994 and January 1998. There was no occurrence of any target compound exceeding the North Carolina Groundwater Quality Standards as defined in North Carolina Administrative Code (NCAC) Title 15A, Subchapter 2L, Section .0200, except for 2.38 ug/l benzo(a)anthracene detected in 58GW05 in August 1995. However, because Site 491 is classified as "low" risk, the Gross Contamination Level (GCL) of 22 ug/l benzo(a)anthracene is the applicable standard for this site.

2.0 CURRENT SITE REGULATORY STATUS

Title 15A of the North Carolina Administrative Code, Subchapter 2L, Section .0115, subsection h [15A NCAC 2L .0115 (h)] for RBCA rules for petroleum USTs contained in 15A NCAC 2L .0115 became effective on January 2, 1998. Releases reported prior to January 2, 1998 that were previously designated as Class A or B were automatically reclassified as High Risk according to 15A NCAC 2L .0115(r). Discharges or releases that were previously designated as Class C, D or E were automatically reclassified as a Low Risk by the same rule.

Current RBCA rules and guidelines state that a Soil Contamination Report (SCR) must be submitted to the NCDWQ for Low Risk sites where the release occurred prior to January 2, 1998 ("old release sites") and where a Comprehensive Site Assessment (CSA) or Corrective Action Plan (CAP) were not prepared or submitted to the State (15A NCAC 2L .0115(c) (3)). The SCR must provide information sufficient to show that remaining unsaturated soil does not contain contaminant levels which exceed either the "Soil-to-Groundwater" or the Industrial/Commercial Maximum Soil Contaminant Concentrations established by 15A NCAC 2L .115(m). An abbreviated SCR is contained in Section 4.2 of this document.

3.0 SITE CHARACTERIZATION

3.1 Background Information

Incident Number: 12516

Previous Site Ranking: E

Contaminant Type: No. 2 Fuel Oil

Source (tank, piping include size):

A 6,000-gallon steel tank with underground distribution lines was removed from the site in 1994.

Quantity released: Unknown

Date of release discovery: 1992

Cause of release: Unknown

Summary of initial abatement/remedial actions:

The tank was taken out of service in 1992 and was removed in 1994. The tank closure report stated that the tank had a 6,000-gallon capacity. No additional abatement actions have been performed.

Summary of assessment and additional remedial activities:

A site check assessment was conducted in April 1992 that included the installation of three Type II monitoring wells around the temporarily closed UST system. The tank was removed in August 1994. A total of nine quarterly ground water sampling events were conducted at the site between 1994 and 1996.

3.2 List of Previous Environmental Reports

Table 1

List of Previous Environmental Reports

No.	Report Title	Date	Author
1	Underground Storage Tank (UST) Site Check Investigation Report, UST 491	8/5/92	ATEC
2	Tank Closure Report, UST 491	11/94	Sub-Tech, Inc.
3	Quarterly Sampling Report, Tank 491	3/29/94	Law Engineering
4	Second Quarterly Sampling Report, Tank 491	6/28/94	Law Engineering
5	Third Quarterly Sampling Report, Tank 491	11/23/94	Law Engineering
6	Fourth Quarterly Sampling Report, Tank 491	2/14/95	Law Engineering
7	Fifth Quarterly Sampling Event, Tank 491	7/6/95	Law Engineering
8	Sixth Quarterly Sampling Event, Tank 491	9/18/95	Law Engineering
9	Seventh Quarterly Sampling Event, Tank 491	4/1/96	Law Engineering
10	Eighth Quarterly Sampling Event, Tank 491	6/21/96	Law Engineering
11	Ninth Quarterly Sampling Event, Building 491	10/18/96	Law Engineering
12	Periodic Monitoring Report	11/13/98	CATLIN

4.0 SECONDARY CONTAMINANT SOURCES

Corrective Action rules require the removal of secondary contaminant sources as defined under 15 NCAC 2L .0106 (f)(4). Secondary contaminant sources include the presence of free phase petroleum (free product) and/or the presence of soil contamination in excess of regulatory requirements. The following information documents the absence of secondary contaminant sources at the site.

4.1 Free Product

Free product was not detected at the project site during the site check and/or subsequent monitoring events (Reports 1 and 11, Section 2.4 and Appendix A, Page 5 and Appendix A, respectively).

4.2 *Vadose Zone Soil*

Results of soil sampling revealed the absence of Total Petroleum Hydrocarbons (TPH) (<1.0 milligrams per kilogram) per EPA Method 8015 (California modified) (Report #1, Section 2.2, Pages 3 and 8). This concentration is below the DWQ 1997 guideline Action Levels. However, during tank closure activities in August 1994, Sub-Tech, Inc. indicated the presence of TPH 5030/3550 contaminants. Soil samples 491-TPE and 491-TPW, taken at the bottom of the tank excavation, contained soil contamination ranging from <0.45 ppm to <54.0 ppm per EPA Method 5030, and 338 ppm to 546 ppm per EPA Method 3550.

Subsequently, additional sampling was performed to confirm that no soil contamination is present at this site in excess of Residential or Commercial/Industrial RBCA MSCC cleanup levels. Three borings were advanced to the approximate depth of the ground water table using a hand auger. Soils were visually inspected for evidence of contamination and were screened in the field using the headspace method. The soil samples from each boring which indicated the highest concentration of contamination were submitted for laboratory analysis and analyzed for Volatile Organic Compounds (VOCs) per EPA Method 8260, Base/Neutral and Acid Extractables (BNA) per EPA Method 8270, and Massachusetts Department of Environmental Protection (MADEP) Extractable Petroleum Hydrocarbons (EPHs) and Volatile Petroleum Hydrocarbons (VPHs).

Three borings (58SB01, 58SB02, and 58SB03) were installed at the site (see Figure 1.3). Laboratory results are summarized in the following table. See Appendix A for laboratory test results and chain-of-custody documentation.

Table 2

Summary of Laboratory Results - Soil
EPA Methods 8260 and 8270 and MADEP EPH and VPH

Tank 491
MCAS Cherry Point, North Carolina

Contaminant Identified	Residential MSCC[3] (mg/kg)	Industrial/ Commercial[3] MSCC (mg/kg)	58SB01 (10'-12') (mg/kg)	58SB02 (10'-12') (mg/kg)	58SB03 (10'-12') (mg/kg)
EPA Method 8260			NCD	NCD	NCD
EPA Method 8270					
Dibenzofuran	62.6	1,635	ND	ND	0.1295
Fluorene	620	16,400	ND	ND	0.1648
C5-C8 (VPH)	939	24,528	ND	ND	ND
C9-C18 (VPH/EPH)[1]	9,386	245,280	ND	ND	ND
C9-C22 (VPH/EPH)[2]	469	12,264	ND	ND	ND

Table 2 Summary of Laboratory Results - Soil EPA Methods 8260 and 8270 and MADEP EPH and VPH Tank 491 MCAS Cherry Point, North Carolina					
Contaminant Identified	**Residential MSCC[3] (mg/kg)**	**Industrial/ Commercial[3] MSCC (mg/kg)**	**58SB01 (10'-12') (mg/kg)**	**58SB02 (10'-12') (mg/kg)**	**58SB03 (10'-12') (mg/kg)**
C19-C36 (EPH)	93,860	None (Immobile)	ND	ND	ND

ND = Not detected at or above laboratory method detection limit.
NCD = No constituents detected for this method at or above laboratory method detection limits.
MSCC = Maximum Soil Contaminant Concentration
(1) = In accordance with NCDENR memo dated March 26, 1998 C9-C18 = (C9-C12 + C9-C18)
(2) = In accordance with NCDENR memo dated March 26, 1998 C9-C22 = (C9-C10 + C11-C22)
(3) = In accordance with NCDENR memo dated October 20, 1999

Volatile Organic Compounds, EPHs, and VPHs were not detected in the soil samples analyzed. Base/Neutral and Acid Extractables were identified in the soil sample analyzed from boring 58SB03. However, the concentrations detected are below respective Residential and Commercial/Industrial MSCCs as listed in Table 4 of Section 7.3 Risk Based Soil Cleanup Requirements of 15A NCAC 2L.0115 "The Risk Based Corrective Action Rule," effective January 2, 1998.

5.0 GROUND WATER

Ground water was sampled and analyzed during the initial site check and during 10 subsequent quarterly monitoring events. Table 3 contains a summary of historical laboratory analytical results. Benzo(a)anthracene at 2.38 ug/l exceeded the NCAC 15A:02L Standard in well 58GW05 when it was sampled in August 1995. However, this did not exceed the GCL of 22 ug/l that is applicable for this low risk site. Furthermore, benzo(a)anthracene was not detected in this or any other well on the site for four consecutive monitoring events thereafter. No other constituent exceeded the GCLs nor even the more stringent NCAC Groundwater Quality Standards at any time at Site 491.

TABLE 3

SITE 491
SUMMARY OF HISTORICAL LABORATORY ANALYTICAL RESULTS - GROUND WATER (UG/L)

Well Analytical Method Detected Compound	Initial Analytical Results 5/5/92	1st Quarter 3/16/94	2nd Quarter 6/10/94	3rd Quarter 10/26/94	4th Quarter 1/18/95	5th Quarter 6/5/95	6th Quarter 8/16/95	7th Quarter 3/6/96	8th Quarter 6/4/96	9th Quarter 9/17/96	10th Quarter 1/13/98	GCL (ug/l)	2L (ug/l)
58GW01													
EPA Method 602	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA	--	--
EPA Method 610	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA	--	--
58GW02													
EPA Method 602	ND	NA	ND	ND	ND	ND	ND	ND	ND	ND*	ND	--	--
Total Xylenes	ND	NA	ND	ND	ND	ND	ND	ND	ND	0.63	ND	87,500	530
EPA Method 610	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND*	ND	--	--
2-Methylnaphthalene	NA	ND	ND	ND	ND	ND	ND	ND	ND	0.80	ND	12,500	28
58GW03													
EPA Method 602	ND	NA	ND	NA	NA	NA	NA	NA	NA	NA	NA	--	--
EPA Method 610	NA	ND*	ND	NA	NA	NA	NA	NA	NA	NA	NA	--	--
Acenaphthene	NA	3.5	ND	NA	NA	NA	NA	NA	NA	NA	NA	2,120	80
Fluorene	NA	2.4	ND	NA	NA	NA	NA	NA	NA	NA	NA	950	280
1-Methylnaphthalene	NA	7.7	ND	NA	NA	NA	NA	NA	NA	NA	NA	--**	--**
2-Methylnaphthalene	NA	7.3	ND	NA	NA	NA	NA	NA	NA	NA	NA	12,500	28
Naphthalene	NA	3.0	ND	NA	NA	NA	NA	NA	NA	NA	NA	15,500	21
58GW04													
EPA Method 602	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND*	ND	--	--
Toluene	NA	NA	NA	NA	NA	NA	ND	ND	ND	0.79	ND	257,500-	1,000
EPA Method 610	NA	NA	NA	NA	NA	NA	ND	ND*	ND*	ND*	ND	-	--
Anthracene	NA	NA	NA	NA	NA	NA	ND	1.73	1.59	1.78	ND	645	2,100
58GW05													
EPA Method 602	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND*	ND	--	--
Benzene	NA	NA	NA	NA	NA	NA	ND	ND	ND	0.56	ND	5,000	1
EPA Method 610	NA	NA	NA	NA	NA	NA	ND*	ND*	ND*	ND	ND	--	--
Acenaphthene	NA	NA	NA	NA	NA	NA	1.09	0.69	0.94	ND	ND	2,120	80
Benzo(a)anthracene	NA	NA	NA	NA	NA	NA	2.38***	ND	ND	ND	ND	22	0.05
Fluoranthene	NA	NA	NA	NA	NA	NA	0.80	ND	ND	ND	ND	280	280
Fluorene	NA	NA	NA	NA	NA	NA	0.789	0.4	0.56	ND	ND	950	280
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	1.16	ND	ND	ND	ND	12,500	28

2L = NCAC Title 15A, Subchapter 2L Groundwater Quality Standards (includes Interim Groundwater Standards) as stated in NCDENR memo dated October 20, 1999.
GCL = Gross Contamination Levels as stated in NCDENR memo dated October 20, 1999.
ND = Not Detected
NA = Not Analyzed
* No EPA Method compounds detected except those shown.
** There is no Interim Groundwater Quality Standard or Gross Contamination Level for 1-methylnaphthalene.
*** Exceeded 2L but did not exceed GCL which is the cleanup level that applies to this "Low" risk site.

6.0 RISK CHARACTERIZATION

Risk characterization must be performed to demonstrate that the site meets the requirements for Low Risk classification prior to Site Closure. The following information has been provided to support a Low Risk classification for the site.

6.1 Part I – Ground Water, Surface Water and Subsurface Vapor Migration Impacts

1) Has the discharge or release contaminated any water supply well including any used for non-drinking purposes? If yes, explain.

No. Results from the Ninth Quarterly Sampling Report, which summarizes the finding of the previous sampling events, suggest that ground water contamination is limited to the general area of Building 491. Based on the Wellhead Protection Program map (which shows all Base supply wells) provided by MCAS Cherry Point, no water supply wells are located within the Building 491 area.

2) Is a water supply well used for drinking water located within 1000 feet of the source area of the discharge or release?

No. Based on the Wellhead Protection Program map provided by MCAS Cherry Point, the nearest drinking water well is located approximately 3,500 feet southwest of the site along Roosevelt Boulevard.

3) Is a water supply well used for any purpose (e.g. irrigation, washing cars, industrial cooling water, filling swimming pools) located within 250 feet of the source area of the release or discharge?

No. Based on the Wellhead Protection Program map provided by MCAS Cherry Point, the nearest supply well is located approximately 3,500 feet southwest of the site along Roosevelt Boulevard.

4) *Does ground water within 500 feet of the source area of the discharge or the release have the potential for future use in that there is no other source of water supply other than ground water? Explain.*

No. *There are an adequate number of locations for additional water supply wells to be installed on other portions of the Base.*

5) *Do vapors from the discharge or release pose a threat of explosion because of accumulation of the vapors in a confined space or pose any other serious threat to public health, public safety, or the environment? If yes, explain.*

No. Review of previous environmental reports does not provide evidence to suggest the potential threat of explosion because of accumulation of the vapors in a confined space or pose any other serious threat to public health, public safety, or the environment.

6) *Are there any other factors that would cause the discharge or release to pose an imminent danger to public health, public safety, or the environment? If yes, explain.*

No. Review of previous environmental reports does not provide evidence to suggest other factors that would cause the discharge or release to pose an imminent danger to public health, public safety, or the environment.

7) *Is a surface water body located within 500 feet of the source area of the discharge or release? If yes, does the maximum ground water contaminant concentration exceed the surface water quality standards and criteria found in 15A NCAC 2B .0200 by a factor of 10?*

Yes. The Neuse River (SA waters) is located within 500 feet of the source area. However, during the last quarterly monitoring report (11/13/98), maximum ground water contaminant concentration did not exceed the surface water quality standards and criteria found in 15A NCAC 2B .0200 by a factor of 10

8) *Is the source area of the discharge or release located within a designated wellhead protection area as defined in 42 USC 300h-7(e)? If yes, explain.*

No. Wellhead protection areas defined by 42 USC 300h-7(e) have not, as of this time, been designated by the State. However, MCAS Cherry Point has identified proposed wellhead protection areas on the Base. The site is not located in a proposed wellhead protection area.

9) *Is the discharge or release located in the Coastal Plain physiographic region as designated on a map entitled "Geology of North Carolina" published by the Department in 1985? If yes, is the source area of the discharge or release located in an area in which there is a recharge to an unconfined or semi-confined deeper aquifer that is being used or may be used as a source of drinking water? If yes, explain.*

Yes. The site is located in the Coastal Plain physiographic region. While there is likely recharge to the unconfined surficial aquifer at the Base, this aquifer is not used for water supply. Deeper aquifers may obtain a portion of recharge from the surficial aquifer at the Base; however, the amount of recharge provided by the surficial aquifer is expected to be substantially limited due to the presence of confining units.

Additionally, dissolved petroleum constituents were not detected at concentrations above North Carolina Groundwater Quality Standards in samples obtained from wells screened at the base of the surficial aquifer at this site. These conditions imply that the shallow ground water contamination detected at this site does not pose a substantial risk to the quality of ground water in deeper aquifers.

10) *Do the levels of ground water contamination for any contaminant exceed the GCLs established (see Table 7) in the Groundwater Section Guidelines for the Investigation and Remediation of Soil and Groundwater, Volume II, dated January 2, 1998 by the Department?*

No. A review of previous environmental reports does not identify the presence of compounds in excess of the gross contaminant levels.

11) Is free product present on the ground water at the site?

No. A review of previous environmental reports does not indicate that free product has been detected at the site.

6.2 Part II – Current Land Use

1) Does the property contain one or more primary or secondary residences (permanent or temporary)? Explain.

No. The property is located in the recreation area of the Base, where residences are not located.

2) Does the property contain a school, daycare center, hospital, playground, park, recreation area, church, nursing home, or other place of public assembly? Explain.

No. Besides its use as an Officer's Club, the site does not include a school, daycare center, hospital, playground, park, recreation area, church, nursing home, or other place of public assembly. A golf course is located across the street. However, the UST site is not associated with any area of public assembly.

3) Does the property contain a commercial (e.g., retail, warehouse, office/business space, etc.) or industrial (e.g., manufacturing, utilities, industrial research and development, chemical/petroleum bulk storage, etc.) enterprise, an inactive commercial or industrial enterprise, or is the land undeveloped? Explain.

No. The site has been developed for an Officer's Club.

4) Do children visit the property? Explain

No. The site is an Officer's Club that is only occupied by adults who are visiting the Base.

5) *Is access to the property reliably restricted consistent with its use (e.g., fences, security personnel or both)? Explain.*

Yes. The site is located within a secured area related to Base recreation operations. Unauthorized personnel are not permitted in the area.

6) *Do pavement, buildings, or other structures cap the contaminated soil? If yes, explain what mechanisms are in place or can be put into place to ensure that the contaminated soil will remain capped in the foreseeable future.*

No. The site is covered with grass.

7) *What is the zoning status of the property?*

Marine Corps Air Station, Cherry Point is not subject to local or county zoning requirements. However, the site has been developed for Officer's Club's use.

8) *Is the use of the property likely to change in the next 20 years? Explain*

No. The designated use of the facility on the Base is not likely to change in the foreseeable future.

9) *What is the distance from the source area of the release to the nearest primary or secondary residence (permanent or temporary)?*

Building 491 is located in an area where there are no residences located within 1,500 feet.

10) *What is the distance from the source area of the release to the nearest school, daycare center, hospital, playground, park, recreation area, church, nursing home or other place of public assembly?*

A recreational golf club is located in the vicinity of the Officer's Club.

11) What is the zoning status of properties in the surrounding area?

Marine Corps Air Station, Cherry Point is not subject to local or county zoning requirements. However, the surrounding area has been developed for the Officer's Club.

12) Briefly characterize the use and activities of the land in the surrounding area.

The surrounding area is predominantly recreational with a golf course and boat deck.

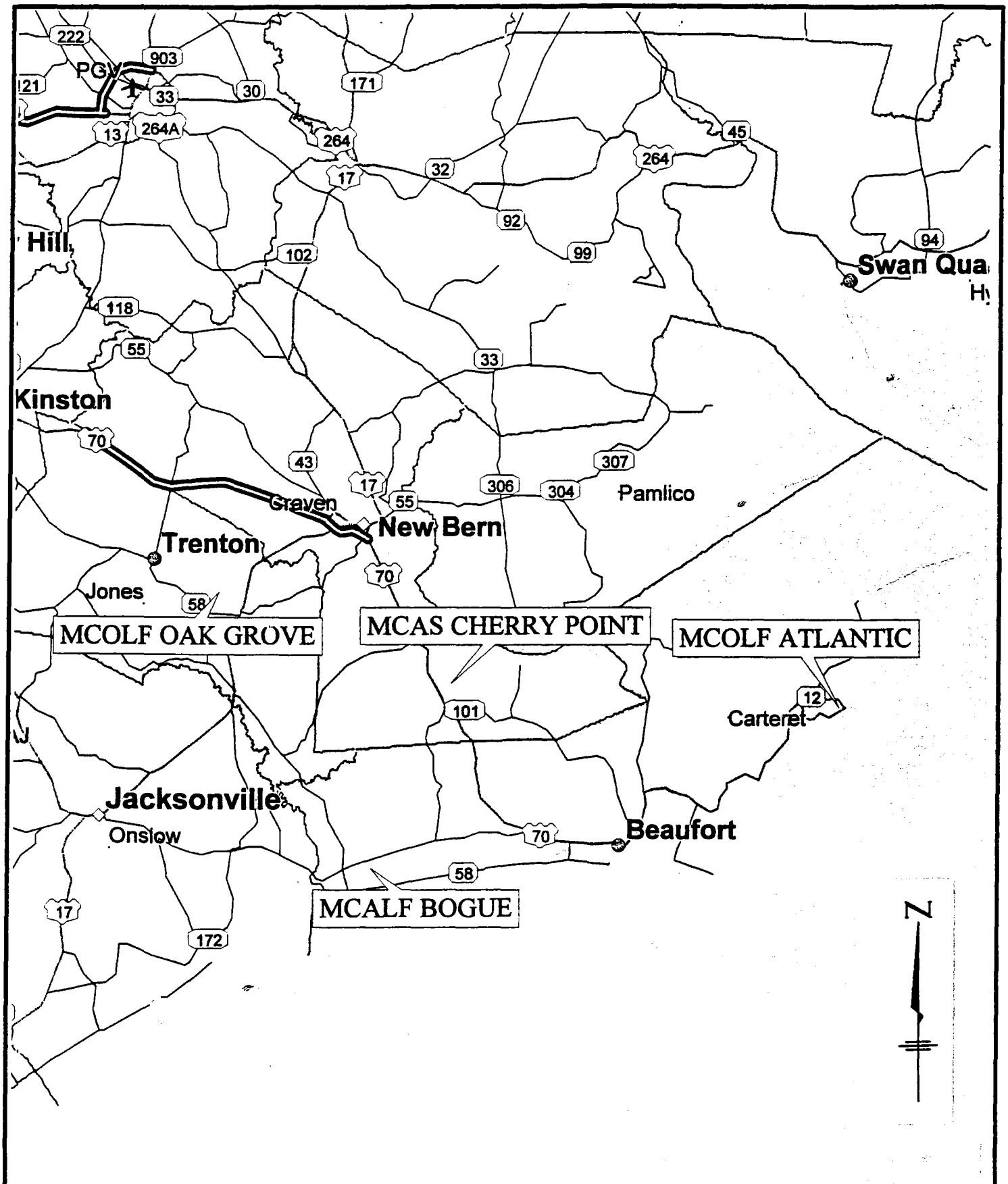
7.0 EVALUATIONS AND CONCLUSIONS

Site 491 meets the criteria for a "Low" risk site as defined by NCAC 15A 2L .0115(d). Therefore, the GCLs are applicable Action Levels for ground water. Results of the site check in 1992 and 10 subsequent quarterly monitoring events did not detect any contaminants in excess of the GCLs.

Soils were sampled and analyzed in accordance with Risk-Based Corrective Action criteria in May 1999. All samples were determined by laboratory analysis to be below their respective Residential and Commercial/Industrial MSCCs.

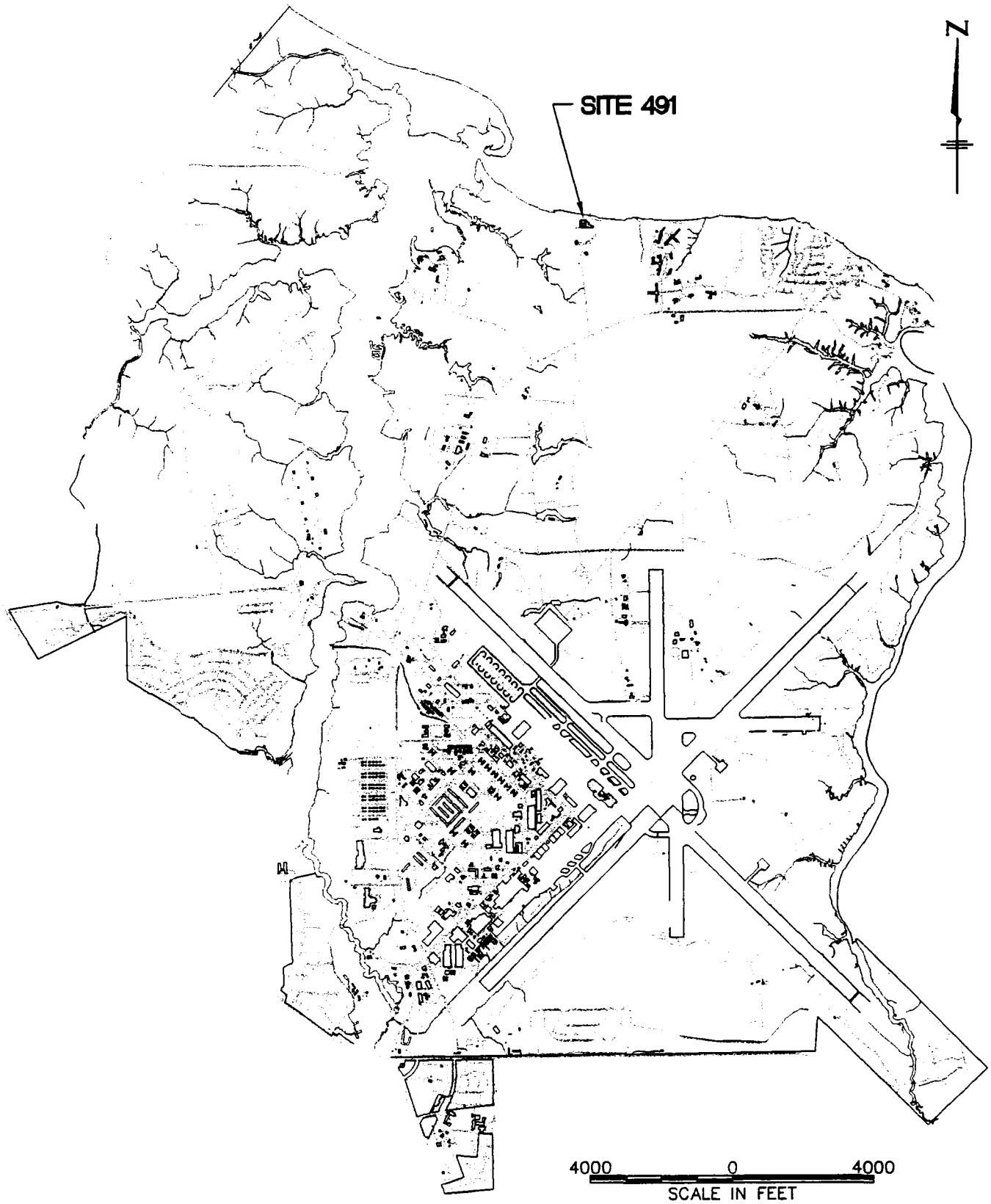
The site is low risk; ground water contamination levels are below GCLs; and soil contamination levels are below Residential and Commercial/Industrial MSCCs. Therefore, CATLIN recommends that Site 491 be considered for "No Further Action" by the North Carolina Division of Solid Waste, UST Section.

FIGURES



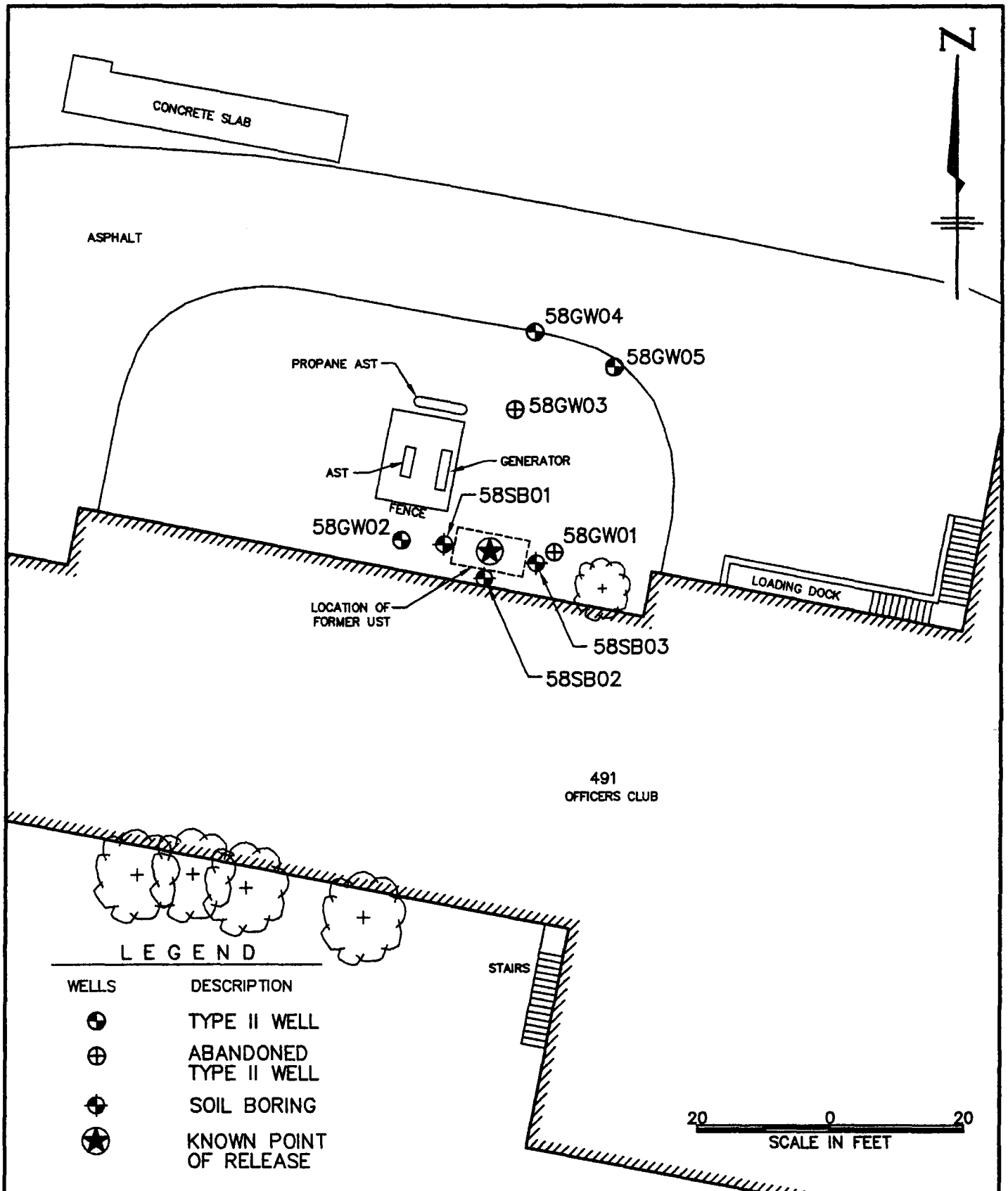
CATLIN ENGINEERS and SCIENTISTS, WILMINGTON, NORTH CAROLINA	PROJECT: MCAS CHERRY POINT UST LONG TERM MONITORING PROGRAM	TITLE: AIR STATION (MCAS), AUXILIARY LANDING (MCALF) AND OUTLYING LANDING (MCOLF) FIELD LOCATIONS			FIGURE 1.1
	JOB NO: 97090	DATE: APR 98	SCALE: 1"=11 Miles	DRAWN BY: DME	CHECKED BY: TMP

7090FG11.DWG



CATLIN ENGINEERS and SCIENTISTS, WILMINGTON, NORTH CAROLINA	PROJECT: MCAS CHERRY POINT PERIODIC MONITORING REPORT		TITLE: MCAS CHERRY POINT SITE 491 LOCATION CHERRY POINT, N.C.			FIGURE 1.2
	JOB NO: 98075	DATE: JAN 99	SCALE: 1"=4000'	DRAWN BY: JCR	CHECKED BY: TMP	

491F12.DWG



0491TC.DWG

NOTE: SITE FACILITY MAP FURNISHED BY CHERRY POINT FACILITIES ENGINEERING OFFICE.

CATLIN ENGINEERS and SCIENTISTS, WILMINGTON, NORTH CAROLINA	PROJECT: MCAS CHERRY POINT UST LONG TERM MONITORING PROGRAM		TITLE: MCAS CHERRY POINT SITE 491 PLAN CHERRY POINT, N.C.			FIGURE 1.3
	JOB NO: 98075	DATE: NOV 99	SCALE: 1"=20'	DRAWN BY: JCR	CHECKED BY: GDM	

APPENDIX A

LABORATORY REPORTS AND CHAIN-OF-CUSTODY DOCUMENTATION

GeoChem, Incorporated

Environmental Laboratories

Certified Analytical Laboratory

NC # 37745 ,NC # 336, NC # 461, EPA ID # 155

'ient Project Manager
ff Tyburski
Site Name:
'740-6-0600
-)1

Law Engineering
3301 Atlantic Avenue
Raleigh NC
27604

Report Date
Wednesday, May 19, 1999
PO #
Date Received in lab:
Monday, May 10, 1999

GCI Project #: 9905-018

Summary of requested analytical work

Sample type code #s :	*1 = solid samples;*	*2 = liquid samples;*	*3 = Air samples;*	*4 = sludges/unknowns*
Field Number: 585B01	*Lab ID* 1221	*Sample Type:* 1	*Date Analyzed:* 5/14/99	*for 8260 soil*
Date Sampled 5/6/99			*Proper Preservation*	Yes
Field Number: 585B01	*Lab ID* 1221	*Sample Type:* 1	*Date Analyzed:* 5/17/99	*for 8270 BNA soil*
Date Sampled 5/6/99			*Proper Preservation*	Yes
Field Number: 585B01	*Lab ID* 1221	*Sample Type:* 1	*Date Analyzed:* 5/18/99	*for EPH soil*
Date Sampled 5/6/99			*Proper Preservation*	Yes
Field Number: 585B01	*Lab ID* 1221	*Sample Type:* 1	*Date Analyzed:* 5/10/99	*for VPH soil*
Date Sampled 5/6/99			*Proper Preservation*	Yes
Field Number: 585B02	*Lab ID* 1222	*Sample Type:* 1	*Date Analyzed:* 5/14/99	*for 8260 soil*
Date Sampled 5/6/99			*Proper Preservation*	Yes
Field Number: 585B02	*Lab ID* 1222	*Sample Type:* 1	*Date Analyzed:* 5/13/99	*for 8270 BNA soil*
Date Sampled 5/6/99			*Proper Preservation*	Yes
Field Number: 585B02	*Lab ID* 1222	*Sample Type:* 1	*Date Analyzed:* 5/14/99	*for EPH soil*
Date Sampled 5/6/99			*Proper Preservation*	Yes
Field Number: 585B02	*Lab ID* 1222	*Sample Type:* 1	*Date Analyzed:* 5/10/99	*for VPH soil*
Date Sampled 5/6/99			*Proper Preservation*	Yes
Field Number: 858B03	*Lab ID* 1223	*Sample Type:* 1	*Date Analyzed:* 5/14/99	*for 8260 soil*
Date Sampled 5/6/99			*Proper Preservation*	Yes

Here by certify that I have Reviewed and approve this data set

2500 Gate Way Centre Blvd., Suite 300 • Morrisville, NC 27560
Telephone: 919-460-8093 • FAX: 919-460-0167

GeoChem, Incorporated

Environmental Laboratories

Certified Analytical Laboratory

NC # 37745 ,NC # 336, NC # 461, EPA ID # 155

'ient Project Manager
..ff Tyburski
Site Name:
)740-6-0600
491

Law Engineering
3301 Atlantic Avenue
Raleigh NC
27604

Report Date
Wednesday, May 19, 1999
PO #
Date Received in lab:
Monday, May 10, 1999

GCI Project #: 9905-018

Summary of requested analytical work

Sample type code #s :	*1 = solid samples;*	*2 = liquid samples;*	*3 = Air samples;*	*4 = sludges/unknowns*
Field Number: 858B03	*Lab ID* 1223	*Sample Type:* 1	*Date Analyzed:* 5/17/99	*for 8270 BNA soil*
Date Sampled 5/6/99			*Proper Preservation*	Yes
Field Number: 858B03	*Lab ID* 1223	*Sample Type:* 1	*Date Analyzed:* 5/14/99	*for EPH soil*
Date Sampled 5/6/99			*Proper Preservation*	Yes
Field Number: 858B03	*Lab ID* 1223	*Sample Type:* 1	*Date Analyzed:* 5/12/99	*for VPH soil*
Date Sampled 5/6/99			*Proper Preservation*	Yes

Here by certify that I have Reviewed and approve this data set

2500 Gate Way Centre Blvd., Suite 300 • Morrisville, NC 27560
Telephone: 919-460-8093 • FAX: 919-460-0167

GeoChem Incorporated Certified Analytical Laboratory

te Name:
10-6-0600

NC # 37745 , NC # 336, EPA ID # 155
Wednesday, May 19, 1999

GCI Project # 9905-018

Field ID **585B01** *Date Analyzed: 5/14/99* Dry wt % 80.7

Lab ID 1221

8260 soil

	Conc. in ug/kg	*lowest detection on sample* PQL in ug/kg	Dilution Factor
MTBE	BDL	5.1	1.0
IPE	BDL	5.1	1.0
n-Butylbenzene	BDL	5.1	1.0
Dichlorodifluoromethane	BDL	10.1	1.0
Chloromethane	BDL	10.1	1.0
Vinyl Chloride	BDL	5.1	1.0
Bromomethane	BDL	10.1	1.0
Chloroethane	BDL	10.1	1.0
Trichlorofluoromethane	BDL	10.1	1.0
Acrolein	BDL	101.0	1.0
Acetone	BDL	50.5	1.0
1,1-Dichloroethene	BDL	5.1	1.0
Iodomethane	BDL	5.1	1.0
Carbon Disulfide	BDL	5.1	1.0
Methylene Chloride	BDL	5.1	1.0
Acrylonitrile	BDL	5.1	1.0
trans-1,2-Dichloroethene	BDL	5.1	1.0
1,1-Dichloroethane	BDL	5.1	1.0
Vinyl Acetate	BDL	10.1	1.0
2,2-Dichloropropane	BDL	5.1	1.0
cis-1,2-Dichloroethene	BDL	5.1	1.0
2-Butanone	BDL	50.5	1.0
Bromochloromethane	BDL	5.1	1.0
Chloroform	BDL	5.1	1.0
1,1,1-Trichloroethane	BDL	5.1	1.0
1,1-Dichloropropene	BDL	5.1	1.0
Carbon Tetrachloride	BDL	5.1	1.0
Benzene	BDL	5.1	1.0
1,2-Dichloroethane	BDL	5.1	1.0
Trichloroethene	BDL	5.1	1.0
1,2-Dichloropropane	BDL	5.1	1.0
Dibromomethane	BDL	5.1	1.0
Bromodichloromethane	BDL	5.1	1.0
2-Chloroethylvinylether	BDL	10.1	1.0
cis-1,3-Dichloropropene	BDL	5.1	1.0
4-Methyl-2-pentanone	BDL	50.5	1.0
Toluene	BDL	5.1	1.0
trans-1,3-Dichloropropene	BDL	5.1	1.0
1,1,2-Trichloroethane	BDL	5.1	1.0
Ethylmethacrylate	BDL	5.1	1.0
Tetrachloroethene	BDL	5.1	1.0

GeoChem Incorporated Certified Analytical Laboratory

Name:
'0-6-0600

NC # 37745 , NC # 336, EPA ID # 155
Wednesday, May 19, 1999

GCI Project # 9905-018

	Conc. in ug/kg	lowest detection on sample PQL in ug/kg	Dilution Factor
1,3-Dichloropropane	BDL	5.1	1.0
2-Hexanone	BDL	50.5	1.0
Chlorodibromomethane	BDL	5.1	1.0
1,2-Dibromoethane	BDL	5.1	1.0
Chlorobenzene	BDL	5.1	1.0
1,1,1,2-Tetrachloroethane	BDL	5.1	1.0
Ethylbenzene	BDL	5.1	1.0
m,p-Xylene	BDL	5.1	1.0
o-Xylene	BDL	5.1	1.0
Styrene	BDL	5.1	1.0
Bromoform	BDL	5.1	1.0
Isopropylbenzene	BDL	5.1	1.0
Bromobenzene	BDL	5.1	1.0
1,2,3-Trichloropropane	BDL	10.1	1.0
1,1,2,2-Tetrachloroethane	BDL	5.1	1.0
n-Propylbenzene	BDL	5.1	1.0
2-Chlorotoluene	BDL	5.1	1.0
1,4-Dichloro-2-butene	BDL	10.1	1.0
4-Chlorotoluene	BDL	5.1	1.0
1,3,5-Trimethylbenzene	BDL	5.1	1.0
tert-Butylbenzene	BDL	5.1	1.0
1,2,4-Trimethylbenzene	BDL	5.1	1.0
sec-Butylbenzene	BDL	5.1	1.0
1,3-Dichlorobenzene	BDL	5.1	1.0
1,4-Dichlorobenzene	BDL	5.1	1.0
4-Isopropyltoluene	BDL	5.1	1.0
1,2-Dichlorobenzene	BDL	5.1	1.0
1,2-Dibromo-3-chloropropan	BDL	5.1	1.0
1,2,4-Trichlorobenzene	BDL	5.1	1.0
Naphthalene	BDL	5.1	1.0
Hexachlorobutadiene	BDL	5.1	1.0
1,2,3-Trichlorobenzene	BDL	5.1	1.0

End of 8260 soil

70 BNA soil

n-Nitrosodimethylamine	BDL	100.0	1.0
Aniline	BDL	100.0	1.0
Bis(2-chloroethyl)ether	BDL	100.0	1.0
2-Chlorophenol	BDL	100.0	1.0
Phenol	BDL	100.0	1.0
1,3-Dichlorobenzene	BDL	100.0	1.0
1,4-Dichlorobenzene	BDL	100.0	1.0
1,2-Dichlorobenzene	BDL	100.0	1.0
Benzyl Alcohol	BDL	200.0	1.0
Bis(2-chloroisopropyl)ether	BDL	100.0	1.0

GeoChem Incorporated Certified Analytical Laboratory

e Name:
9-6-0600

NC # 37745 , NC # 336, EPA ID # 155
Wednesday, May 19, 1999

GCI Project # 9905-018

	Conc. in ug/kg	lowest detection on sample PQL in ug/kg	Dilution Factor
2-Methylphenol (o-cresol)	BDL	100.0	1.0
Hexachloroethane	BDL	100.0	1.0
n-Nitrosodipropylamine	BDL	100.0	1.0
Nitrobenzene	BDL	100.0	1.0
4-Methylphenol (p-cresol)	BDL	100.0	1.0
Isophorone	BDL	100.0	1.0
2-Nitrophenol	BDL	100.0	1.0
2,4-Dimethylphenol	BDL	100.0	1.0
Bis(2-chloroethoxy)methane	BDL	100.0	1.0
2,4-Dichlorophenol	BDL	100.0	1.0
1,2,4-Trichlorobenzene	BDL	100.0	1.0
Naphthalene	BDL	100.0	1.0
Benzoic acid	BDL	500.0	1.0
4-Chloroaniline	BDL	100.0	1.0
Hexachlorobutadiene	BDL	100.0	1.0
2-Methylnaphthalene	BDL	100.0	1.0
4-Chloro-3-methylphenol	BDL	200.0	1.0
Hexachlorocyclopentadiene	BDL	100.0	1.0
2,4,6-Trichlorophenol	BDL	100.0	1.0
2,4,5-Trichlorophenol	BDL	100.0	1.0
2-Chloronaphthalene	BDL	100.0	1.0
2-Nitroaniline	BDL	500.0	1.0
Acenaphthylene	BDL	100.0	1.0
Dimethylphthalate	BDL	100.0	1.0
2,6-Dinitrotoluene	BDL	100.0	1.0
Acenaphthene	BDL	100.0	1.0
3-Nitroaniline	BDL	500.0	1.0
2,4-Dinitrophenol	BDL	100.0	1.0
Dibenzofuran	BDL	100.0	1.0
2,4-Dinitrotoluene	BDL	100.0	1.0
4-Nitrophenol	BDL	500.0	1.0
Fluorene	BDL	100.0	1.0
4-Chlorophenyl Phenyl Ether	BDL	100.0	1.0
Diethylphthalate	BDL	100.0	1.0
4-Nitroaniline	BDL	500.0	1.0
4,6-Dinitro-2-methylphenol	BDL	100.0	1.0
n-Nitrosodiphenylamine	BDL	100.0	1.0
4-Bromophenyl Phenyl Ether	BDL	100.0	1.0
Hexachlorobenzene	BDL	100.0	1.0
Benzidine	BDL	500.0	1.0
Pentachlorophenol	BDL	100.0	1.0
Phenanthrene	BDL	100.0	1.0
Anthracene	BDL	100.0	1.0
Di-n-butylphthalate	BDL	100.0	1.0

GeoChem Incorporated Certified Analytical Laboratory

S ? Name:
0-6-0600

NC # 37745 , NC # 336, EPA ID # 155
Wednesday, May 19, 1999

GCI Project # 9905-018

	Conc. in ug/kg	lowest detection on sample PQL in ug/kg	Dilution Factor
Fluoranthene	BDL	100.0	1.0
Pyrene	BDL	100.0	1.0
Butyl Benzyl Phthalate	BDL	200.0	1.0
Benzo(a)anthracene	BDL	100.0	1.0
3,3'-Dichlorobenzidine	BDL	200.0	1.0
Chrysene	BDL	50.0	1.0
Bis(2-ethylhexyl)phthalate	BDL	100.0	1.0
Di-n-octylphthalate	BDL	100.0	1.0
Benzo(b)fluoranthene	BDL	100.0	1.0
Benzo(k)fluoranthene	BDL	100.0	1.0
Benzo(a)pyrene	BDL	100.0	1.0
Indeno(1,2,3-cd)pyrene	BDL	100.0	1.0
Dibenz(a,h)anthracene	BDL	100.0	1.0
Benzo(g,h,i)perylene	BDL	100.0	1.0

End of 8270 BNA soil

GeoChem Incorporated Certified Analytical Laboratory

: e Name:
10-6-0600

NC # 37745 , NC # 336, EPA ID # 155
Wednesday, May 19, 1999

GCI Project # 9905-018

ld ID 585B02 Date Analyzed: 5/14/99 Dry wt % 86.3

Lab ID 1222

8260 soil

	Conc. in ug/kg	lowest detection on sample PQL in ug/kg	Dilution Factor
MTBE	BDL	5.0	1.0
IPE	BDL	5.0	1.0
n-Butylbenzene	BDL	5.0	1.0
Dichlorodifluoromethane	BDL	10.0	1.0
Chloromethane	BDL	10.0	1.0
Vinyl Chloride	BDL	5.0	1.0
Bromomethane	BDL	10.0	1.0
Chloroethane	BDL	10.0	1.0
Trichlorofluoromethane	BDL	10.0	1.0
Acrolein	BDL	100.0	1.0
Acetone	BDL	50.0	1.0
1,1-Dichloroethene	BDL	5.0	1.0
Iodomethane	BDL	5.0	1.0
Carbon Disulfide	BDL	5.0	1.0
Methylene Chloride	BDL	5.0	1.0
Acrylonitrile	BDL	5.0	1.0
trans-1,2-Dichloroethene	BDL	5.0	1.0
1,1-Dichloroethane	BDL	5.0	1.0
Vinyl Acetate	BDL	10.0	1.0
2,2-Dichloropropane	BDL	5.0	1.0
cis-1,2-Dichloroethene	BDL	5.0	1.0
2-Butanone	BDL	50.0	1.0
Bromochloromethane	BDL	5.0	1.0
Chloroform	BDL	5.0	1.0
1,1,1-Trichloroethane	BDL	5.0	1.0
1,1-Dichloropropene	BDL	5.0	1.0
Carbon Tetrachloride	BDL	5.0	1.0
Benzene	BDL	5.0	1.0
1,2-Dichloroethane	BDL	5.0	1.0
Trichloroethene	BDL	5.0	1.0
1,2-Dichloropropane	BDL	5.0	1.0
Dibromomethane	BDL	5.0	1.0
Bromodichloromethane	BDL	5.0	1.0
2-Chloroethylvinylether	BDL	10.0	1.0
cis-1,3-Dichloropropene	BDL	5.0	1.0
4-Methyl-2-pentanone	BDL	50.0	1.0
Toluene	BDL	5.0	1.0
trans-1,3-Dichloropropene	BDL	5.0	1.0
1,1,2-Trichloroethane	BDL	5.0	1.0
Ethylmethacrylate	BDL	5.0	1.0
Tetrachloroethene	BDL	5.0	1.0

GeoChem Incorporated Certified Analytical Laboratory

S e Name:
10-6-0600

NC # 37745 , NC # 336, EPA ID # 155
Wednesday, May 19, 1999

GCI Project # 9905-018

	Conc. in ug/kg	lowest detection on sample PQL in ug/kg	Dilution Factor
1,3-Dichloropropane	BDL	5.0	1.0
2-Hexanone	BDL	50.0	1.0
Chlorodibromomethane	BDL	5.0	1.0
1,2-Dibromoethane	BDL	5.0	1.0
Chlorobenzene	BDL	5.0	1.0
1,1,1,2-Tetrachloroethane	BDL	5.0	1.0
Ethylbenzene	BDL	5.0	1.0
m,p-Xylene	BDL	5.0	1.0
o-Xylene	BDL	5.0	1.0
Styrene	BDL	5.0	1.0
Bromoform	BDL	5.0	1.0
Isopropylbenzene	BDL	5.0	1.0
Bromobenzene	BDL	5.0	1.0
1,2,3-Trichloropropane	BDL	10.0	1.0
1,1,2,2-Tetrachloroethane	BDL	5.0	1.0
n-Propylbenzene	BDL	5.0	1.0
2-Chlorotoluene	BDL	5.0	1.0
1,4-Dichloro-2-butene	BDL	10.0	1.0
4-Chlorotoluene	BDL	5.0	1.0
1,3,5-Trimethylbenzene	BDL	5.0	1.0
tert-Butylbenzene	BDL	5.0	1.0
1,2,4-Trimethylbenzene	BDL	5.0	1.0
sec-Butylbenzene	BDL	5.0	1.0
1,3-Dichlorobenzene	BDL	5.0	1.0
1,4-Dichlorobenzene	BDL	5.0	1.0
4-Isopropyltoluene	BDL	5.0	1.0
1,2-Dichlorobenzene	BDL	5.0	1.0
1,2-Dibromo-3-chloropropan	BDL	5.0	1.0
1,2,4-Trichlorobenzene	BDL	5.0	1.0
Naphthalene	BDL	5.0	1.0
Hexachlorobutadiene	BDL	5.0	1.0
1,2,3-Trichlorobenzene	BDL	5.0	1.0

End of 8260 soil

8270 BNA soil

n-Nitrosodimethylamine	BDL	100.0	1.0
Aniline	BDL	100.0	1.0
Bis(2-chloroethyl)ether	BDL	100.0	1.0
2-Chlorophenol	BDL	100.0	1.0
Phenol	BDL	100.0	1.0
1,3-Dichlorobenzene	BDL	100.0	1.0
1,4-Dichlorobenzene	BDL	100.0	1.0
1,2-Dichlorobenzene	BDL	100.0	1.0
Benzyl Alcohol	BDL	200.0	1.0
Bis(2-chloroisopropyl)ether	BDL	100.0	1.0

GeoChem Incorporated Certified Analytical Laboratory

'e Name:
10-6-0600

NC # 37745 , NC # 336, EPA ID # 155
Wednesday, May 19, 1999

GCI Project # 9905-018

	Conc. in ug/kg	lowest detection on sample PQL in ug/kg	Dilution Factor
2-Methylphenol (o-cresol)	BDL	100.0	1.0
Hexachloroethane	BDL	100.0	1.0
n-Nitrosodipropylamine	BDL	100.0	1.0
Nitrobenzene	BDL	100.0	1.0
4-Methylphenol (p-cresol)	BDL	100.0	1.0
Isophorone	BDL	100.0	1.0
2-Nitrophenol	BDL	100.0	1.0
2,4-Dimethylphenol	BDL	100.0	1.0
Bis(2-chloroethoxy)methane	BDL	100.0	1.0
2,4-Dichlorophenol	BDL	100.0	1.0
1,2,4-Trichlorobenzene	BDL	100.0	1.0
Naphthalene	BDL	100.0	1.0
Benzoic acid	BDL	500.0	1.0
4-Chloroaniline	BDL	100.0	1.0
Hexachlorobutadiene	BDL	100.0	1.0
2-Methylnaphthalene	BDL	100.0	1.0
4-Chloro-3-methylphenol	BDL	200.0	1.0
Hexachlorocyclopentadiene	BDL	100.0	1.0
2,4,6-Trichlorophenol	BDL	100.0	1.0
2,4,5-Trichlorophenol	BDL	100.0	1.0
2-Chloronaphthalene	BDL	100.0	1.0
2-Nitroaniline	BDL	500.0	1.0
Acenaphthylene	BDL	100.0	1.0
Dimethylphthalate	BDL	100.0	1.0
2,6-Dinitrotoluene	BDL	100.0	1.0
Acenaphthene	BDL	100.0	1.0
3-Nitroaniline	BDL	500.0	1.0
2,4-Dinitrophenol	BDL	100.0	1.0
Dibenzofuran	BDL	100.0	1.0
2,4-Dinitrotoluene	BDL	100.0	1.0
4-Nitrophenol	BDL	500.0	1.0
Fluorene	BDL	100.0	1.0
4-Chlorophenyl Phenyl Ether	BDL	100.0	1.0
Diethylphthalate	BDL	100.0	1.0
4-Nitroaniline	BDL	500.0	1.0
4,6-Dinitro-2-methylphenol	BDL	100.0	1.0
n-Nitrosodiphenylamine	BDL	100.0	1.0
4-Bromophenyl Phenyl Ether	BDL	100.0	1.0
Hexachlorobenzene	BDL	100.0	1.0
Benzidine	BDL	500.0	1.0
Pentachlorophenol	BDL	100.0	1.0
Phenanthrene	BDL	100.0	1.0
Anthracene	BDL	100.0	1.0
Di-n-butylphthalate	BDL	100.0	1.0

GeoChem Incorporated Certified Analytical Laboratory

e Name:
40-6-0600

NC # 37745 , NC # 336, EPA ID # 155
Wednesday, May 19, 1999

GCI Project # 9905-018

	Conc. in ug/kg	lowest detection on sample PQL in ug/kg	Dilution Factor
Fluoranthene	BDL	100.0	1.0
Pyrene	BDL	100.0	1.0
Butyl Benzyl Phthalate	BDL	200.0	1.0
Benzo(a)anthracene	BDL	100.0	1.0
3,3'-Dichlorobenzidine	BDL	200.0	1.0
Chrysene	BDL	50.0	1.0
Bis(2-ethylhexyl)phthalate	BDL	100.0	1.0
Di-n-octylphthalate	BDL	100.0	1.0
Benzo(b)fluoranthene	BDL	100.0	1.0
Benzo(k)fluoranthene	BDL	100.0	1.0
Benzo(a)pyrene	BDL	100.0	1.0
Indeno(1,2,3-cd)pyrene	BDL	100.0	1.0
Dibenz(a,h)anthracene	BDL	100.0	1.0
Benzo(g,h,i)perylene	BDL	100.0	1.0

End of 8270 BNA soil

GeoChem Incorporated Certified Analytical Laboratory

e Name:
10-6-0600

NC # 37745 , NC # 336, EPA ID # 155
Wednesday, May 19, 1999

GCI Project # 9905-018

eld ID **858B03** *Date Analyzed: 5/14/99* Dry wt % 85.0

Lab ID 1223

8260 soil

	Conc. in ug/kg	lowest detection on sample PQL in ug/kg	Dilution Factor
MTBE	BDL	5.0	1.0
IPE	BDL	5.0	1.0
n-Butylbenzene	BDL	5.0	1.0
Dichlorodifluoromethane	BDL	10.0	1.0
Chloromethane	BDL	10.0	1.0
Vinyl Chloride	BDL	5.0	1.0
Bromomethane	BDL	10.0	1.0
Chloroethane	BDL	10.0	1.0
Trichlorofluoromethane	BDL	10.0	1.0
Acrolein	BDL	99.8	1.0
Acetone	BDL	49.9	1.0
1,1-Dichloroethene	BDL	5.0	1.0
Iodomethane	BDL	5.0	1.0
Carbon Disulfide	BDL	5.0	1.0
Methylene Chloride	BDL	5.0	1.0
Acrylonitrile	BDL	5.0	1.0
trans-1,2-Dichloroethene	BDL	5.0	1.0
1,1-Dichloroethane	BDL	5.0	1.0
Vinyl Acetate	BDL	10.0	1.0
2,2-Dichloropropane	BDL	5.0	1.0
cis-1,2-Dichloroethene	BDL	5.0	1.0
2-Butanone	BDL	49.9	1.0
Bromochloromethane	BDL	5.0	1.0
Chloroform	BDL	5.0	1.0
1,1,1-Trichloroethane	BDL	5.0	1.0
1,1-Dichloropropene	BDL	5.0	1.0
Carbon Tetrachloride	BDL	5.0	1.0
Benzene	BDL	5.0	1.0
1,2-Dichloroethane	BDL	5.0	1.0
Trichloroethene	BDL	5.0	1.0
1,2-Dichloropropane	BDL	5.0	1.0
Dibromomethane	BDL	5.0	1.0
Bromodichloromethane	BDL	5.0	1.0
2-Chloroethylvinylether	BDL	10.0	1.0
cis-1,3-Dichloropropene	BDL	5.0	1.0
4-Methyl-2-pentanone	BDL	49.9	1.0
Toluene	BDL	5.0	1.0
trans-1,3-Dichloropropene	BDL	5.0	1.0
1,1,2-Trichloroethane	BDL	5.0	1.0
Ethylmethacrylate	BDL	5.0	1.0
Tetrachloroethene	BDL	5.0	1.0

GeoChem Incorporated Certified Analytical Laboratory

: e Name:
'0-6-0600

NC # 37745 , NC # 336, EPA ID # 155
Wednesday, May 19, 1999

GCI Project # 9905-018

	Conc. in ug/kg	lowest detection on sample PQL in ug/kg	Dilution Factor
1,3-Dichloropropane	BDL	5.0	1.0
2-Hexanone	BDL	49.9	1.0
Chlorodibromomethane	BDL	5.0	1.0
1,2-Dibromoethane	BDL	5.0	1.0
Chlorobenzene	BDL	5.0	1.0
1,1,1,2-Tetrachloroethane	BDL	5.0	1.0
Ethylbenzene	BDL	5.0	1.0
m,p-Xylene	BDL	5.0	1.0
o-Xylene	BDL	5.0	1.0
Styrene	BDL	5.0	1.0
Bromoform	BDL	5.0	1.0
Isopropylbenzene	BDL	5.0	1.0
Bromobenzene	BDL	5.0	1.0
1,2,3-Trichloropropane	BDL	10.0	1.0
1,1,2,2-Tetrachloroethane	BDL	5.0	1.0
n-Propylbenzene	BDL	5.0	1.0
2-Chlorotoluene	BDL	5.0	1.0
1,4-Dichloro-2-butene	BDL	10.0	1.0
4-Chlorotoluene	BDL	5.0	1.0
1,3,5-Trimethylbenzene	BDL	5.0	1.0
tert-Butylbenzene	BDL	5.0	1.0
1,2,4-Trimethylbenzene	BDL	5.0	1.0
sec-Butylbenzene	BDL	5.0	1.0
1,3-Dichlorobenzene	BDL	5.0	1.0
1,4-Dichlorobenzene	BDL	5.0	1.0
4-Isopropyltoluene	BDL	5.0	1.0
1,2-Dichlorobenzene	BDL	5.0	1.0
1,2-Dibromo-3-chloropropan	BDL	5.0	1.0
1,2,4-Trichlorobenzene	BDL	5.0	1.0
Naphthalene	BDL	5.0	1.0
Hexachlorobutadiene	BDL	5.0	1.0
1,2,3-Trichlorobenzene	BDL	5.0	1.0

End of 8260 soil

8270 BNA soil

n-Nitrosodimethylamine	BDL	100.0	1.0
Aniline	BDL	100.0	1.0
Bis(2-chloroethyl)ether	BDL	100.0	1.0
2-Chlorophenol	BDL	100.0	1.0
Phenol	BDL	100.0	1.0
1,3-Dichlorobenzene	BDL	100.0	1.0
1,4-Dichlorobenzene	BDL	100.0	1.0
1,2-Dichlorobenzene	BDL	100.0	1.0
Benzyl Alcohol	BDL	200.0	1.0
Bis(2-chloroisopropyl)ether	BDL	100.0	1.0

GeoChem Incorporated Certified Analytical Laboratory

S ? Name:
0-6-0600

NC # 37745 , NC # 336, EPA ID # 155
Wednesday, May 19, 1999

GCI Project # 9905-018

	Conc. in ug/kg	lowest detection on sample PQL in ug/kg	Dilution Factor
2-Methylphenol (o-cresol)	BDL	100.0	1.0
Hexachloroethane	BDL	100.0	1.0
n-Nitrosodipropylamine	BDL	100.0	1.0
Nitrobenzene	BDL	100.0	1.0
4-Methylphenol (p-cresol)	BDL	100.0	1.0
Isophorone	BDL	100.0	1.0
2-Nitrophenol	BDL	100.0	1.0
2,4-Dimethylphenol	BDL	100.0	1.0
Bis(2-chloroethoxy)methane	BDL	100.0	1.0
2,4-Dichlorophenol	BDL	100.0	1.0
1,2,4-Trichlorobenzene	BDL	100.0	1.0
Naphthalene	BDL	100.0	1.0
Benzoic acid	BDL	500.0	1.0
4-Chloroaniline	BDL	100.0	1.0
Hexachlorobutadiene	BDL	100.0	1.0
2-Methylnaphthalene	BDL	100.0	1.0
4-Chloro-3-methylphenol	BDL	200.0	1.0
Hexachlorocyclopentadiene	BDL	100.0	1.0
2,4,6-Trichlorophenol	BDL	100.0	1.0
2,4,5-Trichlorophenol	BDL	100.0	1.0
2-Chloronaphthalene	BDL	100.0	1.0
2-Nitroaniline	BDL	500.0	1.0
Acenaphthylene	BDL	100.0	1.0
Dimethylphthalate	BDL	100.0	1.0
2,6-Dinitrotoluene	BDL	100.0	1.0
Acenaphthene	BDL	100.0	1.0
3-Nitroaniline	BDL	500.0	1.0
2,4-Dinitrophenol	BDL	100.0	1.0
Dibenzofuran	129.5	100.0	1.0
2,4-Dinitrotoluene	BDL	100.0	1.0
4-Nitrophenol	BDL	500.0	1.0
Fluorene	164.8	100.0	1.0
4-Chlorophenyl Phenyl Ether	BDL	100.0	1.0
Diethylphthalate	BDL	100.0	1.0
4-Nitroaniline	BDL	500.0	1.0
4,6-Dinitro-2-methylphenol	BDL	100.0	1.0
n-Nitrosodiphenylamine	BDL	100.0	1.0
4-Bromophenyl Phenyl Ether	BDL	100.0	1.0
Hexachlorobenzene	BDL	100.0	1.0
Benzidine	BDL	500.0	1.0
Pentachlorophenol	BDL	100.0	1.0
Phenanthrene	BDL	100.0	1.0
Anthracene	BDL	100.0	1.0
Di-n-butylphthalate	BDL	100.0	1.0

GeoChem Incorporated Certified Analytical Laboratory

Name:
0-6-0600

NC # 37745 , NC # 336, EPA ID # 155
Wednesday, May 19, 1999

GCI Project # 9905-018

	Conc. in ug/kg	lowest detection on sample PQL in ug/kg	Dilution Factor
Fluoranthene	BDL	100.0	1.0
Pyrene	BDL	100.0	1.0
Butyl Benzyl Phthalate	BDL	200.0	1.0
Benzo(a)anthracene	BDL	100.0	1.0
3,3'-Dichlorobenzidine	BDL	200.0	1.0
Chrysene	BDL	50.0	1.0
Bis(2-ethylhexyl)phthalate	BDL	100.0	1.0
Di-n-octylphthalate	BDL	100.0	1.0
Benzo(b)fluoranthene	BDL	100.0	1.0
Benzo(k)fluoranthene	BDL	100.0	1.0
Benzo(a)pyrene	BDL	100.0	1.0
Indeno(1,2,3-cd)pyrene	BDL	100.0	1.0
Dibenz(a,h)anthracene	BDL	100.0	1.0
Benzo(g,h,i)perylene	BDL	100.0	1.0

End of 8270 BNA soil

GeoChem Incorporated Certified Analytical Laboratory

NC # 37745 , NC # 336, EPA ID # 155

Wednesday, May 19, 1999

Project 9905-018

e Name:

30740-6-0600

		Conc. in mg/kg	PQL in mg/kg	Dilution Factor
Field ID **585B01**	*Lab ID 1221*			
Date Analyzed: 5/18/99	*Dry Wt %: 0.81*			
	Analysis:	**EPH soil**		
	C9-C18 Aliphatics	**BDL**	12.389	1.0
	C19-C36 Aliphatics	**BDL**	12.389	1.0
	C11-C22 Aromatics	**BDL**	12.389	1.0
Field ID **585B02**	*Lab ID 1222*			
Date Analyzed: 5/14/99	*Dry Wt %: 0.86*			
	Analysis:	**EPH soil**		
	C9-C18 Aliphatics	**BDL**	11.582	1.0
	C19-C36 Aliphatics	**BDL**	11.582	1.0
	C11-C22 Aromatics	**BDL**	11.582	1.0
Field ID **858B03**	*Lab ID 1223*			
Date Analyzed: 5/14/99	*Dry Wt %: 0.85*			
	Analysis:	**EPH soil**		
	C9-C18 Aliphatics	**BDL**	11.77	1.0
	C19-C36 Aliphatics	**BDL**	11.77	1.0
	C11-C22 Aromatics	**BDL**	11.77	1.0

GeoChem Incorporated Certified Analytical Laboratory

NC # 37745 , NC # 336, EPA ID # 155

Project 9905-018 *Wednesday, May 19, 1999*

Name:

740-6-0600

		Conc. in mg/kg	PQL in mg/kg	Dilution Factor
Field ID **585B01**	*Lab ID 1221*			
Date Analyzed: 5/10/99	*Dry Wt %: 0.81*			
	VPH soil			
	C5-C8 Aliphatics	**BQL**	12.389	1.0
	C9-C12 Aliphatics	**BQL**	12.389	1.0
	C9-C10 Aromatics	**BQL**	12.389	1.0
Field ID **585B02**	*Lab ID 1222*			
Date Analyzed: 5/10/99	*Dry Wt %: 0.86*			
	VPH soil			
	C5-C8 Aliphatics	**BQL**	11.582	1.0
	C9-C12 Aliphatics	**BQL**	11.582	1.0
	C9-C10 Aromatics	**BQL**	11.582	1.0
Field ID **858B03**	*Lab ID 1223*			
Date Analyzed: 5/12/99	*Dry Wt %: 0.85*			
	VPH soil			
	C5-C8 Aliphatics	**BQL**	11.77	1.0
	C9-C12 Aliphatics	**BQL**	11.77	1.0
	C9-C10 Aromatics	**BQL**	11.77	1.0

GeoChem Incorporated Quality Control Results

NC # 37745 , NC # 336, EPA ID # 155

Project # 9905-018

Wednesday, May 19, 1999

	Percent Recovery	Lab Blank:	MDL in ug/l (*lowest detection @ ideal conditions*)
8260 soil			
1,1-Dichloroethene	**95**	0	0.88
Benzene	**100**	0	0.72
Trichloroethene	**99**	0	0.71
Toluene	**94**	0	0.64
Chlorobenzene	**98**	0	0.49
	End of 8260 soil		
8270 BNA soil			
2-Chlorophenol	**83**	0	2.39
Phenol	**68**	0	2.44
1,4-Dichlorobenzene	**71**	0	2.96
n-Nitrosodipropylamine	**95**	0	4.77
1,2,4-Trichlorobenzene	**88**	0	2.68
4-Chloro-3-methylphenol	**82**	0	2.45
Acenaphthene	**67**	0	6.83
2,4-Dinitrotoluene	**100**	0	2.48
4-Nitrophenol	**95**	0	6.65
Pentachlorophenol	**117**	0	2.4
Pyrene	**92**	0	3.34
	End of 8270 BNA soil		

GeoChem Incorporated Quality Control Results

NC # 37745 , NC # 336, EPA ID # 155

018 *Wednesday, May 19, 1999*

VPH soil	*Percent Recovery*	*Lab Blank*	*MDL in mg/kg*
C5-C8 Aliphatics	**113.5**	0	0.013
C9-C12 Aliphatics	**106.6**	0	0.004
C9-C10 Aromatics	**121.1**	0	0.003