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FINAL OFF-BASE COMMUNITY SAMPLING REPORT NCBC GULFPORT MS

9/1/2003

TETRA TECH

Rev. 1
09/24/03

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FINAL

OFF-BASE COMMUNITY SAMPLING REPORT

NAVAL CONSTRUCTION BATTALION CENTER

GULFPORT

GULFPORT, MISSISSIPPI

Southern Division

Naval Facilities Engineering Command

Contract Number N62467-94-D-0888

Contract Task Order 0143

SEPTEMBER 2003

Comment Response Form
Off Base Community Sampling Report, Naval Contruction Battalion Center

Comment	Response
Comments from Art Conrad, Southern Division RPM	
1. Typograhpic	Corrected
Comments from Bob Merrill, MDEQ Project Manager	
1. The report (eg. Page 4-1, paragraph 2) references 15.0 ppt as "the MDEQ cleanup goal" for dioxin contaminated soils. As stated in comment number one of the comment letter (dated 20 June 2003) concerning the previous version of this report (dated May 2003), a cleanup goal of 15.0 ppt for dioxin has not been established by MDEQ. All language referencing a cleanup goal, screening level, or any other regulatory level of 15.0 ppt should be removed from the report. Please consult the TRG Table located at the MDEQ website for appropriate screening levels.	All references to the MDEQ cleanup goal have been modified to present only the unrestricted value of 4.26 ppt.

Rev. 1
09/24/03

FINAL
OFF-BASE COMMUNITY SAMPLING REPORT

NAVAL CONSTRUCTION BATTALION CENTER
GULFPORT, MISSISSIPPI

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Southern Division
Naval Facilities Engineering Command
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North Charleston, South Carolina 29406

Submitted by:
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CONTRACT NUMBER N62467-94-D-0888
CONTRACT TASK ORDER 0143

SEPTEMBER 2003

PREPARED UNDER THE SUPERVISION OF:

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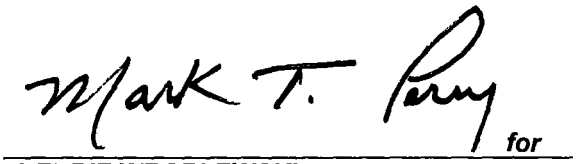

DEBBIE WROBLEWSKI
PROGRAM MANAGER
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TABLE OF CONTENTS

ACRONYMS

ABB-ES	ABB Environmental Services, Inc.
CLEAN III	Comprehensive Long-Term Environmental Action Navy
COC	Contaminant of Concern
CTO	Contract Task Order
HO	Herbicide Orange
MDEQ	Mississippi Department of Environmental Quality
NAVFAC	Naval Facilities Engineering Command
NCBC	Naval Construction Battalion Center
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NPL	National Priorities List
SOUTHDIV	Southern Division
TEQ	Toxicity Equivalence Quotient
TCDD	primarily 2, 3, 7, 8-tetrachlorodibenzo p-dioxin
TRG	Target Remediation Goal
TtNUS	Tetra Tech NUS, Inc.

1.0 INTRODUCTION

This report presents the results and conclusions of a community-sampling event conducted near the Naval Construction Battalion Center (NCBC) Gulfport in Gulfport, Mississippi. Samples were collected and analyzed in response to public concerns expressed during the Proposed Plan public meetings for future remedial action at Site 8. This report has been prepared by Tetra Tech NUS, Inc. (TtNUS) for the Southern Division (SOUTHDIV) Naval Facilities Engineering Command (NAVFAC) under Contract Task Order (CTO) 0143, for the Comprehensive Long-term Environmental Action Navy (CLEAN III) Contract Number N62467-94-D-0888.

In June 2002, the Navy and the Air Force presented a Proposed Plan for remediating the former HO storage area at Site 8. This Proposed Plan addresses the soils and sediments that have been impacted by dioxins related to the storage and subsequent leaks of herbicide orange (HO). During the Proposed Plan's public comment period, members of the local community requested additional off-base sampling in previously uninvestigated areas. The public's primary concerns were (1) that significant storm events or changes in drainage patterns during the last 30 years may have allowed dioxins to migrate into areas not hydraulically connected by surface water to the base today, (2) that potentially contaminated surface soil and sediment from the base were used as fill material for the road bed of South Blvd., and (3) the proximity of Turkey Creek to residential areas north of the base could have impacted private potable water wells and property. As a response to these public concerns and comments, additional off-base sampling was conducted in October 2002.

2.0 BACKGROUND

The expression of public concern for dioxins contained in the ditch systems near NCBC Gulfport are due to the storage and handling of HO at the base from 1968 to 1977 – an area referred to as Site 8. The primary chemical of concern related to HO is 2,3,7,8-tetrachlorodibenzo-p-dioxin or TCDD, an impurity produced during the manufacturing of HO. As a result of spills and leaks that occurred during the years of HO storage, dioxin has migrated through the system of on-base ditches to an area north of the base (see Figure B-1 in Appendix B). Since 1996, there have been seven phases of off-base sampling to determine the extent of dioxins related to HO. All HO-related TCDD discovered in the sediment of off-base ditches has been linked by surface water flow to Site 8. The ditches and streams evaluated in this study were found to have no current surface water link to Site 8, but individual reports from the public indicated that surface water flow directions during the time of HO storage at the Base could have been different from those patterns observed today. To follow up on these reports, the Navy and the Air Force provided funding to examine previously unsamples ditch systems by having the sediment tested for dioxin using the highest resolution method available, E.P.A. Method 8290.

The laboratory analyses provided in this report include all of the 17 dioxin and furan compounds reported by the above stated method, however; only TCDD is directly related to the storage and handling of HO, as other dioxin and furan compounds are commonly found in developed and/or industrialized areas, and are not sole indicators of HO contamination. Therefore, all sediment results will have a representation of the TCDD amount and the single toxicity equivalence quotient (TEQ) which combines all of the 17 dioxin and furan compounds into a single number. The term "dioxin" will be used in this report to represent the TEQ of all 17 dioxin and furan congeners unless noted otherwise.

3.0 FIELD INVESTIGATION

Seventeen sediment samples were collected and analyzed for dioxin. Three aqueous samples were collected from shallow private wells and analyzed for TCL VOA, SVOA, Pest/PCB, Metals, Herbicides and Dioxin.

The locations selected for sediment sample collection are located in ditches and streams that are prone to flooding during large storm events and were identified from the examination of historical maps and aerial photographs and interviews with local long-term residents. The selection of individual sampling locations is discussed in greater detail in the following sections. See Appendix B for Figures.

3.1 NORTH OF BASE/28th STREET

This area is the closet to Site 8 studied for this investigation. A depression on this property extends from 28th Street to the northwest. The concern, as confirmed by interviews with local residents and aerial photography, is that dioxin contaminated sediments from the base may have been transported across 28th Street during large precipitation events and deposited in the depression. Nine grab samples (CS001, CS002, CS003, CS004, CS005, CS006, CS007, CS008, CS009, and CS017), as shown on Figures B-2 and B-3 (Appendix B) were collected from the sediments in the area immediately north of 28th Street, between 53rd and 43rd Avenue. This depression is a likely area for deposition of sediments following storm events.

3.2 NORTH OF TURKEY CREEK/CANAL ROAD

Two composite, sediment samples and three aqueous samples were collected within the neighborhood north of Turkey Creek and east of Canal Rd. This area, according to local residents, is prone to flooding from nearby Turkey Creek. Local residents also reported a section of South Blvd. (Figure B-4) was constructed using fill from NCBC Gulfport.

A 5-way composite sample (CS010) was collected from South Blvd to determine if dioxin contaminated material was used as fill. Samples were collected from the roadbed as well as from the adjacent ditch. The composite sample insured a thorough sweep of the potentially impacted area.

A 2-way composite sample (CS011) was collected at a private lot adjacent to Turkey Creek. This lot is used by the local owner to raise goats and frequently receives floodwater from Turkey Creek. The landowner has felt that his goats have had a higher than normal rate of mortality. The 2-way composite was collected in the southeast corner of the lot in an area that is commonly flooded by Turkey Creek.

Three aqueous samples (CS001GP1, CS002GP1, and CS003GP1) were collected from residential potable water wells, adjacent to Turkey Creek (immediately east of Canal Rd). Aqueous samples were collected for a full suite of analyses (TCL VOA, SVOA, Pest/PCB, Metals, Herbicides and Cyanide) as well as Dioxin. Cyanide was not collected at CS001GP1 due to access issues with the occupant of the rental property.

3.3 BEAR CREEK DRAINAGE BASIN

Three grab samples (CS012, CS013, and CS104), as shown on Figures B-5 and B-6, were collected from the sediments within Bear Creek to determine if potentially contaminated sediments were migrating off base via this natural waterway. Samples CS013 and CS014 were recollected and reanalyzed in March 2003 due to an estimated maximum possible concentration (noted as an EMPC) of TCDD above the MDEQ screening level of 4.26 (ppt).

3.4 CLEVELAND AVE./CANAL 1 BASIN

One grab sample (CS015) shown on Figure B-7, was collected from the man-made drainage ditch intersecting Cleveland Ave. This sample was the western-most sample collected in relation to NCBC Gulfport.

3.5 GASTON PONTE/BRICKYARD BAYOU BASIN

One grab sample (CS016) shown on Figure B-8, was collected from a man-made ditch intersecting Mill Ave, approximately 1 block south of NCBC Gulfport. This ditch system includes surface water flow from the southern portion of the base.

4.0 RESULTS

All dioxin samples were screened against the MDEQ Tier 1 Target Risk Goal Table unrestricted values. For soil and sediment that screening value is 4.26 ppt. For groundwater analyses, the screening value is 30 parts per quadrillion (PPQ). Analytical results are listed in Table A-1. As discussed in the following sections, four of the seventeen sediment samples exceeded the screening value. None of the TEQs that exceeded the screening value were due to elevated levels of TCDD, indicating that herbicide orange is not a primary contributor to the dioxins and furans reported. The following sections describe the results in greater detail and provide a discussion regarding the source(s) of the reported dioxins and furans.

4.1 NORTH OF BASE/28th STREET

Of the nine samples (CS001, CS002, CS003, CS004, CS005, CS006, CS007, CS008, CS009, and CS017) collected from the sediments in the potentially impacted area north of the base, two samples exceeded the MDEQ screening level of 4.26 ppt. CS006 resulted in a TEQ of 35.54 ppt and a TCDD of 0.308 ppt. The leading contributor to the TEQ was the detection of a hexafuran. This elevated hexafuran detection commonly results from the presence of octachlorinated biphenylethers (an ingredient of older transformer oils) interfering with the analysis, since both have identical masses and are indistinguishable on the mass spectrographic equipment used in this method. CS003 also exceeded the screening level at 9.87 ppt, due to non-HO related dioxins and furans (primarily OCDD). TCDD was not detected in CS003.

4.2 NORTH OF TURKEY CREEK/CANAL ROAD

Results from the two composite, sediment samples (CS010 and CS011) produced no TCDD and did not exceed the screening value.

Results from the three community tap water samples (CS001GP1, CS002GP1, and CS003GP1) showed no exceedences above MDEQ screening values for drinking water.

4.3 BEAR CREEK

Grab samples (CS012, CS013, and CS104) were collected from the sediments within Bear Creek, approximately 1 mile southwest of NCBC Gulfport. Samples CS013 and CS014 were

recollected because both had TCDD results above the screening level and an ion ration imbalance (laboratory quality assurance check) resulting in an EMPC qualifier. Results from CS012 and CS014 (resampled) did not exceed the screening value. The results for CS013 (resampled) did exceed the screening value (5.91 ppt vs. 4.26 ppt) due almost entirely to octa- and hexa-furans. The TCDD result for CS013 was again qualified as an EMPC result, but was only 0.232 ppt.

4.4 CANAL 1 TRIBUTARY

Grab sample (CS015) was collected from the man-made drainage ditch intersecting Cleveland Ave., approximately 1.5 miles south-west of NCBC Gulfport. This sample was the western-most sample collected in relation to the base. Results from CS015 did not exceed the screening value.

4.5 GASTON PONTE

A grab sample (CS016) was collected from a man-made waterway intersecting Mill Ave, approximately 1 block south of NCBC Gulfport. This waterway flows in a westerly direction and provides a potential migration pathway for Dioxin. Results from CS016 (12.68 ppt) exceeded the screening value. No TCDD was detected in this sample, and the dioxins and furans detected in this sample are not related to the manufacture of HO.

5.0 CONCLUSIONS AND RECOMMENDATIONS

5.1 CONCLUSIONS

Based on these results, there is no evidence of dioxin contamination related to Site 8 within the areas studied in this report. In addition dioxin, results from local water wells did not exceed MDEQ screening levels for drinking water.

Based on the results of the 5-way composite sample collected along South Blvd. there is no evidence to support the claim it was built up with dioxin contaminated sediment. The results of the 2-way composite sample collected in the private lot along Turkey Creek were below state screening levels and do not indicate a dioxin connection to reports of increased goat mortality.

5.2 RECOMMENDATIONS

Based on the results of the sediment sampling no further investigation should be conducted in the areas identified in this report with respect to dioxin and HO. However, the elevated hexafuran in sample CS006 should be investigated further for the presence of transformer fluid components (PCBs and Chlorobenzene).

REFERENCES

MDEQ (Mississippi Department of Environmental Quality) 1999. *Tier I TRG Table*, Office of Pollution Control, Jackson, Mississippi

TtNUS (Tetra Tech NUS, Inc.) 1999. *Comprehensive Quality Assurance Plan*, Tallahassee, Florida.

USEPA (U.S. Environmental Protection Agency) 1996b. *Environmental Investigations Standard Operating Procedure Quality Assurance Manual (EISOPQAM),* Environmental Compliance Branch, Region 4, Science and Ecosystems Support Division, Athens, Georgia.

USEPA (U.S. Environmental Protection Agency) 1999d. *USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review,* EPA/540/R-94/012, Office of Emergency and Remedial Response, Washington, D.C.

USEPA (U.S. Environmental Protection Agency) 1994e. *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review,* EPA/540/R-94/013, Office of Emergency and Remedial Response, Washington, D.C.

APPENDIX A

TABLES

TABLE A-1
COMMUNITY SAMPLING
SEDIMENT RESULTS

site	08	08	08	08	08	08	08	08	08	08	08	08	08	08	08	08	08
location	CS001	CS002	CS003	CS004	CS005	CS006	CS007	CS008	CS009	CS010	CS011	CS012	CS013	CS014	CS015	CS016	CS017
nsample	CS001DP1	CS002DP1	CS003DP1	CS004DP1	CS005DP1	CS006DP1	CS007DP1	CS008DP1	CS009DP1	CS010DP1	CS011DP1	CS012DP1	CS013DP2	CS014DP2	CS015DP1	CS016DP1	CS017DP1
matrix	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD
depth_rang	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 0.5	0 - 0.5	0 - 1	0 - 1	0 - 0.5
sample_dat	10/11/02	10/11/02	10/11/02	10/11/02	10/11/02	10/11/02	10/11/02	10/11/02	10/11/02	10/13/02	10/14/02	10/15/02	01/30/03	01/30/03	10/15/02	10/15/02	01/30/03
Dioxins (ng/kg)																	
1,2,3,4,6,7,8,9-OCDD	585.1 J	63.6 J	2729 J	226.3 J	521.7 J	540.9 J	375.7 J	502.6 J	118.6 J	930.7 J	174.3 J	200.6 J	1787	241.4	10.96 J	280	69.31
1,2,3,4,6,7,8,9-OCDF	30.03 J	0.594 J	502.1 J	19.87 J	38.36 J	42.31 J	29.35 J	39.55 J	4.919 J	24.76 J	7.026 J	14.22 J	321.8	11.64	0.767 U	21.7	7.056
1,2,3,4,6,7,8-HPCDD	47.25 J	4.279 J	259.1 J	19.25 J	49.88 J	65.2 J	38.06 J	41.21 J	13.68 J	105.1 J	17.53 J	18.39 J	158.3	39.17	1.475 U	133.8	7.136
1,2,3,4,6,7,8-HPCDF	9.453 J	0.526 J	91.69 J	6.88 J	11.66 J	33.87 J	19.84 J	14.81 J	2.113 J	18.09 U	2.988 U	4.089 J	42.59	5.671	0.126 UJ	93.18	2.527
1,2,3,4,7,8,9-HPCDF	0.294 UJ	0.181 UJ	3.695 J	0.18 UJ	0.562 J	2.623 J	0.808 J	0.569 J	0.162 UJ	0.785 J	0.173 J	0.218 UJ	2.329	0.523	0.163 UJ	2.118	0.245
1,2,3,4,7,8-HXCDD	0.848 J	0.25 UJ	1.762 J	0.264 UJ	1.187 J	1.616 J	0.495 UJ	0.69 U	0.22 UJ	1.883 J	0.353 J	0.209 UJ	0.539 U	0.432	0.171 UJ	7.629	0.109
1,2,3,4,7,8-HXCDF	0.906 J	0.173 UJ	8.875 J	0.996 J	1.526 J	257.3 J	1.536 J	0.655 J	0.115 UJ	0.72 J	0.31 J	0.163 UJ	0.988	0.213	0.123 UJ	24.24	0.338
1,2,3,6,7,8-HXCDD	1.615 J	0.213 UJ	8.163 J	0.928 J	2.211 J	6.723 J	1.845 J	1.551 J	0.605 J	5.473 J	0.588 J	0.794 J	4.352	1.884	0.134 UJ	12.44	0.33
1,2,3,6,7,8-HXCDF	2.203 J	0.169 UJ	1.653 J	0.178 UJ	0.466 J	0.219 UJ	1.031 J	0.509 J	0.113 UJ	2.664 J	0.635 J	0.844 J	5.551 J	1.432 J	0.119 UJ	5.972 J	0.451 J
1,2,3,7,8,9-HXCDD	2.807 J	0.964 J	5.218 J	1.04 J	2.973 J	4.948 J	1.81 J	1.555 J	0.446 J	4.368	0.902 U	0.976 U	1.872	3.06	0.13 UJ	15.95	0.317
1,2,3,7,8,9-HXCDF	0.32 UJ	0.228 UJ	0.286 UJ	0.24 UJ	0.235 UJ	0.68 J	0.28 UJ	0.229 UJ	0.152 UJ	0.066 UJ	0.05 UJ	0.187 UJ	0.104 U	0.054 U	0.141 UJ	0.132	0.04 U
1,2,3,7,8-PECDD	0.343 U	0.207 U	0.332 U	0.18 U	0.448 U	1.708	0.309 U	0.213 U	0.177 U	0.548	0.090 UJ	0.315 U	0.113 U	0.075 U	0.2 U	0.951	0.07 U
1,2,3,7,8-PECDF	0.178 U	0.146 U	0.615	0.111 U	0.144 U	22.94	0.421	0.236	0.106 U	0.067 U	0.065 UJ	0.114 U	0.346	0.056 U	0.076 U	0.427	0.057 U
2,3,4,6,7,8-HXCDF	0.283 UJ	0.201 UJ	1.784 J	0.212 UJ	0.676 J	16.26 J	1.011 J	0.788 J	0.134 UJ	0.666	0.164 J	0.185 UJ	0.571	0.049 U	0.14 UJ	12.07	0.135 U
2,3,4,7,8-PECDF	0.189 U	0.155 U	0.627	0.118 U	0.153 U	5.641	0.482	0.281	0.113 U	0.07 U	0.068 UJ	0.119 U	0.382	0.059 U	0.079 U	3.351 J	0.059 U
2,3,7,8-TCDD	0.486 U	0.312 U	0.446 U	0.292 U	0.261 U	0.308 U	0.317 U	0.267 U	0.221 U	0.321 U	0.332 UJ	0.154 U	0.232 E	0.062 U	0.079 U	0.33 U	0.056 U
2,3,7,8-TCDF	0.265 U	0.159 U	0.265 U	0.15 U	0.153 U	3.73	0.16 U	0.148 U	0.104 U	0.117 U	0.119 UJ	0.194 U	0.086 U	0.044 U	0.104 U	0.677	0.054 U
TEQ	2.02	0.21	9.87	0.80	2.08	35.54	1.98	1.77	0.39	3.87	0.56	0.60	5.91	1.41	0.01	12.68	0.33
Screening Level (MDEQ Tier 1 TRG)	4.26	4.26	4.26	4.26	4.26	4.26	4.26	4.26	4.26	4.26	4.26	4.26	4.26	4.26	4.26	4.26	4.26

*Note: E = EMPC; estimated maximum concentration

TABLE A-2
COMMUNITY SAMPLING
RESIDENTIAL TAP WELLS

site location sample matrix sample_dat	08 Site 7 CS001GP1 GW 10/14/02	08 Site 7 CS002GP1 GW 10/14/02	08 Site 7 CS003GP1 GW 10/14/02
Volatile Organics (ug/L)			
1,1,1-TRICHLOROETHANE	10 U	10 U	10 U
1,1,2,2-TETRACHLOROETHANE	10 U	10 U	10 U
1,1,2-TRICHLOROETHANE	10 U	10 U	10 U
1,1,2-TRICHLOROTRIFLUOROETHANE	10 U	10 U	10 U
1,1-DICHLOROETHANE	10 U	10 U	10 U
1,1-DICHLOROETHENE	10 U	10 U	10 U
1,2,4-TRICHLOROBENZENE	10 U	10 U	10 U
1,2-DIBROMO-3-CHLOROPROPANE	10 U	10 U	10 U
1,2-DIBROMOETHANE	10 U	10 U	10 U
1,2-DICHLOROBENZENE	10 U	10 U	10 U
1,2-DICHLOROETHANE	10 U	10 U	10 U
1,2-DICHLOROPROPANE	10 U	10 U	10 U
1,3-DICHLOROBENZENE	10 U	10 U	10 U
1,4-DICHLOROBENZENE	10 U	10 U	10 U
2-BUTANONE	10 U	10 U	10 U
2-HEXANONE	10 UJ	10 UJ	10 UJ
4-METHYL-2-PENTANONE	10 U	10 U	10 U
ACETONE	10 U	10 U	10 U
BENZENE	10 U	10 U	10 U
BROMODICHLOROMETHANE	10 U	10 U	2 J
BROMOFORM	10 U	10 U	10 U
BROMOMETHANE	10 U	10 U	10 U
CARBON DISULFIDE	10 U	10 U	10 U
CARBON TETRACHLORIDE	10 U	10 U	10 U
CHLOROBENZENE	10 U	10 U	10 U
CHLORODIBROMOMETHANE	10 U	10 U	2 J
CHLOROETHANE	10 U	10 U	10 U
CHLOROFORM	10 U	10 U	3 J
CHLOROMETHANE	10 U	10 U	10 U
CIS-1,2-DICHLOROETHENE	10 U	10 U	10 U
CIS-1,3-DICHLOROPROPENE	10 U	10 U	10 U
CYCLOHEXANE	10 U	10 U	10 U
DICHLORODIFLUOROMETHANE	10 UJ	10 UJ	10 UJ
ETHYLBENZENE	10 U	10 U	10 U
ISOPROPYLBENZENE	10 U	10 U	10 U
METHYL ACETATE	10 U	10 U	10 U
METHYL CYCLOHEXANE	10 U	10 U	10 U
METHYL TERT-BUTYL ETHER	10 U	10 U	10 U
METHYLENE CHLORIDE	10 U	10 U	10 U
STYRENE	10 U	10 U	10 U
TETRACHLOROETHENE	10 U	10 U	10 U
TOLUENE	10 U	10 U	10 U
TOTAL XYLENES	10 U	10 U	10 U
TRANS-1,2-DICHLOROETHENE	10 U	10 U	10 U
TRANS-1,3-DICHLOROPROPENE	10 U	10 U	10 U
TRICHLOROETHENE	10 U	10 U	10 U
TRICHLOROFLUOROMETHANE	10 U	10 U	10 U
VINYL CHLORIDE	10 U	10 U	10 U

TABLE A-2
COMMUNITY SAMPLING
RESIDENTIAL TAP WELLS

Site location sample matrix sample date	08 Site 7 CS001GP1 GW 10/14/02	08 Site 7 CS002GP1 GW 10/14/02	08 Site 7 CS003GP1 GW 10/14/02
Semivolatile Organics (ug/L)			
1,1-BIPHENYL	10 U	10 U	10 U
2,2'-OXYBIS(1-CHLOROPROPANE)	10 U	10 U	10 U
2,4,5-TRICHLOROPHENOL	25 U	25 U	25 U
2,4,6-TRICHLOROPHENOL	10 U	10 U	10 U
2,4-DICHLOROPHENOL	10 U	10 U	10 U
2,4-DIMETHYLPHENOL	10 U	10 U	10 U
2,4-DINITROPHENOL	25 U	25 U	25 U
2,4-DINITROTOLUENE	10 U	10 U	10 U
2,6-DINITROTOLUENE	10 U	10 U	10 U
2-CHLORONAPHTHALENE	10 U	10 U	10 U
2-CHLOROPHENOL	10 U	10 U	10 U
2-METHYLNAPHTHALENE	10 U	10 U	10 U
2-METHYLPHENOL	10 U	10 U	10 U
2-NITROANILINE	25 U	25 U	25 U
2-NITROPHENOL	10 U	10 U	10 U
3,3'-DICHLOROBENZIDINE	10 U	10 U	10 U
3-NITROANILINE	25 U	25 U	25 U
4,6-DINITRO-2-METHYLPHENOL	25 U	25 U	25 U
4-BROMOPHENYL PHENYL ETHER	10 U	10 U	10 U
4-CHLORO-3-METHYLPHENOL	10 U	10 U	10 U
4-CHLOROANILINE	10 U	10 U	10 U
4-CHLOROPHENYL PHENYL ETHER	10 U	10 U	10 U
4-METHYLPHENOL	10 U	10 U	10 U
4-NITROANILINE	25 U	25 U	25 U
4-NITROPHENOL	25 U	25 U	25 U
ACENAPHTHENE	10 U	10 U	10 U
ACENAPHTHYLENE	10 U	10 U	10 U
ACETOPHENONE	10 U	10 U	10 U
ANTHRACENE	10 U	10 U	10 U
ATRAZINE	10 U	10 U	10 U
BENZALDEHYDE	10 U	10 U	10 U
BENZO(A)ANTHRACENE	10 U	10 U	10 U
BENZO(A)PYRENE	10 U	10 U	10 U
BENZO(B)FLUORANTHENE	10 U	10 U	10 U
BENZO(G,H,I)PERYLENE	10 U	10 U	10 U
BENZO(K)FLUORANTHENE	10 U	10 U	10 U
BIS(2-CHLOROETHOXY)METHANE	10 U	10 U	10 U
BIS(2-CHLOROETHYL)ETHER	10 U	10 U	10 U
BIS(2-ETHYLHEXYL)PHTHALATE	10 U	10 U	10 U
BUTYL BENZYL PHTHALATE	10 U	10 U	10 U
CAPROLACTAM	10 U	10 U	10 U
CARBAZOLE	10 U	10 U	10 U
CHRYSENE	10 U	10 U	10 U
DI-N-BUTYL PHTHALATE	10 U	10 U	10 U
DI-N-OCTYL PHTHALATE	10 U	10 U	10 U
DIBENZO(A,H)ANTHRACENE	10 U	10 U	10 U
DIBENZOFURAN	10 U	10 U	10 U
DIETHYL PHTHALATE	10 U	10 U	10 U
DIMETHYL PHTHALATE	10 U	10 U	10 U

TABLE A-2
COMMUNITY SAMPLING
RESIDENTIAL TAP WELLS

site	08	08	08
location	Site 7	Site 7	Site 7
sample	CS001GP1	CS002GP1	CS003GP1
matrix	GW	GW	GW
sample_dat	10/14/02	10/14/02	10/14/02
FLUORANTHENE	10 U	10 U	10 U
FLUORENE	10 U	10 U	10 U
HEXACHLOROBENZENE	10 U	10 U	10 U
HEXACHLOROBUTADIENE	10 U	10 U	10 U
HEXACHLOROCYCLOPENTADIENE	10 U	10 U	10 U
HEXACHLOROETHANE	10 U	10 U	10 U
INDENO(1,2,3-CD)PYRENE	10 U	10 U	10 U
ISOPHORONE	10 U	10 U	10 U
N-NITROSO-DI-N-PROPYLAMINE	10 U	10 U	10 U
N-NITROSODIPHENYLAMINE	10 U	10 U	10 U
NAPHTHALENE	10 U	10 U	10 U
NITROBENZENE	10 U	10 U	10 U
PENTACHLOROPHENOL	25 U	25 U	25 U
PHENANTHRENE	10 U	10 U	10 U
PHENOL	10 U	10 U	10 U
PYRENE	10 U	10 U	10 U
Pesticides/PCBs (ug/L)			
AROCLOR-1016	1.0 U	1.0 U	1.0 U
AROCLOR-1221	1.0 U	1.0 U	1.0 U
AROCLOR-1232	1.0 U	1.0 U	1.0 U
AROCLOR-1242	1.0 U	1.0 U	1.0 U
AROCLOR-1248	1.0 U	1.0 U	1.0 U
AROCLOR-1254	1.0 U	1.0 U	1.0 U
AROCLOR-1260	1.0 U	1.0 U	1.0 U
Herbicides (ug/L)			
2,4,5-T	0.8 U	0.8 U	0.8 U
2,4,5-TP (SILVEX)	0.5 U	0.5 U	0.5 U
2,4-D	2.5 U	2.5 U	2.5 U
2,4-DB	4.5 U	4.5 U	4.5 U
4-NITROPHENOL	2.5 U	2.5 U	2.5 U
DALAPON	8 U	8 U	8 U
DICAMBA	1 U	1 U	1 U
DICHLOROPROP	1.5 U	1.5 U	1.5 U
DINOSEB	1 U	1 U	1 U
MCPA	100 U	100 U	100 U
MCPP	70 U	70 U	70 U
PENTACHLOROPHENOL	0.5 U	0.5 U	0.5 U
Inorganics (ug/L)			
ALUMINUM	8.8 U	34.3 U	20.1 U
ANTIMONY	3.9 U	3.9 U	3.9 U
ARSENIC	2.9	2.5	1.9
BARIUM	55	53.1	6.2
BERYLLIUM	0.30 U	0.30 U	0.30 U
CADMIUM	0.40 U	0.40 U	0.40 U
CALCIUM	3830	3490	780
CHROMIUM	0.70 U	0.70 U	0.70 U
COBALT	1.6 U	1.6 U	1.6 U
COPPER	2.4 U	0.50 U	0.88 U
CYANIDE		1.0 U	1.0 U
IRON	22.3 U	475	22.3 U

TABLE A-2
COMMUNITY SAMPLING
RESIDENTIAL TAP WELLS

site	08	08	08
location	Site 7	Site 7	Site 7
sample	CS001GFT6	CS002GFT1	CS003GFT
matrix	GW	GW	GW
sample dat	10/14/02	10/14/02	10/14/02
LEAD	1.7 U	1.7 U	1.7 U
MAGNESIUM	951	1660	66.8
MANGANESE	18.4	57.5	5.9
MERCURY	0.10 U	0.10 U	0.10 U
NICKEL	4.5 U	4.5 U	4.5 U
POTASSIUM	1790	2210	246
SELENIUM	1.4 U	1.4 U	1.4 U
SILVER	0.90 U	0.90 U	0.90 U
SODIUM	36200 J	18200 J	46500 J
THALLIUM	2.3 U	2.3 U	2.3 U
VANADIUM	0.60 U	0.60 U	0.60 U
ZINC	20.1	8.1	6.2 U
Dioxins (pg/L)			
1,2,3,4,6,7,8,9-OCDD	12.74 U	10.6 U	19.54 U
1,2,3,4,6,7,8,9-OCDF	1.396 UJ	1.27 UJ	3.126 UJ
1,2,3,4,6,7,8-HPCDD	1.09 UJ	0.933 UJ	2.237 UJ
1,2,3,4,6,7,8-HPCDF	0.579 UJ	0.588 UJ	1.426 UJ
1,2,3,4,7,8,9-HPCDF	0.749 UJ	0.759 UJ	1.843 UJ
1,2,3,4,7,8-HXCDD	1.536 UJ	1.062 UJ	3.314 UJ
1,2,3,4,7,8-HXCDF	1.158 UJ	1.062 UJ	2.421 UJ
1,2,3,6,7,8-HXCDD	1.203 UJ	0.832 UJ	2.596 UJ
1,2,3,6,7,8-HXCDF	1.107 UJ	1.053 UJ	2.357 UJ
1,2,3,7,8,9-HXCDD	1.166 UJ	0.806 UJ	2.515 UJ
1,2,3,7,8,9-HXCDF	1.304 UJ	1.24 UJ	2.777 UJ
1,2,3,7,8-PECDD	2.607 U	2.194 U	6.122 U
1,2,3,7,8-PECDF	0.974 U	0.801 U	2.044 U
2,3,4,6,7,8-HXCDF	1.295 UJ	1.232 UJ	2.757 UJ
2,3,4,7,8-PECDF	1.019 U	0.838 U	2.139 U
2,3,7,8-TCDD	1.828 U	1.618 U	3.79 U
2,3,7,8-TCDF	1.457 U	1.236 U	3.036 U
TEQ	0	0	0
TOTAL HPCDD	1.09 U	0.933 U	2.237 U
TOTAL HPCDF	0.579 U	0.588 U	1.426 U
TOTAL HXCDD	1.166 U	0.806 U	2.515 U
TOTAL HXCDF	1.107 U	1.053 U	2.357 U
TOTAL PECDD	2.607 U	2.194 U	6.122 U
TOTAL PECDF	0.974 U	0.801 U	2.044 U
TOTAL TCDD	1.828 U	1.618 U	3.79 U
TOTAL TCDF	1.457 U	1.235 U	3.036 U

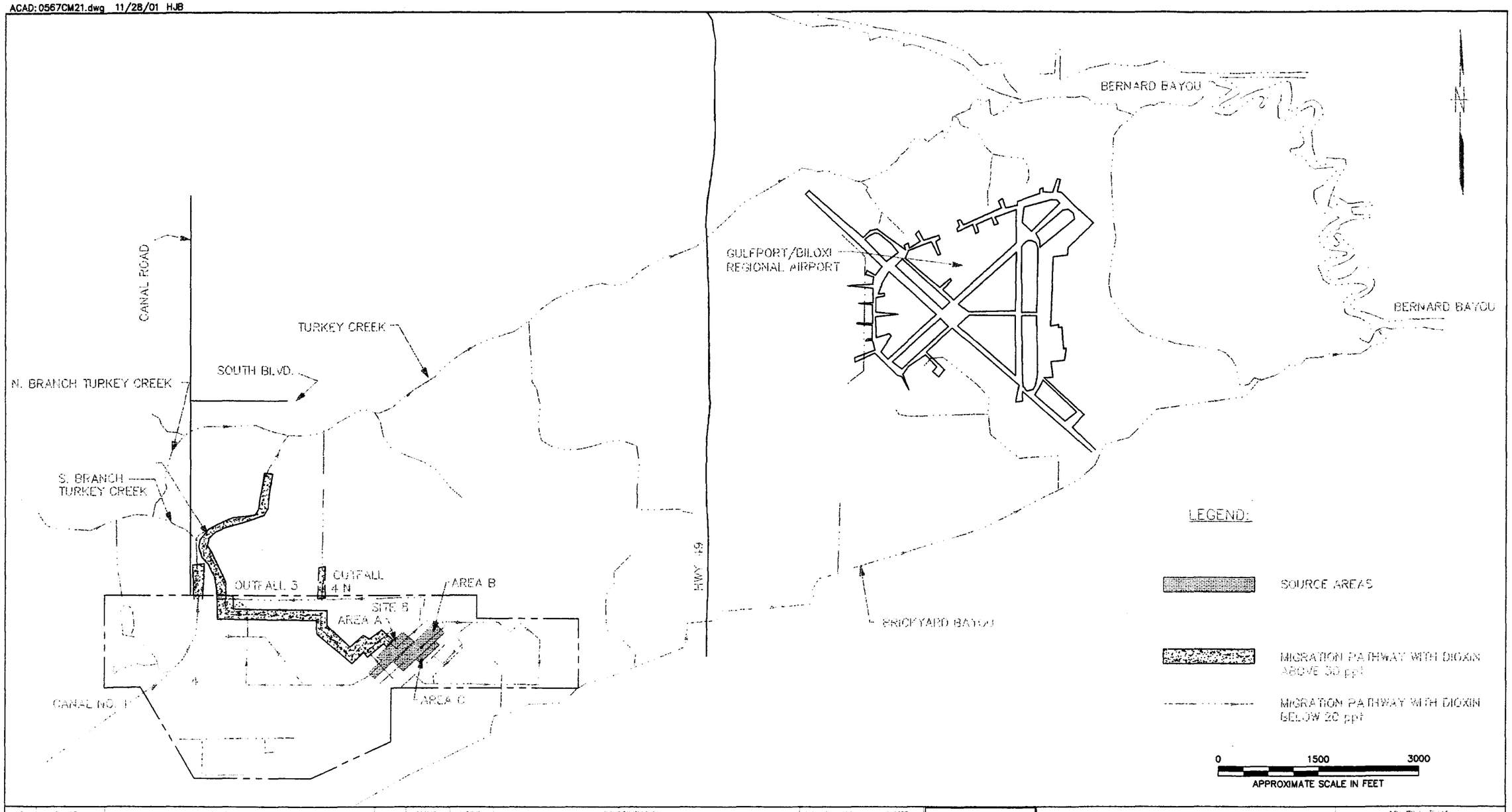
TABLE A-3
COMMUNITY SAMPLING
SITE 7 GROUNDWATER

site	07	07
location	MW-1	MW-2
sample	GPT71G1P1	GPT72G1P1
matrix	GW	GW
sample_dat	10/17/02	10/17/02
Dioxins (pg/L)		
1,2,3,4,6,7,8,9-OCDD	12.65 U	12.28 U
1,2,3,4,6,7,8,9-OCDF	1.476 J	0.405 U
1,2,3,4,6,7,8-HPCDD	2.348 U	1.975 U
1,2,3,4,6,7,8-HPCDF	0.207 UJ	0.143 U
1,2,3,4,7,8,9-HPCDF	0.268 UJ	0.185 U
1,2,3,4,7,8-HXCDD	0.242 UJ	0.268 U
1,2,3,4,7,8-HXCDF	0.136 UJ	0.125 U
1,2,3,6,7,8-HXCDD	0.19 UJ	0.21 U
1,2,3,6,7,8-HXCDF	0.132 UJ	0.125 U
1,2,3,7,8,9-HXCDD	0.184 UJ	0.203 U
1,2,3,7,8,9-HXCDF	0.156 UJ	0.147 U
1,2,3,7,8-PECDD	0.207 U	0.166 U
1,2,3,7,8-PECDF	0.157 U	0.136 U
2,3,4,6,7,8-HXCDF	0.155 UJ	0.146 U
2,3,4,7,8-PECDF	0.164 U	0.143 U
2,3,7,8-TCDD	0.198 U	0.188 U
2,3,7,8-TCDF	0.198 U	0.149 U
TEQ	0.00148	0
TOTAL HPCDD	3.941 U	1.975 U
TOTAL HPCDF	0.207 U	0.143 U
TOTAL HXCDD	0.184 U	0.762
TOTAL HXCDF	0.132 U	0.125 U
TOTAL PECDD	0.207 U	0.166 U
TOTAL PECDF	0.157 U	0.136 U
TOTAL TCDD	0.198 U	0.188 U
TOTAL TCDF	0.198 U	0.149 U

APPENDIX B

FIGURES

ACAD: 0567CM21.dwg 11/28/01 HJB



NO.	DATE	REVISIONS	BY	CHKD	APPD	REFERENCE

DRAWN BY: BHF DATE: 7/27/02
DESIGNED BY: DATE:
COST/SCHED-AREA:
CALL: AS NOTED

R:\BORDERS\southdk\Southdk.tif

DRAINAGE SYSTEMS
OFFBASE COMMUNITY SAMPLING REPORT
NAVAL CONSTRUCTION
BATTALION CENTER
GULFPORT, MISSISSIPPI

CONTRACT NO. 0143
APPROVED BY: DATE:
APPROVED BY: DATE:
DRAWING NO. FIGURE B-1
REV. 0

FORM CADD NO. SDIV_BH.DWG - REV 0 - 1/20/98

SOIL SAMPLES 1 THROUGH 5 AND 17

SAMPLES IN THE SE 1/4 OF THE SE 1/4 OF
SECTION 31, TOWNSHIP 07 SOUTH, RANGE 11 WEST,
CITY OF GULFPORT, HARRISON COUNTY, MISSISSIPPI

SURVEY FOR TETRA TECH NUS, INC., NOVEMBER 2002

THIS SURVEY AND PLAT WERE PREPARED ONLY FOR CLIENT AS NAMED HEREON AND NO THIRD OR OTHER PARTY CERTIFICATION IS EXPRESSED OR IMPLIED. ALL BEARINGS/DISTANCES ARE SHOWN AS MEASURED UNLESS NOTED OTHERWISE. THIS SURVEY PERFORMED WITHOUT THE BENEFIT OF A TITLE REPORT. THIS PLAT IS CERTIFIED ONLY TO THAT DATA SHOWN HEREON AND MAY NOT BE COMPLETE OR ALL-INCLUSIVE FOR ANY PURPOSES OR USES OTHER THAN THOSE AS ORIGINALLY CONTRACTED FOR BY CLIENT. VERIFICATION OF ACTUAL FIELD CONDITIONS IS REQUIRED BEFORE DETAILED PLANNING OR CONSTRUCTION IS COMMENCED.

IP = IRON PIPE	S = SET
IR = IRON ROD	F = FOUND
PK = PK NAIL	D = DEED BEARING/ DISTANCE
RR = RAIL ROAD SPIKE	
CS = COTTON SPINDLE	ohe = OVERHEAD ELECTRIC LINES
CM = CONCRETE MONUMENT	

SAMPLE LOCATION DATA SHOWN DEVELOPED FROM INFORMATION PROVIDED BY TETRA TECH, N.U.S. PROPERTY TAX MAP INFORMATION OBTAINED FROM HARRISON COUNTY TAX MAPS, DATED AUGUST 2002. AERIAL PHOTOGRAPHY SHOWN OBTAINED FROM HARRISON COUNTY, CIRCA 1996. COORDINATES SUPPLIED WERE DERIVED FROM A COMBINATION OF FIELD MEASUREMENTS, AERIAL MAP AND HARRISON COUNTY BASE MAP CORRELATION. THIS SURVEY IS REFERENCED IN FEET TO STATE PLANE COORDINATES SUPPLIED BY HARRISON COUNTY ENGINEERING DEPARTMENT, DATUM NAD-1983.

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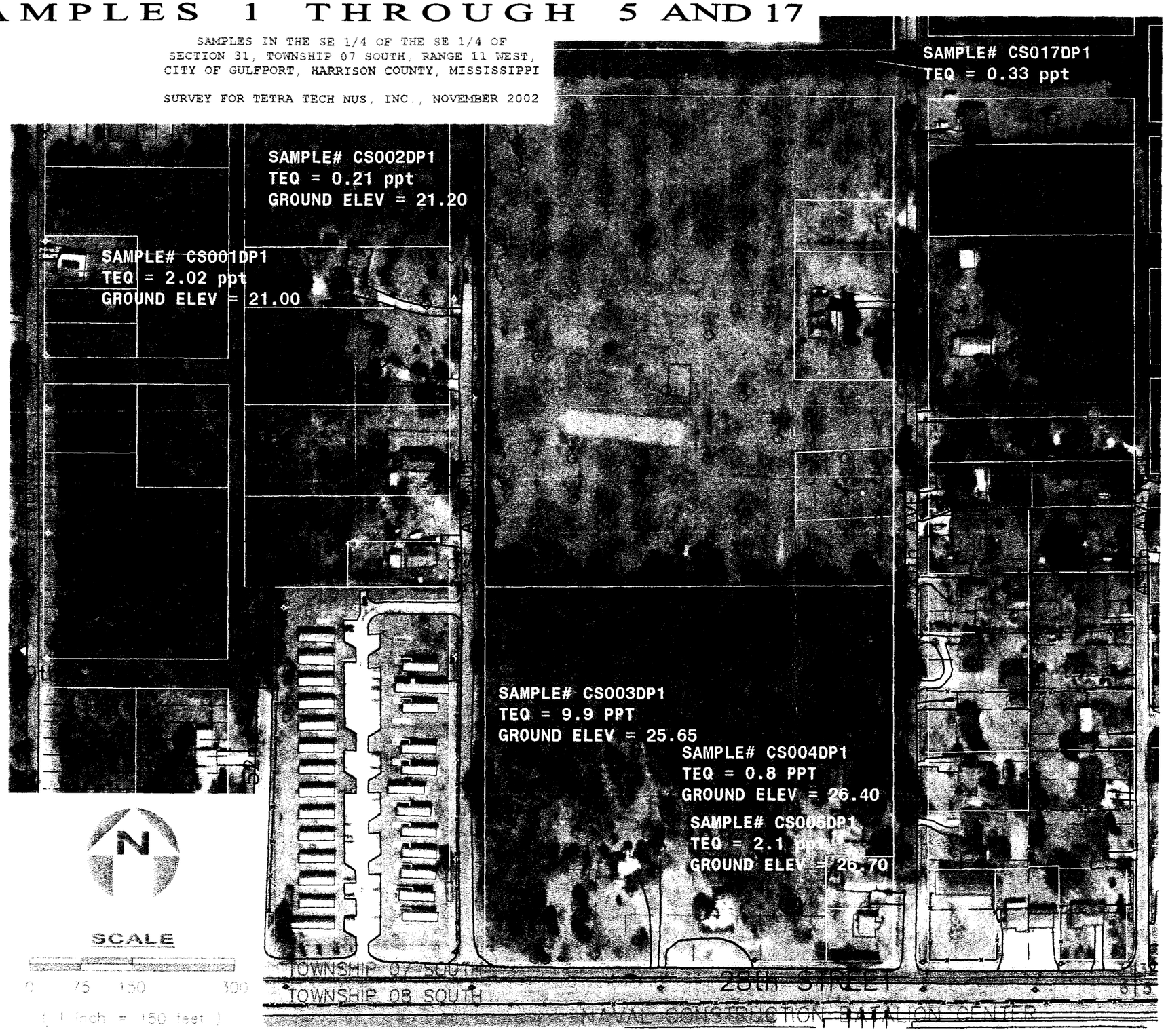

N

SCALE

0 75 150 300

(1 inch = 150 feet)

FIGURE B-2

TETRA TECH, NUS

SECTION 31, TOWNSHIP 07 SOUTH, RANGE 11 WEST

SOIL SAMPLES 1 THROUGH 5

LAND SURVEYING
INCORPORATED
203 - 48th STREET
GULFPORT, MS 39507

SCALE:	1" = 150'
PLOT DATE:	
DRAWN BY:	RDP
CHECKED BY:	RDP
DWG NAME:	
REVISED:	

SOIL SAMPLES 6 THROUGH 9

SAMPLES IN THE S 1/2 OF THE SW 1/4 OF
SECTION 32, TOWNSHIP 07 SOUTH, RANGE 11 WEST,
CITY OF GULFPORT, HARRISON COUNTY, MISSISSIPPI

SURVEY FOR TETRA TECH NUS, INC., NOVEMBER 2002

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IR = IRON ROD	F = FOUND
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RR = RAIL ROAD SPIKE	
CS = COTTON SPINDLE	ohe = OVERHEAD ELECTRIC LINES
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N

SCALE

0 75 150 300

(1 inch = 150 feet)

FIGURE B-3

TETRA TECH, NUS

SECTION 32, TOWNSHIP 07 SOUTH, RANGE 11 WEST

SOIL SAMPLES 6 THROUGH 9

LAND SURVEYING
INCORPORATED
203 - 46th STREET
GULFPORT, MS 39507

SCALE:	1" = 150'
PLOT DATE:	
DRAWN BY:	RDP
CHECKED BY:	RDP
DWG NAME:	
REVISED:	

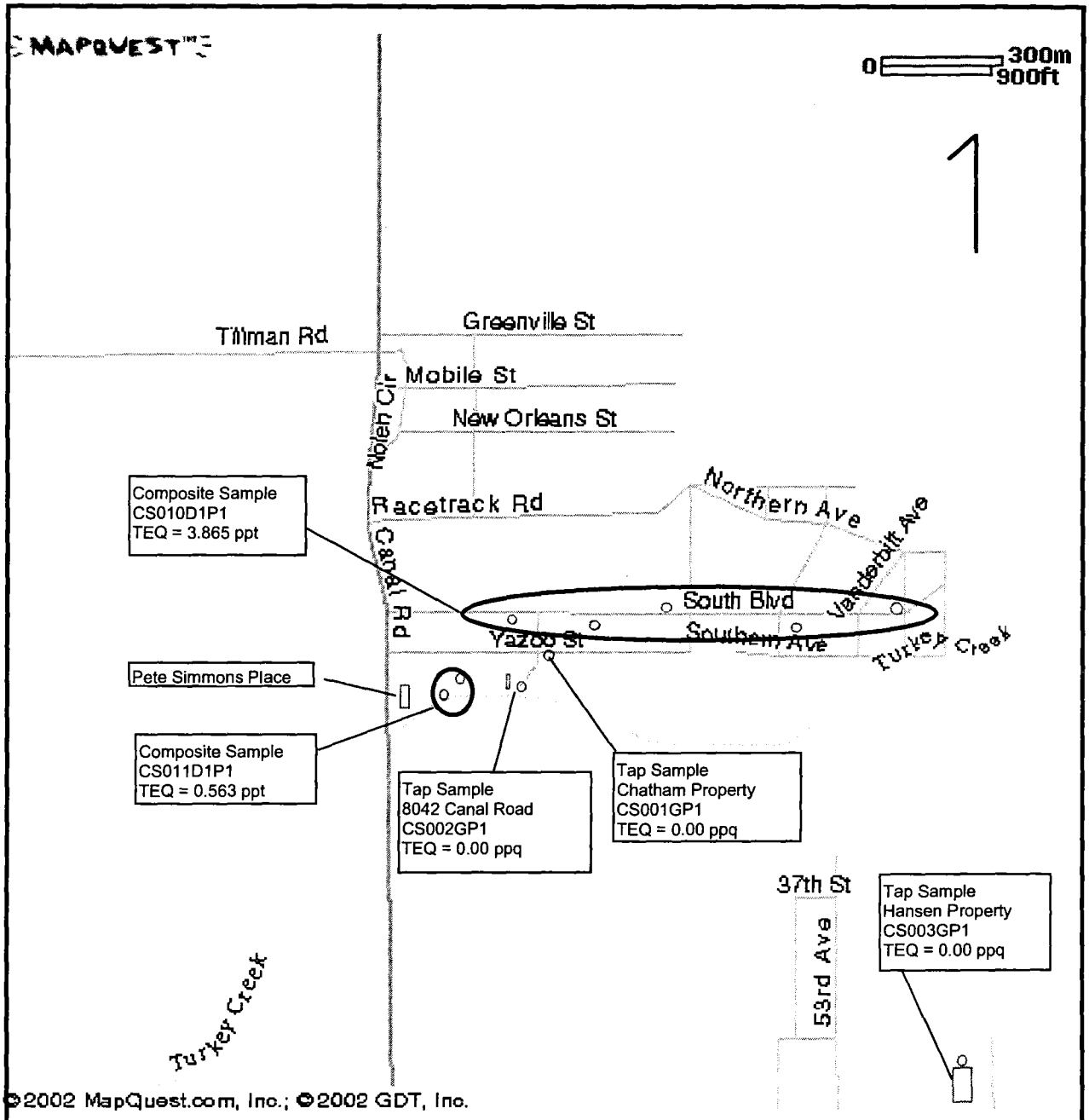

FIGURE B-4

Offbase Community Sampling

Composite Sampling and Offbase Wells

NCBC GULFPORT

OFFBASE COMMUNITY SAMPLING

SOIL SAMPLE 12

SAMPLE IN THE NW 1/4 OF THE SW 1/4 OF
SECTION 7, TOWNSHIP 08 SOUTH, RANGE 11 WEST,
CITY OF GULFPORT, HARRISON COUNTY, MISSISSIPPI

SURVEY FOR TETRA TECH NUS, INC., NOVEMBER 2002

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CS = COTTON SPINDLE	
CM = CONCRETE MONUMENT	

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FIGURE B-5

TETRA TECH, NUS

SECTION 07, TOWNSHIP 08 SOUTH, RANGE 11 WEST

SOIL SAMPLE 12

LAND SURVEYING
INCORPORATED
203 - 46th STREET
GULFPORT MS 39507

SCALE:	1" = 150'
PLOT DATE:	
DRAWN BY:	RDP
CHECKED BY:	RDP
DWG NAME:	
REVISED:	

N

SCALE

0 75 150 300

(1 inch = 150 feet)

SOIL SAMPLES 13 THROUGH 14

SAMPLES IN THE E 1/2 OF THE NE 1/4 OF
SECTION 13, TOWNSHIP 08 SOUTH, RANGE 12 WEST,
CITY OF LONG BEACH, HARRISON COUNTY, MISSISSIPPI

SURVEY FOR TETRA TECH NUS, INC., NOVEMBER 2002

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IR = IRON ROD		F = FOUND	
PK = PK NAIL		D = DEED BEARING	
RR = RAIL ROAD SPIKE		DISTANCE	
CS = COTTON SPINDLE	o/he =	OVERHEAD ELECTRIC LINES	
CM = CONCRETE MONUMENT			

SAMPLE LOCATION DATA SHOWN DEVELOPED FROM INFORMATION PROVIDED BY TETRA TECH, N.U.S. PROPERTY TAX MAP INFORMATION OBTAINED FROM HARRISON COUNTY TAX MAPS, DATED AUGUST 2002. AERIAL PHOTOGRAPHY SHOWN OBTAINED FROM HARRISON COUNTY, CIRCA 1996. COORDINATES SUPPLIED WERE DERIVED FROM A COMBINATION OF FIELD MEASUREMENTS, AERIAL MAP AND HARRISON COUNTY BASE MAP CORRELATION. THIS SURVEY IS REFERENCED IN FEET TO STATE PLANE COORDINATES SUPPLIED BY HARRISON COUNTY ENGINEERING DEPARTMENT, DATUM NAD-1983.

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N

SCALE

0 75 150 300

(1 inch = 150 feet)

FIGURE B-6

TETRA TECH, NUS

SECTION 13, TOWNSHIP 08 SOUTH, RANGE 12 WEST

SOIL SAMPLES 13 THROUGH 14

LAND SURVEYING
INCORPORATED
203 48th STREET
GULFPORT, MS 39507

SCALE:	1" = 150'
PLOT DATE:	
DRAWN BY:	RDP
CHECKED BY:	RDP
DWG NAME:	
REVISED:	

SOIL SAMPLE 15

SAMPLE IN THE NW 1/4 OF THE SW 1/4 OF
SECTION 12, TOWNSHIP 08 SOUTH, RANGE 12 WEST,
CITY OF LONG BEACH, HARRISON COUNTY, MISSISSIPPI

SURVEY FOR TETRA TECH NUS, INC., NOVEMBER 2002

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IR	= IRON ROD	F	= FOUND
PK	= PK NAIL	D	= DEED BEARING/ DISTANCE
RR	= RAIL ROAD SPIKE		
CS	= COTTON SPINDLE	ohe	= OVERHEAD ELECTRIC LINES
CM	= CONCRETE MONUMENT		

SAMPLE LOCATION DATA SHOWN DEVELOPED FROM INFORMATION PROVIDED BY TETRA TECH, N.U.S. PROPERTY TAX MAP INFORMATION OBTAINED FROM HARRISON COUNTY TAX MAPS, DATED AUGUST 2002. AERIAL PHOTOGRAPHY SHOWN OBTAINED FROM HARRISON COUNTY, CIRCA 1996. COORDINATES SUPPLIED WERE DERIVED FROM A COMBINATION OF FIELD MEASUREMENTS, AERIAL MAP AND HARRISON COUNTY BASE MAP CORRELATION. THIS SURVEY IS REFERENCED IN FEET TO STATE PLANE COORDINATES SUPPLIED BY HARRISON COUNTY ENGINEERING DEPARTMENT, DATUM NAD-1983.

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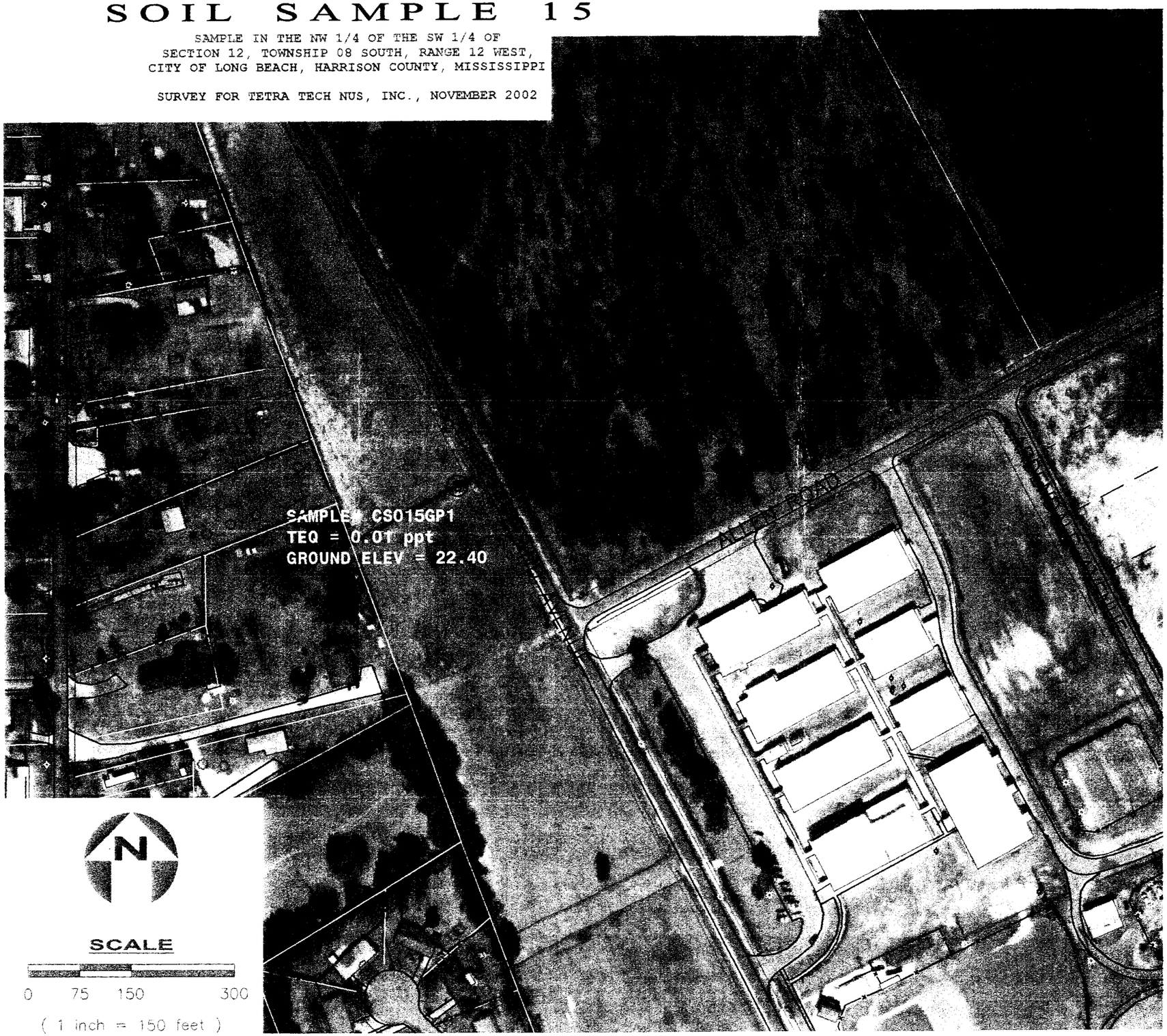

FIGURE B-7

N

SCALE

0 75 150 300

(1 inch = 150 feet)

TETRA TECH, NUS

SECTION 12, TOWNSHIP 08 SOUTH, RANGE 12 WEST

SOIL SAMPLE 15

LAND SURVEYING
INCORPORATED
203 - 48th STREET
GULFPORT, MS 39507

SCALE:	1" = 150'
PLOT DATE:	
DRAWN BY:	RDP
CHECKED BY:	RDP
DWG NAME:	
REVISED:	

SOIL SAMPLE 16

SAMPLE IN THE NE 1/4 OF THE NE 1/4 OF
SECTION 07, TOWNSHIP 08 SOUTH, RANGE 11 WEST,
CITY OF GULFPORT, HARRISON COUNTY, MISSISSIPPI

SURVEY FOR TETRA TECH NUS, INC., NOVEMBER 2002

THIS SURVEY AND PLAT WERE PREPARED ONLY FOR CLIENT AS NAMED HEREON AND NO THIRD OR OTHER PARTY CERTIFICATION IS EXPRESSED OR IMPLIED. ALL BEARINGS/DISTANCES ARE SHOWN AS MEASURED UNLESS NOTED OTHERWISE. THIS SURVEY PERFORMED WITHOUT THE BENEFIT OF A TITLE REPORT. THIS PLAT IS CERTIFIED ONLY TO THAT DATA SHOWN HEREON AND MAY NOT BE COMPLETE OR ALL-INCLUSIVE FOR ANY PURPOSES OR USES OTHER THAN THOSE AS ORIGINALLY CONTRACTED FOR BY CLIENT. VERIFICATION OF ACTUAL FIELD CONDITIONS IS REQUIRED BEFORE DETAILED PLANNING OR CONSTRUCTION IS COMMENCED.

IP	= IRON PIPE	S	= SET
IR	= IRON ROD	F	= FOUND
PK	= PK NAIL	D	= DEED BEARING/ DISTANCE
RR	= RAIL ROAD SPIKE		
CS	= COTTON SPINDLE	ohe	= OVERHEAD ELECTRIC LINES
CM	= CONCRETE MONUMENT		

SAMPLE LOCATION DATA SHOWN DEVELOPED FROM INFORMATION PROVIDED BY TETRA TECH, N.U.S. PROPERTY TAX MAP INFORMATION OBTAINED FROM HARRISON COUNTY TAX MAPS, DATED AUGUST 2002. AERIAL PHOTOGRAPHY SHOWN OBTAINED FROM HARRISON COUNTY, CIRCA 1996. COORDINATES SUPPLIED WERE DERIVED FROM A COMBINATION OF FIELD MEASUREMENTS, AERIAL MAP AND HARRISON COUNTY BASE MAP CORRELATION. THIS SURVEY IS REFERENCED IN FEET TO STATE PLANE COORDINATES SUPPLIED BY HARRISON COUNTY ENGINEERING DEPARTMENT, DATUM NAD-1983.

THE INTENT OF THIS SURVEY IS TO SHOW SAMPLE LOCATIONS AS INSTALLED OR COLLECTED BY TETRA TECH, NUS.
A COPY OF THIS PLAT IS VALID ONLY IF IT IS COMPLETE AND INTACT, HAS AN ORIGINAL SIGNATURE AND DATE, AND HAS THE ORIGINAL EMBOSSED OR COLORED (NOT BLACK) STAMPED SURVEYOR'S SEAL.

FIGURE B-8

TETRA TECH, NUS

SECTION 07, TOWNSHIP 08 SOUTH, RANGE 11 WEST

SOIL SAMPLE 16

LAND SURVEYING
INCORPORATED
203 - 48th STREET
GULFPORT, MS 39507

SCALE:	1" = 150'
PLOT DATE:	
DRAWN BY:	RDP
CHECKED BY:	RDP
DWG NAME:	
REVISED:	