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SEMI ANNUAL EVALUATION FOR STUDY AREA 36 NTC ORLANDO FL

3/17/2005

TETRA TECH

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March 17, 2005

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Contract Task Order No. 0332

Subject: Semi-Annual Evaluation Report for SA 36
Naval Training Center, Orlando, Florida

Dear Ms. Nwokike:

Please find enclosed two hardcopies and two CDs of the Semi-Annual Evaluation Report for SA 36 for your use.

If you have any questions or comments, please contact me at (865) 220-4730 or Teresa Grayson at (865) 220-4701.

Sincerely,

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Rev. 0
03/17/05

Semi-Annual Evaluation Report
for
Study Area 36

Naval Training Center
Orlando, Florida

Southern Division
Naval Facilities Engineering Command
Contract Number N62467-94-D-0888
Contract Task Order 0332

March 2005

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03/17/05

SEMI-ANNUAL EVALUATION REPORT
FOR
STUDY AREA 36

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

COMPREHENSIVE LONG-TERM
ENVIRONMENTAL ACTION NAVY (CLEAN) CONTRACT

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I hereby certify that this document, *Semi-Annual Evaluation Report for Study Area 36*, was prepared under my direct supervision in accordance with acceptable standards of geological practice.

Allan T. Jenkins

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ACRONYMS AND ABBREVIATIONS

AFCEE	Air Force Center for Environmental Excellence
bgs	below ground surface
BGSV	background screening value
BOA	Basic Ordering Agreement
CCI	CH2M Hill Constructors, Inc.
cis-1,2-DCE	*cis* -1,2-dichloroethene
CO_2	carbon dioxide
CVOC	chlorinated VOC
DCE	dichloroethene
DO	dissolved oxygen
DPT	direct push technology
Eh	ORP of groundwater
Fe^{+2}	Ferrous Iron
Fe^{+3}	Ferric Iron
FDEP	Florida Department of Environmental Protection
ft/yr	feet per year
GCTL	Groundwater Cleanup Target Level
HCA	Hydrochloric Acid
IRA	Interim Remedial Action
MCL	Maximum Contaminant Levels
MCLG	Maximum Contaminant Level Goals
MEE	methane/ethane/ethane
mg/L	milligrams per liter
MTBE	methyl tert-butyl ether
mV	millivolts
NAPL	non-aqueous phase liquid
NAVFAC EFD SOUTH	Southern Division, Naval Facilities Engineering Command
nM	nanomoles per liter
NO_2	Nitrite
NO_3	Nitrate
NTC	Naval Training Center
OPT	Orlando Partnering Team
ORP	oxidation-reduction potential
PCE	tetrachloroethene

SA	Study Area
SCTL	Soil Cleanup Target Level
SO_4	sulfate
TCE	Trichloroethene
TOC	total organic carbon
TRPH	Total Recoverable Petroleum Hydrocarbons
TtNUS	Tetra Tech NUS, Inc.
µg/L	micrograms per liter
USEPA	United States Environmental Protection Agency
VC	vinyl chloride
VOC	volatile organic compound

1.0 INTRODUCTION

1.1 PURPOSE

The Interim Remedial Action (IRA) described in this report was implemented at Study Area (SA) 36, located at the Main Base of the former Naval Training Center (NTC) Orlando, Florida. This report provides a brief summary of field activities conducted at SA 36 through June 2004, presents and interprets the results of the groundwater analytical data, and provides conclusions and recommendations based on those results.

1.2 SITE LOCATION AND DESCRIPTION

SA 36 occupies 1.94 acres in the southwestern portion of the Main Base at the former NTC Orlando (Figure 1-1 located in section following text). Prior to residential redevelopment activities, the site included a Paint Shop (Building 2122), a lumber storage facility (Building 2121), and the western half of the Public Works Yard. All buildings, roadways, structures, and facilities were removed during redevelopment activities. Figure 1-2 shows the location of the SA 36 site boundary in relation to the streets and residential lots of the new development now known as Baldwin Park. The SA 36 site boundary currently includes seven single family homes, two vacant residential lots, and associated roadways.

1.3 SITE BACKGROUND

The Navy acquired the Main Base in 1968 and used SA 36 for storage of lumber, pipe, paint, and other materials until the mid-1990s. While operated by the Navy, paint and paint thinner were stored in Building 2122. The western half of the Public Works Yard was used to store a variety of hazardous and non-hazardous materials including waste oil drums, transformers, and batteries prior to disposal. The South Storage Area was used to store bulky items such as pipes, fire hydrants, and bricks. A small fenced area south and east of Building 2121 was used to store oil and hazardous materials.

2.0 ENVIRONMENTAL SETTING

2.1 SITE GEOLOGY

The geology of the site was investigated during drilling for the construction of monitoring wells. The shallow geology at SA 36 consists of undifferentiated Pleistocene and Recent marine terrace deposits underlain by the Hawthorn Group. The undifferentiated sediments are about 65 feet in thickness and consist of gray to dark brown, predominantly quartz sand with varying amounts of silt and clay-sized grains, and shell fragments. The lithology of these sediments varies somewhat laterally and vertically. An interval consisting of cemented fine sand, interbedded fine sand and silt, and indurated, cemented sand, locally called a "hardpan," was encountered at a depth of 15 to 25 feet below ground surface (bgs). Beneath the cemented sand interval is another unit of brown to dark brown, sand and silty sand with some clay lenses, and an interval containing shell fragments at about 60 feet bgs (TtNUS, 2003).

The Hawthorn Group in the vicinity of SA 36 is typically described as gray-green, calcareous, phosphatic sandy clay, and includes clayey sand interbedded with thin, discontinuous lenses of phosphatic sand or limerock. The deepest borings at SA 36 showed a coarsening of the sand and a change to a green color at a depth of about 60 to 65 feet bgs (beneath the interval of shell fragments described above); this is interpreted to represent the top of the Hawthorn Group. A plastic, green clay interval followed by limestone was encountered at depths of 66 to 70 feet bgs.

2.2 SITE HYDROGEOLOGY

The hydrogeology of the surficial aquifer of interest at SA 36 has been investigated by the installation and monitoring of wells installed at the site. A water table lies at a depth of about 5 to 10 feet bgs across the site, with several feet of seasonal variation observed in some wells. The surficial aquifer extends to a depth of about 60 to 65 feet and the uppermost Hawthorn clay layer described in Section 2.1 marks its bottom. Figure 2-1 provides a well depth schematic that demonstrates the relationship of the wells and the nomenclature used to distinguish the aquifer-depth zones at SA 36 (e.g., "A" and "B" wells are screened above the cemented sand interval). Groundwater elevation data from periodic monitoring of water levels in the site's monitoring wells are summarized in Table 2-1 (located in section following figures). Comparison of groundwater elevations between wells screened above the cemented sand interval [e.g., OLD-36-08BR (08BR)] with a nearby well screened deeper in the aquifer (e.g., 09CR) shows that the potentiometric surface above the cemented sand layer (i.e., "A and B" wells) is typically several feet higher than the potentiometric surface at deeper well intervals ("C and D" wells). Thus, a downward gradient is observed across the cemented sand interval.

2.2.1 Potentiometric Data Evaluation

Water levels were periodically collected from all the monitoring wells during the site investigation conducted between 1999 and 2001 (TtNUS, 2003). The groundwater elevations in the A and B wells ranged between 104 and 109 feet in elevation and the groundwater elevation difference across the site typically ranged from 1 to 2 feet. The shallow groundwater flow directions based on elevation data from wells in Zones A and B were consistently towards the northwest. Well hydrographs and potentiometric surface maps that represent the range of the observed data for each aquifer zone are presented in Appendix A.

During the site investigation, the groundwater elevation in the Zone C wells ranged between 100 and 105 feet in elevation and the groundwater elevation difference across the site was typically 0.5 feet, much less than observed for the wells in Zones A and B. The deep groundwater flow direction indicated by the Zone C wells (i.e., below the cemented sand layer) was east or southeast toward Lake Susannah opposite to the flow direction in the overlying shallow Zone A and Zone B wells.

Site investigation wells were abandoned to allow for site redevelopment in December 2001. In April and May 2002, 17 replacement wells (indicated by “R” in the well identification number) were installed to allow continued monitoring of the plume and progress of the groundwater IRA. Table 2-1 summarizes the replacement well groundwater elevation data from August 2002 through June 2004. Water levels were recorded in the replacement wells twice in August 2002 prior to construction of a small surface water body (Pond 14) approximately 200 feet east of SA 36. The water levels and resulting groundwater flow directions and gradients mapped using the Zone A and Zone B replacement well potentiometric surface data from August 2002 were consistent with the previous site investigation results, with the exception that the groundwater elevations were at historically high levels by about 1 foot. For the Zone C wells, the August 16, 2002 data contained apparent spurious data for downgradient wells 35CR and 36CR; rational plotting of the potentiometric surface or interpretation of the groundwater flow direction could only be attempted by censoring the data from these two wells. The Zone C water levels were measured again on August 24, 2002 and found to be consistent with the site investigation data with respect to flow direction and gradient, but as was observed with the Zone A and Zone B well data, the groundwater elevation was historically high by about 1 foot.

From August 2002 until June 2003 site redevelopment was aggressively implemented including construction of Pond 14 located approximately 200 feet east of SA 36. Pond 14 is located closer to the site than any existing surface water body (i.e., Lakes Susannah and Barton to the east and northeast, respectively). Construction design details for Pond 14 provided by the site developer show that the bottom of the pond lies at an elevation of 96 feet and that the nominal surface water elevation is 108 feet.

The design data indicate that pond construction did not cut through the cemented sand layer that separates the shallow and deep portions of the surficial aquifer.

Groundwater monitoring of the replacement wells has been conducted quarterly during 2003 to 2004. The water level data presented in Table 2-1 have been used to prepare hydrographs and potentiometric surface maps (Appendix A) for all replacement well data sets and the data appear to represent seasonal (high-low) conditions. The flow directions for the Zone A and Zone B wells has remained primarily towards the northwest, consistent with the historical site investigation data. An anomalously low water elevation at well 19AR in June 2004 results in a more westerly flow direction that is inconsistent with historical data. An anomalously low water elevation in well 08BR (March 2004) and high water levels in well 10BR (December 2003, March 2004, and June 2004) were not used in the construction of the potentiometric surface maps; the inconsistent behavior of these wells is apparent on the detailed hydrograph presented in Appendix A. Anomalously low water elevations at wells 20BR and 24BR in June 2004 results in a more westerly flow direction that is also inconsistent with historic interpretation. The elevation data for both A and B Zone wells during 2003-2004 ranged between 107 to 111 feet and show that the overall groundwater elevation above the cemented sand layer is 1 to 2 feet higher than observed during the site investigation (April to August 2000).

The 2003-2004 data for the Zone C wells has continued to demonstrate spurious groundwater elevations as was observed in August 2002 (see “detailed” hydrographs in Appendix A). Two Zone C wells (35CR and 36CR) located along the eastern (i.e., downgradient) perimeter of the site, have shown groundwater elevations (ranging between 109 to 112 feet) that are several feet higher than was observed in the site investigation wells and several feet higher than the remaining five Zone C replacement wells. Because construction of the replacement wells was concurrent with site development activities the well riser pipes were left extending above grade until final elevations could be determined for flush-mounted wells. Subsequently, the wells were cut off and re-surveyed at various times as indicted in Table 2-1. For well 36CR, it appears that the well top was cut off after the June 2003 data was collected, but the well was not immediately re-surveyed resulting in anomalously high water levels reported for September and December 2003. The well top was re-surveyed in March 2004; however, the water elevations observed in March and June 2004 remain high relative to the other Zone C wells (see detailed hydrograph in Appendix A). The well top for well 35CR has not been re-surveyed; additionally, the well was never properly completed and appears to be damaged. The groundwater elevation in this well has been consistently erratic since the well was installed. Well 35CR will be either repaired or replaced. Similar to well 36CR, the data at well 18CR show erratic behavior during March and June 2004; since no re-survey of this well has been reported, it is surmised that the well was cut off prior to the 2004 measurements and the latter data is not useable. Well 25CR was intended to be left in place until the homes on adjacent lots

were constructed and inhabited. The Orlando Partnering Team (OPT) agreed that 25CR would be properly abandoned to minimize impact to residents. The site developer's environmental contractor, Nodarse, properly abandoned well 25CR in early 2004. The data used to construct the potentiometric surface maps presented in Appendix A were censored to remove spurious groundwater elevations as identified above. It is noteworthy that the remaining Zone C wells [09CR, 11CR, 23CR, 25CR, and 18CR (prior to 2004)] show a groundwater flow direction and gradient that is similar to the site investigation data (i.e., no significant change in flow direction) and within the same elevation range.

2.2.2 Groundwater Flow Evaluation

A rise in the water table elevation has been observed for all aquifer zones since the replacement wells were installed and concurrent with site redevelopment. The well hydrographs for the 2003-2004 monitoring period show that the highest shallow groundwater elevations were observed in August 2003 and September 2003, which is consistent with historically high seasonal rainfall for the Orlando area.

The hydrogeologic system from the cemented sand layer downward does not appear to have been altered by redevelopment. The aquitard properties of the cemented sand layer were documented during the site investigation and resulted in a strong downward gradient between the shallow and deeper portions of the surficial aquifer. Therefore, there is little likelihood that the new (shallow) Pond No. 14 and new recharge (i.e., lawn irrigation) that are associated with site redevelopment have impacted the deeper portion of the aquifer. Because of the overall consistency demonstrated by the hydrographs for all aquifer zones, the rise in the potentiometric surface is attributed to an overall increase in aquifer recharge due to precipitation.

To further evaluate the impact of site redevelopment on groundwater flow conditions at SA 36, representative hydraulic gradients were calculated for each aquifer zone. A comparison of the average site gradients presented with the site investigation data (2001) versus the site redevelopment data (2003) is presented in Table 2-2. As shown by the average results, more than a 50 percent decrease in the shallow aquifer hydraulic gradient (Zones A and B) has occurred concurrent with site redevelopment. This impact is consistent with and attributed to an overall rise in the potentiometric surface at all aquifer depths; however, a leveling effect from nearby recharge provided by new Pond 14 to the southeast of the site and the likely increase in aquifer recharge across the site due to lawn maintenance can not be ruled out as contributing factors for the shallow aquifer zones. The data from the deep aquifer wells (Zone C) do not indicate any change in the hydraulic gradient beneath the cemented-sand layer. Because no change in aquifer hydraulic conductivity or effective porosity is attributed to site redevelopment, the change in the average shallow groundwater seepage velocity is directly proportional to the change in hydraulic gradient, or a decrease of 50 percent or greater for the shallow aquifer. The average

groundwater seepage velocities calculated for the site investigation data (TtNUS, 2003) have been updated for the current site conditions (see Appendix B). The estimated seepage velocities for the Zones A, B, and C are 30 ft/yr, 16 ft/yr, and 13 ft/yr, respectively.

3.0 SITE INVESTIGATION

The technical approach to the investigation of SA 36 was developed by the OPT, which was assembled to address environmental issues at the NTC, Orlando. The OPT consists of representatives from the United States Environmental Protection Agency (USEPA) Region 4, the Florida Department of Environmental Protection (FDEP) and Southern Division, Naval Facilities Engineering Command (NAVFAC EFD SOUTH) and their contractors. Table 3-1 presents a chronological list of the historical events and relevant dates discussed in Sections 3 and 4.

3.1 SITE SCREENING INVESTIGATION

Initial and supplemental site screening activities conducted at SA 36 between July 1997 and October 1998 included a passive soil gas survey, soil sampling, monitoring well installation, direct push technology (DPT) groundwater sampling, and groundwater monitoring well sampling. The details of the site screening activities are documented in the *Base Realignment and Closure Environmental Site Screening Report, Study Area 36, Naval Training Center, Orlando, Florida* (HLA, 1999).

Contaminants were detected during site screening in soil and groundwater that exceeded screening criteria. Screening criteria are defined as follows: for an organic contaminant, or an inorganic contaminant without a background screening value (BGSV), the screening criterion is the Florida Groundwater Cleanup Target Level (GCTL) or the Florida residential Soil Cleanup Target Level (SCTL); for an inorganic contaminant with an established GCTL or SCTL and a BGSV, the screening criterion is the greater of the two.

3.1.1 Soil

A passive soil gas survey was conducted at the storage areas, drainage swale, and the western portion of the Public Works Yard in August 1997. Tetrachloroethene (PCE) was detected at a concentration greater than its screening criterion at one location, approximately 60 feet northeast of Building 2122. Based on the results of the soil gas survey, surface and subsurface soil samples were collected during the installation of monitoring wells 01A through 06A in October 1997. Total Recoverable Petroleum Hydrocarbons (TRPH), mercury, benzo(a)pyrene, barium, arsenic, and antimony were detected in soil at concentrations exceeding their respective screening criteria.

3.1.2 Groundwater

The initial site screening included the installation of six monitoring wells (01A through 06A) to a depth of about 16 feet bgs in October 1997. Groundwater samples collected in November 1997 indicated that antimony, aluminum, and trichloroethene (TCE) concentrations exceeded screening criteria in some of

the site monitoring wells. As a result, additional groundwater sampling employing DPT was conducted beginning in March 1998. Chlorinated volatile organic compounds (VOCs) were detected at depths ranging from 6 to 28 feet bgs. A cemented sand layer, encountered from approximately 20 to 24 feet bgs, prevented sampling below the layer at several locations.

In 1998, additional wells (07A, 08B, 09C, 10B, 11C, 12C, 13D, and 14D) were installed at various depths above and below the cemented sand layer, extending to the base of the surficial aquifer. Figure 2-1 provides a schematic that demonstrates the well screen depth relationship with the site hydrogeology. Analytical results of the groundwater samples from these wells indicated that TCE and PCE were present at concentrations exceeding their GCTLs [i.e., 3 micrograms per liter (µg/L) for each] below the cemented sand layer (i.e., C wells). TCE was present in the North Storage Area over an area of approximately 5,000 square feet to a depth of 35 feet bgs. PCE was only detected at a concentration slightly greater than its GCTL (i.e., 3.3 µg/L) at one C well at a depth of 35 feet bgs. Analytical data for the wells 13D and 14D indicated that TCE and PCE concentrations were non-detect.

3.2 SITE INVESTIGATION

Site investigation activities conducted at SA 36 between April 2000 and August 2000 included soil sampling and groundwater monitoring well installation and sampling. The details of the site investigation activities are documented in the *Site Investigation Report for Study Area 36, Naval Training Center, Orlando, Florida* (TtNUS, 2003).

3.2.1 Soil

In April 2000, additional surface soil samples were collected to confirm and define the horizontal extent of mercury, barium, arsenic, antimony, and TRPH contamination at “hot spots” in surface soil to assess the possible need for soil removal actions. Sample analytes were selected in each area according to the exceedances reported in the initial investigation. The analyses of the soil samples revealed some elevated concentrations of inorganics, but not at concentrations that exceeded the screening criteria. From the soil data it was determined that there were no significant quantities of impacted soil that posed a current or future risk to human health or the environment at SA 36. Based on the soil sampling results, the OPT determined that no actions for soil source removal or control were necessary.

3.2.2 Groundwater

The installation of an additional monitoring well (15A) and groundwater sampling in April 2000 showed that the TCE plume in the North Storage Area was poorly defined and required additional investigation. In August 2000, 10 additional wells (16A through 25C) were installed at various depths of up to 50 feet bgs and subsequently sampled. PCE was detected in two C wells, but exceeded its GCTL in only one

C well at a depth of 35 feet bgs. Neither TCE nor PCE were detected in the two deepest D wells (40-50 feet bgs). The presence of PCE, TCE, and *cis*-1,2-dichloroethene (*cis*-1,2-DCE) in the April 2000 and August 2000 sample results from the A, B, and C wells suggested that reductive dechlorination of PCE and its degradation products TCE and *cis*-1,2-DCE could be occurring. Although the plume limits within each zone were defined to some extent, the plume was not fully defined in any zone.

In November 2000, wells 33A through 37C were installed to complete delineation of the plumes. The results of subsequent groundwater sampling defined the plume limits for Zone C. In Zones A and B, the plume limits were defined except in the downgradient (northwest) direction. The new wells installed during August and November 2000 provided additional groundwater potentiometric data at each aquifer depth that was used to better understand groundwater flow direction.

3.2.3 Replacement Wells

All site monitoring wells were abandoned in December 2001 to allow for residential site development. Zones A, B and C plume maps provided in the Site Investigation Report are presented in this report as Figures 3-1, 3-2, and 3-3, respectively. These maps show the locations and concentrations of TCE and PCE exceedances of GCTLs from initiation of the site investigation until abandonment of the wells (i.e., April 2000 through October 2001). Seventeen (17) replacement wells were subsequently installed in April and May 2002 to investigate the downgradient extent of the TCE plumes in Zones A and B and to evaluate the efficacy of the IRA (see Section 4.0). May 2002 groundwater analytical results for wells 01AR and 10BR completed plume delineation in Zones A and B.

4.0 GROUNDWATER INTERIM REMEDIAL ACTION

After reviewing documents from investigation reports and studying the available remedies for the VOC-contaminated groundwater at SA 36, the OPT elected to have CH2M Hill Constructors, Inc. (CCI) perform an IRA to enhance the natural attenuation of the chlorinated VOCs detected at the site via the reductive dechlorination process. The IRA, which consists of injecting food-grade vegetable oil into the most concentrated parts of the plume, offers the following benefits:

- Vegetable oil is inexpensive and innocuous.
- The equipment needed to inject vegetable oil and monitor remediation progress is simple and relatively inexpensive.
- Vegetable oil is safe to ship and handle on site.
- Vegetable oil provides an important carbon source to supplement the native total organic carbon (TOC), which may be depleted by natural processes. Carbon is essential for maintaining a reducing environment for anaerobic organisms that can degrade chlorinated chemical compounds.

In November 2000, the OPT initiated the IRA, which included the following tasks:

- Baseline groundwater sampling for comparison with future data.
- Vegetable oil injection into the surficial aquifer to enhance microbial growth and subsequent destruction of the chlorinated solvents.
- Quarterly sampling and analysis of groundwater to assess progress in achieving the Florida GCTLs.
- Reporting results of remedial actions and groundwater monitoring to the OPT.

A brief summary of the anaerobic dechlorination process and the regulatory requirements for sites being remediated through natural attenuation are provided in Appendix C.

4.1 FIELD ACTIVITIES

As described below, IRA field activities to date have included baseline groundwater sampling, monitoring well and injection point installation, two rounds of vegetable oil injections and quarterly groundwater monitoring since March 2001.

4.1.1 Baseline Groundwater Sampling

In November 2000, seven additional monitoring wells were installed at various depths to provide monitoring points in close proximity to the proposed IRA vegetable oil injection points and to define the lateral extent of the groundwater plume. Results of the December 2000 IRA baseline groundwater sampling (prior to injection) indicated that TCE was the predominant VOC exceeding GCTLs. The baseline sampling also showed that shallow and intermediate-depth plumes (i.e., A and B well depths) in the surficial aquifer were small compared to the larger TCE plume in the deeper (i.e., C well depth) portion of the aquifer. Historically, no TCE or PCE detections have been observed in the D Zone. Figures 3-1, 3-2, and 3-3 are plume maps from the Site Investigation Report (TtNUS, 2003) that depict the limits of the plume in each zone based on the baseline sampling results (December 2000), prior to implementation of the IRA.

4.1.2 IRA Installation

In November 2000, 15 vegetable oil injection points were installed using hollow-stem auger drilling methods. The injection points were placed near wells 06A, 07A, 08B, 10B, and 09C, where the greatest TCE concentrations had been observed. For the source area near wells 06A and 07A, six injection points were installed in Zone A approximately 5 to 7 feet upgradient or southeast of wells 06A and 07A. There were two rows of three injection points, and the injection points were approximately 8 to 10 feet apart. The two new monitoring wells for this area (26A and 27A) were installed downgradient from wells 06A and 07A. Figure 3-1 shows the Zone A injection points and monitoring well locations.

Three Zone B injection points were located approximately 5 to 7 feet upgradient or southeast of well 08B. The injection points were spaced approximately 8 to 10 feet apart. The two new monitoring wells for this area (28B and 29B) were installed downgradient of well 08B. For the source area near well 10B, three injection points were installed in a row approximately 5 to 7 feet upgradient of well 10B. Figure 3-2 shows the Zone B injection points and monitoring well locations.

Three Zone C injection points were located approximately 5 to 7 feet upgradient or northwest of well 09C. The injection points were spaced approximately 8 to 10 feet apart. The three new monitoring wells for this area (30C, 31C, and 32C) were installed upgradient and downgradient of well 09C. Figure 3-3 shows the Zone C injection points and monitoring well locations.

4.1.3 Vegetable Oil Injections

In January 2001, 360 gallons of vegetable oil were injected into aquifer Zone A, 360 gallons were injected into aquifer Zone B, and 180 gallons were injected into aquifer Zone C. The OPT evaluated the results of the baseline groundwater sampling (December 2000) and three subsequent quarterly sampling efforts (March, July, and October 2001), and agreed that additional vegetable oil should be injected at SA 36 because the sulfate present in the groundwater had consumed much of the carbon from the first injection (CCI, 2002a). In November 2001, approximately 540 gallons of vegetable oil were injected into the Zone B and Zone C aquifer areas in the vicinity of wells 10B, 29B, 11C, and 31C. Zones B and C were selected for additional injections because they had shown the least amount of TCE reduction. Vegetable oil was not injected into aquifer Zone A in November 2001. Details of IRA activities from November 2000 (well installation) through January 2001 (initial vegetable oil injection) can be found in *Construction Documentation Report Enhanced Biodegradation IRA at Study Area 36*, (CCI, 2001).

4.1.4 Historical IRA Evaluation

A baseline sampling event (December 2000) and three quarterly groundwater monitoring rounds (March, July, and October 2001) were performed to evaluate the performance of the IRA. Figures 3-1, 3-2, and 3-3 show the approximate aerial extent of the contaminant plume within each aquifer zone respectively as interpreted from the baseline sampling event and the October 2001 sampling event conducted just prior to abandonment of the monitoring well network.

As depicted in Figures 3-1 to 3-3 the aerial extent of the contaminant plume decreased noticeably in Zones A and B during the approximately 325 days from the baseline sampling event to the last sampling event collected from the original monitoring network. An evaluation of the IRA performance from baseline to October 2001 shows both primary and secondary indicators demonstrating favorable conditions for reductive dechlorination. An evaluation of the C Zone from baseline to October 2001 shows little change in primary contaminant concentrations or secondary indicators.

The details of IRA monitoring for Rounds 1, 2, and 3, (March, July, and October 2001) are presented in Treatment Efficiency Reports for Study Area 36 (CCI, 2001b, 2001c, and 2002a). Each Treatment Efficiency Report includes a natural attenuation evaluation. The evaluation method used consists of a "scoring" system developed by AFCEE to determine the degree to which natural attenuation is occurring in a groundwater plume. The "scoring" involves assigning a numeric value to each applicable parameter in the contamination source well of each plume on the basis of its role in the reductive dechlorination process. The score of each parameter is then summed to give a final value or "score" to the plume's contamination source well. This process is described in detail in the *Draft EPA Region 4 Suggested Principles for Evaluation of a Site for Natural Attenuation (Biological Degradation) of Chlorinated Solvents*

(EPA, 1999). The analytical parameters and their respective values assigned are presented in Table 4-1. The general steps implemented to complete the groundwater evaluation are listed in Appendix D.

The evaluation was performed for the October 2001 sampling event (the last event prior to well abandonment) for wells OLD-36-27A, OLD-36-08B, and OLD-36-09C. The scoring results indicated there was adequate evidence for biodegradation of chlorinated organics in the A Zone with a score of 19 and strong evidence for biodegradation of chlorinated organics in the B and C Zones with scores of 27 and 25 respectively. The historical analytical data for the original monitoring wells (abandoned wells) are presented in Appendix E.

A new monitoring well network consisting of 17 replacement monitoring wells was installed in April and May 2002. Initial sampling of these wells was performed between May 7, 2002 and May 31, 2002. The results of the May 2002 sampling (Round 4) were reported in the *Round 4 Groundwater Monitoring Sampling Event, Treatment Efficiency Report, Study Area 36* (CCI, 2002b). Figures 4-1, 4-2, and 4-3 depict the location of the former monitoring well network relative to the replacement well network. It should be noted that comparisons of former well data to replacement well data should be performed cautiously. For example, a comparison of analytical data from well 09C (October 2001) to 09CR (May 2002) appears to indicate that TCE concentrations decreased from 150 µg/L to 25.3 µg/L. However, well 09CR is located approximately 15 ft downgradient of 09C. Because the TCE plume seepage velocity was estimated to be 6 ft/yr, based on the observed gradient at that time, TCE concentrations detected from well 09C would require approximately 2.5 years to migrate to well 09CR. This particular comparison has been made during previous evaluations and it is discussed in more detail below.

4.1.5 Data Evaluation – December 2002 through June 2004

The groundwater analytical data from December 2002 through June 2004 were evaluated using the same scoring method previously applied at SA 36 to evaluate the degree to which reductive dechlorination is occurring. The scored analytical parameters and their respective values are defined in Table 4-1. The results of the scoring process are presented in Table 4-5. Historical analytical data for the replacement wells through June 2004 are included in Appendix F. The summary tables described below are located in the tabbed section of this report entitled TABLES and present the groundwater monitoring data collected during from December 2002 through June 2004.

- Table 4-2 - PCE, TCE and their daughter products (primary indicators) presented for Zones A, B, and C and listed in upgradient through downgradient order for the December 2002 through June 2004 monitoring events.

- Table 4-3 - Natural attenuation and water quality parameters (secondary indicators for reductive dechlorination) presented for Zones B and C and listed in upgradient through downgradient order. Data are not presented for Zone A because there were no exceedances of GCTLs and no detections of VOCs in Zone A during this monitoring period except for an anomalous result in June 2004 for well 02AR as discussed in the following subsection.

- Table 4-4 - Reductive dechlorination process evaluation parameters (primary and secondary indicators) for each zone listed in upgradient through downgradient order for the June 2004 monitoring event.

- Table 4-5 - Reductive dechlorination process screening (i.e., AFCEE protocol scoring presented in Table 4-1) for contaminated wells in Zones B and C for the June 2004 monitoring event.

Samples from the first monitoring event of the current evaluation period (December 2002) were collected from the replacement wells (installed in May 2002). The December 2002 sampling event followed the November 2001 vegetable oil injection by approximately one year. The most recent monitoring data presented in this report were collected in June 2004, approximately 31 months after the November 2001 vegetable oil injection.

Tables 4-2, 4-3, and 4-4 list the wells in upgradient to downgradient order. Figures 4-1, 4-2, and 4-3 show TCE and PCE exceedances for Zones A, B, and C, respectively, for the current evaluation period. Results of the data evaluation for each zone are discussed below.

Zone A Evaluation Results

As shown in Table 4-2, the four Zone A wells evaluated in the upgradient to downgradient flow path have had no chlorinated VOC (CVOC) detections from December 2002 to March 2004. The data implies that CVOC contamination in Zone A is below the GCTL. However, June 2004 analytical data for well 02AR shows a TCE concentration of 12.9 µg/L. Historically, this well has shown no CVOC detections and TCE concentrations greater than the GCTL have not been previously observed in this northern area of the site in Zones A or B. Although not included in this report, the results of the September and December 2004 sampling events remain consistent with historical results for well 02AR with non-detect TCE concentrations. In addition, no replacement well is located directly downgradient of former well 27A (previous hot spot) to evaluate TCE concentrations in this area. And, because of the low contaminant seepage velocity, downgradient wells 01AR and 19AR may not detect, at this time, a residual plume that may be present.

For well 07AR, only one sample (September 2003) has been collected for laboratory analysis during all the past monitoring events (see Appendix F). The analytical results showed TCE at 3.16 µg/L in 2003, a value slightly above the GCTL. Sampling of well 07AR was apparently not performed by the Basic Ordering Agreement (BOA) contractor due to a layer of vegetable oil observed in this well during all other monitoring events since that time. Three Zone A vegetable oil injection wells were located approximately 10 feet south of well 07AR. The estimated seepage velocity for the vegetable oil in Zone A is 3.5 feet per year therefore, observing oil in well 07AR is not unexpected. Another explanation for this observance is that the oil may have appeared in the well very quickly during the injection under pressure, possibly by just flowing across the top of the water table as a non-aqueous phase liquid (NAPL).

The hydrographs for Zone A show a historic high water level for September 2003, possibly causing the immiscible oil layer in 07AR to thin or disappear at that time. This behavior is likely due to the well "conduit" effects or perhaps a breakdown or dispersion of the mobile layer of oil. Historically, former well 07A (which had been located approximately 15 feet south of the replacement well 07AR) showed TCE concentrations ranging from 59 µg/L in December 2000 decreasing to 12 µg/L in October 2001. Figure 3-1 shows the approximate aerial extent of the contaminant plume during baseline sampling in December 2000 and just prior to abandonment of the monitoring well network. Figure 3-1 shows the former location of well 07A, the TCE detections during the previous evaluation period, and the locations of the Zone A vegetable oil injection points. Figure 4-1 shows the TCE and PCE exceedances in Zone A for the current evaluation period and the relationship between the former and current monitoring wells.

Zone B Evaluation Results

As shown in Table 4-2, three of the five Zone B wells had CVOC detections during the evaluation period, and only two of them ("source" wells 08BR and 10BR) had detections after March 2003. However, as shown on Figure 4-2, an exceedance of the GCTLs occurred only at well 08BR. CVOCs were not detected in upgradient well 24BR or downgradient well 20BR during any of the seven monitoring events included in this report. TCE concentrations in Zone B wells have decreased from a maximum of 190 µg/L (old well 29B) in the December 2000 baseline monitoring event to a maximum of 1.48 µg/L (10BR) in the June 2004 event. However, similar to Zone A, there is no replacement well directly downgradient of former well 29B (previous hot spot) so monitoring this location is not possible. Downgradient wells 20BR and 22BR located approximately 60 feet from the former hot spot may not detect, at this time, migration of a residual plume. Although PCE and TCE concentrations have not exceeded their cleanup goals of 3 µg/L during the last three monitoring events of this evaluation period, there is a lack of monitoring data in portions of the former plume.

From an initial concentration of 54 µg/L TCE in May 2002, the groundwater contamination in replacement well 08BR has decreased steadily throughout the evaluation period. Table 4-2 and concentration trend plot Figure G-1 (Appendix G) provide evidence that reductive dechlorination is occurring in the area of 08BR as a result of the consistent decline in the TCE concentration with an associated increase in the concentration of its daughter product *cis*-1,2-DCE. Furthermore, 1.07 µg/L VC was detected along with TCE and *cis*-1,2-DCE during the March 2004 event, another indicator that biodegradation is occurring. TCE detections in 10BR have been below the GCTL throughout this evaluation period (Table 4-2). *Cis*-1,2-DCE also has been detected (below GCTLs) in 10BR and has been slightly increasing during recent monitoring events. VC has not been detected indicating either limited evidence of or a slow down in further degradation in the area of 10BR. PCE was detected at concentrations less than its GCTL in samples from downgradient well 22BR during the first two monitoring events of this evaluation period, but has not been detected since March 2003 monitoring event. Since March 2003 no CVOCs have been detected in that well, indicating that area has remained clean.

A plot of the June 2004 Zone B data in Table 4-2 along the flow path (Figure G-3) illustrates that contaminants are breaking down or are not migrating to the downgradient wells. Upgradient well 24BR and downgradient well 20BR have been non-detect throughout the evaluation period with no VOC detections, and downgradient well 22BR has been clean since June 2003. TCE concentrations in 08BR have decreased steadily, while *cis*-1,2-DCE concentrations have been detected (but below its GCTL of 70 µg/L). At 10BR, downgradient of 08BR, the concentrations of both TCE and *cis*-1,2-DCE have remained low and shown little change. As shown in Table 4-3, the only Zone B well to show significant increases in chloride concentrations over time (direct evidence of dechlorination) is 20BR, which suggests it might be more directly downgradient than 10BR from 08BR. Given the distances between these wells (approximately 60 to 100 feet), the estimated range for contaminant seepage velocity (11 to 15 ft/yr) for Zone B, and the observed aquifer's attenuation capacity, constituents detected in 08BR are unlikely to be detected at wells 10BR and/or 20BR during the evaluation period.

Based on the current use of the site and an examination of primary indicator data alone, two of the three regulatory requirements for natural attenuation described in Appendix C have been met for Zone B:

- Continued addition of contaminants to groundwater has been stopped.
- On site, downgradient compliance boundary wells meet GCTLs.

The third requirement, remediating the plume to meet GCTLs, can not be demonstrated because of the lack of monitoring data in the downgradient portion of the plume (i.e., area of former well 29B). Also, the March 2004 data showed a VC detection (1.07 µg/L) in 08BR, which very slightly exceeded the GCTL; however, June 2004 results show no detection of VC for this well. The AFCEE protocol screening

process for the June 2004 08BR monitoring data resulted in a score of 21 (see Table 4-5) indicating strong evidence for biodegradation of chlorinated organics.

Secondary Indicator Data – Zone B

As shown in Table 4-4 and Figure G-4, the very low value for nitrate/nitrite and the absence of sulfate coupled with higher values for ferrous iron, sulfide and methane (relative to both the upgradient and downgradient wells) are all signs that the sequential reductive dechlorination process was occurring in the vicinity of 08BR during June 2004. Other positive signs of reductive dechlorination, some of which are illustrated in Figures G-5 and G-6 or shown in Table 4-5, include the following:

- Negative ORP values indicating moderate reducing conditions (favorable to degradation).
- An increase in both carbon dioxide (sign of increased microbial activity) and alkalinity (often caused by a decrease in pH due to microbial activity resulting in an increase in carbon dioxide).
- The presence of dissolved hydrogen (indicates organic carbon is being fermented).
- Elevated chloride concentrations in downgradient well 20BR.
- TOC (carbon and energy source and breakdown product of vegetable oil) concentration in 08BR was higher than in the upgradient and downgradient wells, but was reduced relative to previous sampling events (Table 4-3).

Secondary indicators for 10BR indicate reductive dechlorination is also occurring in that area. In general, most secondary parameter values were more favorable in 10BR than in the non-source wells, but less favorable than in 08BR. In particular, sulfate was detected at 15.7 mg/L (more than 20 mg/L is considered unfavorable), and the ferrous iron and methane concentrations were lower. The AFCEE protocol screening score was 19 (see Table 4-5), placing it at the high end of the adequate evidence range.

Zone C Evaluation Results

Maximum PCE concentrations have decreased slightly from 13 µg/L (former well 23C) before the baseline monitoring event to a June 2004 concentration of 7.62 µg/L (23CR), and TCE has decreased from 300 µg/L (former well 09C) in the baseline event to June 2004 concentration of 43 µg/L (09CR). However well 09CR is approximately 15 feet south and downgradient of the former location of well 09C and a direct comparison of the data from these wells should be performed with caution. The current PCE and TCE maximums exceed the GCTL of 3 µg/L for both compounds. It should be noted that from wells

currently sampled PCE concentrations above the GCTL have only been detected in the far northern portion of the plume (i.e., well 23CR).

As shown in Table 4-2, wells 23CR and 09CR are the only Zone C wells that have had detections of chlorinated solvents greater than GCTLs throughout the current evaluation period. Low concentrations of *cis*-1,2-DCE in 11CR have been reported in four of the seven monitoring events of this evaluation period; however, no cVOCs were detected in groundwater samples from wells 18CR, 25CR, 35CR or 36CR. Wells 25CR and 35CR were not sampled during the March and June 2004 monitoring events due to damages sustained to the wells during site construction activities. It should be noted that during the previous evaluation period (March 2001 – May 2002), TCE was detected at very low, estimated concentrations in samples collected from 11CR (1.43 µg/L) and the most downgradient well, 36CR (1.66 µg/L).

The sampling results for the primary indicators (Table 4-2 and Figure G-7) in upgradient well 23CR show that reductive dechlorination was taking place early in the evaluation period based on the presence of PCE and its daughter products TCE and *cis*-1,2-DCE. However, *cis*-1,2-DCE has not been detected in the last four sampling rounds and the PCE and TCE concentrations have not decreased significantly, indicating the degradation process may have slowed in this area of Zone C. PCE has not been detected in the other source well, 09CR, which is downgradient of 23CR.

Between May 2002 and September 2003, the TCE concentration in 09CR decreased from 25.3 µg/L to 6.13 µg/L. This TCE decrease and the concurrent *cis*-1,2-DCE detections indicate that reductive dechlorination was occurring. Unlike Zone B where *cis*-1,2-DCE concentrations were equal to or much higher than TCE concentrations, the *cis*-1,2-DCE concentrations in Zone C are consistently lower than the TCE concentrations (Figure G-8). Results for the December 2003, March 2004, and June 2004 monitoring events show increases in both the TCE and *cis*-1,2-DCE concentrations, indicating that in spite of this rebound, the reductive dechlorination process is still working to some degree.

Discussion of Increasing Trend in TCE Concentrations in Well 09CR

For the past three monitoring events, an increasing trend in TCE and *cis*-1,2-DCE concentrations has been observed for well 09CR (Table 4-2). Prior to these events, the TCE concentration varied from 4.63 µg/L (December 2002) to 6.96 µg/L (June 2003). The location of well 09CR is approximately 15 feet south and downgradient of the former well 09C, which historically had the highest observed site-wide TCE concentration of 300 µg/L (December 2000). The Zone C injections were performed in January 2001 and November 2001. After the initial vegetable oil injections in January 2001, the TCE concentrations in well 09C decreased from 180 µg/L (March 2001) to 150 µg/L (October 2001). The

injection points were located approximately 8 feet upgradient of former well 09C and 20 feet upgradient of well 09CR.

The currently observed rebound in TCE concentrations in well 09CR may be attributed to the relatively low estimated Zone C groundwater seepage velocity of 13 feet/yr and the downgradient location of well 09CR from the former well 09C. The last known TCE concentration for well 09C, 15 feet upgradient from 09CR, was 150 µg/L. It is not known how the second injections affected the TCE concentrations in 09C as it was abandoned in December 2001 prior to site development. Based on the performance of the first round of injections, it is likely the TCE concentrations at 09C would have decreased. Therefore, as the groundwater flows slowly east to southeast in Zone C at a velocity of 13 feet/yr, TCE concentration values of 150 µg/L or less may be observed at well 09CR, depending upon the efficiency of the reductive dechloridation process.

Although the indicators observed in well 09CR currently show strong evidence for the reductive chlorination process, the increasing trend in TCE concentration in this area is not unexpected given the analysis above. The TCE concentration may continue to increase in well 09CR and monitoring of this well is critical to define the plume behavior and the efficiency of the reductive dechlorination process.

CVOC data from well 25CR through December 2003 is non-detect but unfortunately this downgradient well has been abandoned due to damage during site construction. The other two downgradient wells (35CR and 36CR) have historically been uncontaminated, therefore these two wells will be critical in assessing any migration of the plume in Zone C.

Contaminants detected in 23CR and 09CR have not been detected in the four downgradient wells (18CR, 25CR, 35CR, and 36CR) during the evaluation period. The low contaminant seepage velocity estimated for Zone C (7 to 11 feet/yr) and the distance between the source and downgradient wells (approximately 100 to 200 feet) will govern the slow migration, if any, of contamination to downgradient wells.

Secondary Indicator Data – Zone C

Review of the secondary indicator data in Tables 4-3 through 4-5 support the interpretation of the primary indicator data. At 23CR, the DO was 0.49 mg/L in June 2004 and has been historically less than 1.0 mg/L since June 2003. The DO concentration measured in March 2004 approached the 1 mg/L DO level above which anaerobic bacteria required for reductive dechlorination can survive. Low nitrate/nitrite concentrations and the presence of ferrous iron in all monitoring events have been observed. Sulfate has been present above 20 mg/L during the past three monitoring events indicating it mat be competing with the reductive dechlorination process. The absence of methane over the past four events further suggests that little or no methanogenesis is occurring. For all monitoring events for

well 23CR, pH values have been outside the favorable range (less than 5). This condition could be contributing to the inefficiency of the degradation process. Carbon dioxide values have not been significantly greater than in other wells in Zone C. Alkalinity, which can increase when carbon dioxide increases, was non-detect in the three events preceding March 2004 when it did spike. An increase in carbon dioxide and alkalinity is a sign of increased microbial activity. Chloride also spiked in the March 2004 event, but was still well below background. Thus, conditions in the 23CR area during the evaluation period do not appear to have been conducive to optimum rates of reductive dechlorination. This conclusion is further supported by the AFCEE protocol score for 23CR of 14 which is at the upper end that limited evidence of biodegradation is occurring.

Reducing conditions appear to improve downgradient of 23CR in the area of the other source well 09CR. DO was not measured in March 2004, but has been historically below 0.85 mg/L. Nitrate/nitrite concentrations have been non-detect for the past four events and sulfate has been below 20 mg/L with consistently high sulfide and methane detections relative to both upgradient and downgradient wells. ORP values indicate slightly reducing conditions throughout the sampling period. Like 23CR, pH values have been outside the favorable range, carbon dioxide values have been similar to other Zone C wells and alkalinity has been non-detect. Chloride has been consistently detected in 09CR, unlike some of the other Zone C wells, but the concentrations have been well below background throughout the evaluation period. Evaluation of the June 2004 sampling data along the groundwater flow path (Table 4-4 and Figures G-9 through G-12) provides a clear indication that the environment around 09CR is more reducing than the other areas of Zone C. The AFCEE protocol screening score (Table 4-5) for 09CR of 22 indicates strong evidence for the reductive dechlorination process; however, based upon the rise in TCE concentrations and slight to moderate reducing conditions, strong evidence should be qualified as unlikely due to these factors.

Summary of Zone C Evaluation Results

Based on the current use of the site and an examination of the primary and secondary indicator data, two of the three requirements for natural attenuation described in Appendix C are being met for Zone C:

- Continued addition of contaminants to groundwater has been stopped.
- On site, downgradient compliance boundary wells meet GCTLs.

The third requirement, remediating the plume to meet GCTLs, has not been met for PCE in the 23CR area and for TCE in the 09CR area. As discussed above, reductive dechlorination appears relatively week at 23CR, and may be the result of low alkalinity and less than favorable pH values. Although TCE and *cis*-1,2-DCE concentrations have increased during the past three monitoring events, reductive dechlorination is occurring at 09CR. The cause and significance of these recent concentration increases

are unknown. Because the estimated groundwater seepage velocity is relatively low for Zone C, several additional monitoring events over an extended period of time may be required to compile the data needed to evaluate the behavior of the plume.

5.0 IRA CONCLUSIONS AND RECOMMENDATIONS

5.1 CONCLUSIONS

In Zone A, CVOCs were detected in June 2004 in well 02AR with a TCE concentration of 12.9 µg/L. Historically, well 02AR has not shown any CVOC detections and was not located within the Zone A plume. Prior to this detection, the last time CVOCs were detected in Zone A was September 2003 when TCE was detected in well 07AR at 3.16 µg/L, slightly above the GCTL of 3 µg/L. Historically, well 07AR has not been sampled due to presence of vegetable oil in the well. The previous maximum Zone A TCE detection was 97 µg/L for well 27A in March 2001 - just after the first vegetable oil injection in January 2001. TCE concentrations decreased in well 27A to 14 µg/L in July 2001 and 1.5 µg/L in October 2001 prior to well abandonment. There were no CVOC detections in groundwater samples collected during the December 2003 and March 2004 monitoring events, but there is no monitoring point downgradient of former well 27A to rule out the presence of a residual plume.

Due to a lack of analytical data for well 07AR and downgradient of 27A, and the recent TCE observance in well 02AR, there is no conclusive evidence that Zone A has been remediated to levels below the GCTL. Additional groundwater monitoring should be conducted to monitor for possible contaminant rebound, and to monitor the TCE concentrations in wells 02AR and 07AR.

In Zone B no GCTL exceedances have occurred since the September 2003 monitoring event, except for a VC detection of 1.07 µg/L (GCTL = 1 µg/L) in March 2004. This slight exceedance occurred in the source well (08BR), which had the highest contaminant concentrations detected during the evaluation period and showed the strongest evidence for reductive dechlorination based on both primary and secondary indicators. Therefore, the VC is considered a breakdown product that should be further monitored. The environment for reductive dechlorination appears to be less favorable in the area of the other source well, 10BR, but CVOC concentrations have remained below GCTLs throughout the evaluation period in this well. The IRA has successfully reduced the PCE and TCE concentrations in Zone B, but there is no monitoring point near or downgradient of former well 29B. Additional groundwater monitoring should be conducted to monitor for possible contaminant rebound or migration to downgradient wells 20BR and 22BR.

Although Zone C appears to have shown a dramatic decline in maximum TCE concentrations, 300 µg/L in December 2000 (former well 09C) to 4.63 µg/L in December 2002 (well 09CR), direct comparison of the data from these two wells is not representative because of the distance between their locations. Additionally, the TCE concentration at well 09CR has rebounded to 43 µg/L, which is greater than the GCTL. PCE detections in upgradient well 23CR have decreased only slightly from 10.8 to 7.62 µg/L,

exceeding the GCTL throughout the evaluation period. Reductive dechlorination appears to be occurring around 09CR, in spite of the rebounding TCE concentrations. However, the primary and secondary indicators for 23CR suggest the reductive dechlorination process may be limited in that area. Well 23CR is the most upgradient well in Zone C and because groundwater moves very slowly (13 ft/yr), and the contaminant seepage velocity is low, the plume is expected to remain stable for the foreseeable future.

The Zone C groundwater flow direction has remained generally towards the east-southeast although some flow variation towards the northeast has been observed. Additional groundwater sampling is needed to monitor the rebound in TCE concentrations at 09CR. Because of the slow groundwater velocity in Zone C, semi-annual monitoring events should be sufficient for detecting trends.

All the original wells used to define the plumes during the site investigation have been abandoned due to the re-development of the property. The replacement wells are adequate to monitor the overall location and lateral extent of the CVOC plumes, but are not necessarily in ideal locations for monitoring hot spots identified during the site investigation. Additionally, some of the replacement wells have been abandoned, further limiting interpretation of monitoring data. The groundwater seepage velocity in all three zones is very low, and some downgradient wells may not see the leading edge of the plume or the effects of reductive dechlorination for many years. While the wells are adequate as compliance boundary wells, they may not assist in defining the behavior of the IRA within the core of the plume.

5.2 RECOMMENDATIONS

Based on the data evaluations and conclusions described above, the following are recommended:

- Continued monitoring of all replacement wells in all three zones until no CVOC detections are observed in any zone for several consecutive monitoring events. (Keeping in mind the possibility of a residual plume located between monitoring points).
- Groundwater monitoring should be conducted to monitor for possible contaminant rebound, and to monitor the TCE concentrations in well 07AR.
- The monitoring frequency should be reduced from quarterly to semi-annually for existing replacement wells (as a result of the very low groundwater seepage velocity).
- All VFA analysis should be performed using lower detection limits.
- Current and future monitoring data should be evaluated to determine whether enhancements to the reductive dechlorination process are needed for Zone C, particularly near 23CR. Fermentation of complex substrates to metabolic acids and hydrochloric acid (HCl) during anaerobic dechlorination

may decrease the pH significantly in low-alkalinity systems. Lowering of pH to below 5 or 4 standard units may inhibit growth of dechlorinating microbes. The analytical results from well 23CR show low alkalinity and low pH therefore, pH buffer amendments such as sodium bicarbonate may be required in this groundwater system with insufficient natural buffering capability.

- Detailed evaluation of monitoring data for Zones A and B may be minimized in future reports, so long as there continues to be limited CVOC detections in these zones and analytical data trends do not indicate increasing concentrations.

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TABLES

TABLE 2-1

GROUNDWATER ELEVATIONS
STUDY AREA 36 - MAIN BASE

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

Well	Well Type	Screened Interval (bgs)	TOC 7/26/02 Elevation (AMSL)	TOC[a] 3/18/03 Elevation (AMSL)	TOC[a] 3/31/04 Elevation (AMSL)	8/16/02		8/24/02		12/6/02		3/24/03		6/16/03	
						Depth to Water (BTOC)	Groundwater Elevation (AMSL)	Depth to Water (BTOC)	Groundwater Elevation (AMSL)	Depth to Water (BTOC)	Groundwater Elevation (AMSL)	Depth to Water (BTOC)	Groundwater Elevation (AMSL)	Depth to Water (BTOC)	Groundwater Elevation (AMSL)
OLD-36-01AR	2" well	8-18	117.19	**115.24**	115.24	7.80	109.39	8.05	109.14	10.04	107.15	8.80	106.44	7.47	107.77
OLD-36-02AR	2" well	5-15	116.90	**114.37**	114.37	7.48	109.42	7.72	109.18	9.68	107.22	7.91	106.46	6.61	107.76
OLD-36-07AR	2" well	5-15	116.93	116.93	**113.82**	Not measured		8.68	108.25	~12" vegetable oil in well		~12" vegetable oil in well		Not measured	
OLD-36-08BR	2" well	13-18	114.90	114.90	**113.84**	5.25	109.65	5.50	109.40	7.41	107.49	8.09	106.81	6.86	108.04
OLD-36-09CR	2" well	27-32	114.50	114.50	**113.82**	8.51	105.99	8.41	106.09	14.68	99.82	13.78	100.72	10.80	103.70
OLD-36-10BR	2" well	16-21	118.34	**115.17**	115.17	8.95	109.39	9.20	109.14	11.20	107.14	8.49	106.68	7.15	108.02
OLD-36-11CR	2" well	27-32	119.08	**115.34**	115.34	12.95	106.13	12.87	106.21	19.10	99.98	14.40	100.94	11.54	103.80
OLD-36-18CR	2" well	26-31	115.38	115.38	115.38	9.35	106.03	9.25	106.13	15.31	100.07	14.41	100.97	11.49	103.89
OLD-36-19AR	2" well	7.4-17.4	117.85	**115.47**	115.47	8.58	109.27	8.99	108.86	10.79	107.06	9.02	106.45	7.65	107.82
OLD-36-20BR	2" well	18-23	117.41	**115.43**	115.43	8.15	109.26	8.55	108.86	10.38	107.03	8.99	106.44	7.63	107.80
OLD-36-22BR	2" well	14.5-19.5	117.72	**114.39**	114.39	8.33	109.39	8.55	109.17	10.36	107.36	7.94	106.45	6.65	107.74
OLD-36-23CR	2" well	28-33	114.69	**114.44**	114.44	8.64	106.05	8.54	106.15	15.06	99.63	13.78	100.66	10.80	103.64
OLD-36-24BR	2" well	18-23	117.18	117.18	**115.08**	7.32	109.86	7.34	109.84	9.58	107.60	10.31	106.87	8.98	108.20
OLD-36-25CR	2" well	28-33	117.01	117.01	117.01	10.97	106.04	10.87	106.14	16.91	100.10	16.00	101.01	13.37	103.64
OLD-36-33AR	2" well	10-20	118.20	118.20	**115.08**	7.97	110.23	8.08	110.12	10.10	108.10	10.81	107.39	9.72	108.48
OLD-36-35CR	2" well	29-34	120.47	120.47	120.47	10.20	110.27	14.52	105.95	15.67	104.80	12.15	108.32	14.35	106.12
OLD-36-36CR	2" well	29-34	120.08	120.08	**115.08**	9.36	110.72	13.95	106.13	20.11	99.97	19.27	100.81	16.35	103.73

TABLE 2-1

GROUNDWATER ELEVATIONS
STUDY AREA 36 - MAIN BASE

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

Well	Well Type	Screened Interval (bgs)	TOC 7/26/02 Elevation (AMSL)	TOC[a] 3/18/03 Elevation (AMSL)	TOC[a] 3/31/04 Elevation (AMSL)	9/15/03		12/15/03		3/15/04		6/13/04	
						Depth to Water (BTOC)	Groundwater Elevation (AMSL)	Depth to Water (BTOC)	Groundwater Elevation (AMSL)	Depth to Water (BTOC)	Groundwater Elevation (AMSL)	Depth to Water (BTOC)	Groundwater Elevation (AMSL)
OLD-36-01AR	2" well	8-18	117.19	**115.24**	115.24	5.27	109.97	6.22	109.02	6.40	108.84	5.85	109.39
OLD-36-02AR	2" well	5-15	116.90	**114.37**	114.37	4.45	109.92	5.37	109.00	5.58	108.79	4.92	109.45
OLD-36-07AR	2" well	5-15	116.93	116.93	**113.82**	8.51	108.42	10.82	106.11	20.14	93.68	7.52	106.30
OLD-36-08BR	2" well	13-18	114.90	114.90	**113.84**	4.70	110.20	5.67	109.23	5.81	108.03	4.45	109.39
OLD-36-09CR	2" well	27-32	114.50	114.50	**113.82**	8.01	106.49	8.88	105.62	9.10	104.72	8.55	105.27
OLD-36-10BR	2" well	16-21	118.34	**115.17**	115.17	5.00	110.17	5.91	109.26	6.10	109.07	5.51	109.66
OLD-36-11CR	2" well	27-32	119.08	**115.34**	115.34	8.72	106.62	9.60	105.74	9.81	105.53	10.00	105.34
OLD-36-18CR	2" well	26-31	115.38	115.38	115.38	Not measured		9.68	105.70	8.05	107.33	8.26	107.12
OLD-36-19AR	2" well	7.4-17.4	117.85	**115.47**	115.47	5.51	109.96	6.43	109.04	6.63	108.84	6.30	109.17
OLD-36-20BR	2" well	18-23	117.41	**115.43**	115.43	5.49	109.94	6.41	109.02	6.62	108.81	6.30	109.13
OLD-36-22BR	2" well	14.5-19.5	117.72	**114.39**	114.39	4.49	109.90	5.46	108.93	5.60	108.79	4.96	109.43
OLD-36-23CR	2" well	28-33	114.69	**114.44**	114.44	7.97	106.47	8.78	105.66	8.98	105.46	9.20	105.24
OLD-36-24BR	2" well	18-23	117.18	117.18	**115.08**	6.87	110.31	7.91	109.27	6.01	109.07	5.81	109.27
OLD-36-25CR	2" well	28-33	117.01	117.01	117.01	10.73	106.28	11.52	105.49	Abandoned		Abandoned	
OLD-36-33AR	2" well	10-20	118.20	118.20	**115.08**	7.62	110.58	8.36	109.84	5.70	109.38	5.56	109.52
OLD-36-35CR	2" well	29-34	120.47	120.47	120.47	11.93	108.54	9.37	111.10	8.25	112.22	Damaged	
OLD-36-36CR	2" well	29-34	120.08	120.08	**115.08**	8.71	111.37	9.55	110.53	9.10	105.98	8.97	106.11

Notes:
[a] Bold indicates well riser casings that were cut and refinished, and well tops resurveyed.
All measurements are in units of feet.
AMSL - Above mean sea level
bgs - below ground surface
BTOC - Below top of casing
TOC - Top of casing

TABLE 2-2

COMPARISON OF AQUIFER HORIZONTAL GRADIENTS
STUDY AREA 36

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

Well Pair	Horizontal Distance (feet)	Groundwater Elevation		2001 Horizontal Gradients		Avg. 2001 Gradient
		Jul-01	Oct-01	Jul-01	Oct-01	
33A	180	108.50	NA	0.008	--	0.007
19A		107.06	108.35			
16A	120	107.96	109.07	0.007	0.006	
19A		107.06	108.35			
24B	172	108.44	109.24	0.009	0.006	0.008
20B		106.89	108.21			
24B	132	108.44	109.24	0.010	0.007	
10B		107.17	108.30			
11C	200	103.19	104.68	0.001	0.002	0.002
36C		102.89	104.34			
12C	200	103.22	104.72	0.002	0.002	
36C		102.89	104.34			

Well Pair	Horizontal Distance (feet)	Groundwater Elevation		2003 Horizontal Gradients		Avg. 2003 Gradient
		Jun-03	Sep-03	Jun-03	Sep-03	
33AR	198	108.48	110.58	0.004	0.003	0.003
02AR		107.76	109.92			
33AR	221	108.48	110.58	0.003	0.003	
19AR		107.82	109.96			
24BR	196	108.20	110.31	0.002	0.002	0.002
22BR		107.74	109.90			
24BR	220	108.20	110.31	0.002	0.002	
20BR		107.80	109.94			
09CR	74	103.70	106.49	0.001	0.003	0.002
25CR		103.64	106.28			
11CR	134	103.80	106.62	0.001	0.003	
25CR		103.64	106.28			

NA - Not applicable; water level for this well on this date was spurious (see hydrograph).

TABLE 3-1

CHRONOLOGICAL SUMMARY OF ENVIRONMENTAL ACTIVITIES
STUDY AREA 36 – MAIN BASE

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

Event	Date
Environmental Baseline Survey	1994
Site Screening Field Investigation	1997
Additional Site Screening	1998
Site Screening Report	July 1999
Site Investigation	April 2000 to August 2000
IRA monitoring well and injection point installation	November 2000
Baseline IRA groundwater sampling	December 2000
Initial vegetable oil injection	January 2001
Quarterly IRA groundwater sampling	March, July, and October 2001
Second vegetable oil injection	November 2001
All site monitoring wells abandoned for Baldwin Park development	December 2001
Replacement monitoring wells installed	April 2002 to May 2002
IRA groundwater monitoring resumed	May and December 2002; March, June, September, and December 2003; March and June 2004
Site Investigation Report	February 2003

TABLE 4-1

ANALYTICAL PARAMETERS AND THEIR RESPECTIVE VALUES FOR SCREENING THE REDUCTIVE DECHLORINATION PROCESS
STUDY AREA 36 – MAIN BASE

NAVAL TRAINING CENTER
ORLANDO FLORIDA

PAGE 1 OF 2

Parameter	Contaminated Zone Concentration	Description	Points Awarded
Dissolved Oxygen	< 0.5 mg/L	Suppresses reductive dechlorination at higher concentrations	3
	> 1 mg/L	Vinyl chloride may be oxidized aerobically, but reductive dechlorination will not occur	-3
Nitrate[a]	< 1 mg/L	May compete with reductive pathway at higher concentrations	2
Iron (II)[a]	> 1 mg/L	Reductive pathway possible; vinyl chloride may be oxidized under Iron (III) reducing conditions	3
Sulfate[a]	< 20 mg/L	May compete with reductive pathway at higher concentrations	2
Sulfide[a]	> 1 mg/L	Reductive pathway possible	3
Methane[a]	< 0.5 mg/L	Vinyl chloride oxidizes	0
	> 0.5 mg/L	Ultimate reductive daughter product, vinyl chloride accumulates	3
Oxidation reduction potential[a] (ORP)	< 50 mV	Reductive pathway possible	1
	< -100 mV	Reductive pathway likely	2
pH[a]	5 < pH < 9	Optimal range for reductive pathway	0
	5 > pH > 9	Outside optimal range for reductive pathway	-2
TOC (total organic carbon)	> 20 mg/L	Carbon and energy source; drives dechlorination; can be natural or anthropogenic	2
Temperature	> 20°C	Biochemical process is accelerated	1
Carbon Dioxide[a]	> 2 times background	Ultimate oxidative daughter product	1
Alkalinity	> 2 times background	Results from interaction of carbon dioxide with aquifer minerals	1
Chloride[a]	> 2 times background	Daughter product of organic chlorine	2
Hydrogen	> 1 nM	Reductive pathway possible; vinyl chloride may accumulate	3
	< 1 nM	Vinyl chloride oxidized	0
Volatile fatty acids	> 0.1 mg/L	Intermediates resulting from biodegradation of aromatic compounds; carbon and energy source	2
BTEX[a]	> 0.1 mg/L	Carbon and energy source; drives dechlorination	2
Perchloroethene (PCE)		Material released	0
Trichloroethene[a] (TCE)		Material released	0
		Daughter product of perchloroethene	2[b]

TABLE 4-1

ANALYTICAL PARAMETERS AND THEIR RESPECTIVE VALUES FOR SCREENING THE REDUCTIVE DECHLORINATION PROCESS STUDY AREA 36 – MAIN BASE

NAVAL TRAINING CENTER ORLANDO FLORIDA

PAGE 2 OF 2

Parameter	Contaminated Zone Concentration	Description	Points Awarded
Dichloroethene[a] (*cis*-1,2-DCE)		Material released Daughter product of TCE and is greater than 80% of the total 1,2-DCE concentration	0 2[b]
Vinyl chloride[a]		Material released Daughter product of DCE	0 2[b]
Ethene/Ethane	> 0.01 mg/L > 0.1 mg/L	Daughter product of vinyl chloride/ethene	2 3
Dichloroethane		Daughter product of TCE	2
Chloroethane[a]		Daughter product of vinyl chloride under reducing conditions	2
1,1,1-Trichloroethane[a]		Material Released	0
Chloroform		Material Released Daughter product of Carbon PCE	0 2
Carbon Tetrachloride		Material Released	0
Dichloromethane		Material Released Daughter product of chloroform	0 2

[a] Required Analysis
[b] Points awarded only if it can be shown that the compound is a daughter product (i.e., not a constituent of the source NAPL).

TABLE 4-2

PRIMARY INDICATORS - PCE/TCE AND DAUGHTER PRODUCTS
DECEMBER 2002 THROUGH JUNE 2004
STUDY AREA 36

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

PAGE 1 OF 2

Station ID	Date	PCE (µg/L)	TCE (µg/L)	cis-1,2-DCE (µg/L)	Vinyl Chloride (µg/L)	Ethene (µg/L)	Ethane (µg/L)
GCTL[(a)]		3	3	70	1	*	*
Zone A							
OLD-36-33AR	Dec 2002	3 U	3 U	5 U	1 U	NA	NA
	March 2003	3 U	3 U	5 U	1 U	NA	NA
	June 2003	1 U	1 U	1 U	1 U	26 U	26 U
	Sept 2003	1 U	2 U	1 U	1 U	26 U	26 U
	Dec 2003	1 U	2 U	1 U	1 U	26 U	26 U
	March 2004	1 U	1 U	1 U	1 U	26 U	26 U
	June 2004	1 U	1 U	1 U	1 U	26 U	26 U
OLD-36-01AR	Dec 2002	3 U	3 U	5 U	1 U	NA	NA
	March 2003	3 U	3 U	5 U	1 U	NA	NA
	June 2003	1 U	1 U	1 U	1 U	26 U	26 U
	Sept 2003	1 U	2 U	1 U	1 U	26 U	26 U
	Dec 2003	1 U	2 U	1 U	1 U	26 U	26 U
	March 2004	1 U	1 U	1 U	1 U	26 U	26 U
	June 2004	1 U	1 U	1 U	1 U	26 U	26 U
OLD-36-02AR	Dec 2002	3 U	3 U	5 U	1 U	NA	NA
	March 2003	3 U	3 U	5 U	1 U	NA	NA
	June 2003	1 U	1 U	1 U	1 U	26 U	26 U
	Sept 2003	1 U	1 U	1 U	1 U	26 U	26 U
	Dec 2003	1 U	1 U	1 U	1 U	26 U	26 U
	March 2004	1 U	1 U	1 U	1 U	26 U	26 U
	June 2004	1 U	**12.9**	1 U	1 U	26 U	26 U
OLD-36-19AR	Dec 2002	3 U	3 U	5 U	1 U	NA	NA
	March 2003	3 U	3 U	5 U	1 U	NA	NA
	June 2003	1 U	1 U	1 U	1 U	26 U	26 U
	Sept 2003	1 U	1 U	1 U	1 U	115	26 U
	Dec 2003	1 U	2 U	1 U	1 U	26 U	26 U
	March 2004	1 U	1 U	1 U	1 U	26 U	26 U
	June 2004	1 U	1 U	1 U	1 U	26 U	26 U
Zone B							
OLD-36-24BR	Dec 2002	3 U	3 U	5 U	1 U	NA	NA
	March 2003	3 U	3 U	5 U	1 U	NA	NA
	June 2003	1 U	3 U	5 U	1 U	26 U	26 U
	Sept 2003	1 U	1 U	1 U	1 U	26 U	26 U
	Dec 2003	1 U	2 U	1 U	1 U	26 U	26 U
	March 2004	1 U	2 U	1 U	1 U	26 U	26 U
	June 2004	1 U	1 U	1 U	1 U	26 U	26 U
OLD-36-08BR	Dec 2002	1 U	**14.1**	9.9	1 U	NA	NA
	March 2003	1 U	**26.8** J	27.9	1 U	NA	NA
	June 2003	1 U	**20.5**	41.6	1 U	26 U	26 U
	Sept 2003	1 U	**7.16**	43.4	1 U	26 U	26 U
	Dec 2003	1 U	2.55	50.1	1 U	26 U	26 U
	March 2004	1 U	1.31	45.4	**1.07**	26 U	26 U
	June 2004	1 U	1 U	61	1 U	13 U	13 U
OLD-36-10BR	Dec 2002	1 U	1 U	4.21 J	1 U	NA	NA
	March 2003	1 U	1.42 J	1.6 J	1 U	NA	NA
	June 2003	1 U	1.8	1.58	1 U	26 U	26 U
	Sept 2003	1 U	2	1 U	1 U	26 U	26 U
	Dec 2003	1 U	2.34	4.63	1 U	26 U	26 U
	March 2004	1 U	2.11	5.77	1 U	26 U	26 U
	June 2004	1 U	1.48	7.61	1 U	26 U	26 U
OLD-36-22BR	Dec 2002	1.25 J	3 U	5 U	1 U	NA	NA
	March 2003	2.1 J	2.25 J	5 U	1 U	NA	NA
	June 2003	1 U	1 U	1 U	1 U	26 U	26 U
	Sept 2003	1 U	2 U	1 U	1 U	26 U	26 U
	Dec 2003	1 U	2 U	1 U	1 U	26 U	26 U
	March 2004	1 U	1 U	1 U	1 U	26 U	26 U
	June 2004	1 U	1 U	1 U	1 U	26 U	26 U
OLD-36-20BR	Dec 2002	3 U	3 U	5 U	1 U	NA	NA
	March 2003	3 U	3 U	5 U	1 U	NA	NA
	June 2003	1 U	1 U	1 U	1 U	26 U	26 U
	Sept 2003	1 U	2 U	1 U	1 U	26 U	26 U
	Dec 2003	1 U	2 U	1 U	1 U	26 U	26 U
	March 2004	1 U	1 U	1 U	1 U	26 U	26 U
	June 2004	1 U	1 U	1 U	1 U	26 U	26 U

TABLE 4-2

PRIMARY INDICATORS - PCE/TCE AND DAUGHTER PRODUCTS
DECEMBER 2002 THROUGH JUNE 2004
STUDY AREA 36

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

Station ID	Date	PCE (µg/L)	TCE (µg/L)	cis-1,2-DCE (µg/L)	Vinyl Chloride (µg/L)	Ethene (µg/L)	Ethane (µg/L)
GCTL[(a)]		3	3	70	1	*	*
Zone C							
OLD-36-23CR	Dec 2002	**10.80**	**3.78**	1.2 J	1 U	NA	NA
	March 2003	**10**	2.59 J	1.07 J	1 U	NA	NA
	June 2003	**8.56**	**3.01**	1.1	1 U	26 U	26 U
	Sept 2003	**9.95**	1.00 U	1 U	1 U	26 U	26 U
	Dec 2003	**8.89**	2.18	1 U	1 U	26 U	26 U
	March 2004	**8.30**	1.68	1 U	1 U	26 U	26 U
	June 2004	**7.62**	1.56	1 U	1 U	26 U	26 U
OLD-36-11CR	Dec 2002	3 U	3 U	5.85	1 U	NA	NA
	March 2003	3 U	3 U	5 U	1 U	NA	NA
	June 2003	1 U	1 U	1 U	1 U	26 U	26 U
	Sept 2003	1 U	2 U	1 U	1 U	26 U	26 U
	Dec 2003	1 U	2 U	1 U	1 U	26 U	26 U
	March 2004	1 U	1 U	1.60	1 U	26 U	26 U
	June 2004	1 U	1 U	1.94	1 U	26 U	26 U
OLD-36-09CR	Dec 2002	1 U	**4.63**	1 U	1 U	NA	NA
	March 2003	1 U	**6.49** J	1.59 J	1 U	NA	NA
	June 2003	1 U	**6.96**	2.18	1 U	26 U	26 U
	Sept 2003	1 U	**6.13**	1.71	1 U	26 U	26 U
	Dec 2003	1 U	**16.6**	3.5	1 U	26 U	26 U
	March 2004	1 U	**27.3**	8.39	1 U	26 U	26 U
	June 2004	1 U	**43**	14.9	1 U	26 U	26 U
OLD-36-18CR	Dec 2002	3 U	3 U	5 U	1 U	NA	NA
	March 2003	3 U	3 U	5 U	1 U	NA	NA
	June 2003	1 U	1 U	1 U	1 U	26 U	26 U
	Sept 2003	1 U	2 U	1 U	1 U	26 U	26 U
	Dec 2003	1 U	2 U	1 U	1 U	26 U	26 U
	March 2004	1 U	1 U	1 U	1 U	26 U	26 U
	June 2004	1 U	1 U	1 U	1 U	26 U	26 U
OLD-36-25CR	Dec 2002	3 U	3 U	5 U	1 U	NA	NA
	March 2003	3 U	3 U	5 U	1 U	NA	NA
	June 2003	1 U	1 U	1 U	1 U	26 U	26 U
	Sept 2003	1 U	2 U	1 U	1 U	26 U	26 U
	Dec 2003	1 U	2 U	1 U	1 U	26 U	26 U
	March 2004			ABANDONED			
	June 2004			ABANDONED			
OLD-36-36CR	Dec 2002	3 U	3 U	5 U	1 U	NA	NA
	March 2003	3 U	3 U	5 U	1 U	NA	NA
	June 2003	1 U	1 U	1 U	1 U	26 U	26 U
	Sept 2003	1 U	2 U	1 U	1 U	26 U	26 U
	Dec 2003	1 U	2 U	1 U	1 U	26 U	26 U
	March 2004	1 U	1 U	1 U	1 U	26 U	26 U
	June 2004	1 U	1 U	1 U	1 U	26 U	26 U
OLD-36-35CR	Dec 2002	3 U	3 U	5 U	1 U	NA	NA
	March 2003	3 U	3 U	5 U	1 U	NA	NA
	June 2003	1 U	1 U	1 U	1 U	26 U	26 U
	Sept 2003	1 U	2 U	1 U	1 U	26 U	26 U
	Dec 2003	1 U	2 U	1 U	1 U	26 U	26 U
	March 2004			DAMAGED			
	June 2004			DAMAGED			

Bold indicates an exceedance of the GCTL.
*Indicates the screening criteria is not available.
[(a)] Groundwater Cleanup Target Level [Development of Soil Cleanup Target Levels (SCTLs) for Chapter 62-777, F.A.C., May 26, 1999].
"J" = qualifier indicates an estimated value.
NA - data not available.
"U" = qualifier indicates a non-detect value.
Well 25CR has been abandoned and will not be replaced.
Wells are listed in upgradient to downgradient flow direction.
Well 35CR is damaged; will be replaced or repaired.

TABLE 4-3

REDUCTIVE DECHLORINATION PROCESS SECONDARY INDICATORS
JUNE 2003 THROUGH JUNE 2004
STUDY AREA 36 - MAIN BASE

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

Station ID	Monitoring Event	Dissolved Oxygen* (mg/L)	Nitrate & Nitrite (mg/L)	Ferrous Iron* (mg/L)	Mn* (mg/L)	Sulfate* (mg/L)	Sulfide & H_2S* (mg/L)	Methane (mg/L)	ORP* (mV)	pH* (SU)	TOC (mg/L)	Temp* (Celsius)	CO_2* (mg/L)	Alkalinity (mg/L)	Chloride (mg/L)	Dissolved Hydrogen (nM/L)	Volatile Fatty Acids (mg/L)
ZONE B																	
OLD-36-24BR	Jun-03	2.28	ND	0.04	ND	80	ND	ND	92	3.92	6.59	26.64	122	ND	ND	3.7	ND
OLD-36-24BR	Sep-03	ND	ND	0.08	ND	100	ND	ND	133	3.92	6.84	28.54	122	ND	ND	14.1	ND
OLD-36-24BR	Dec-03	3.75	0.034	0.22	NM	134	ND	ND	151	5.50	4.82	25.24	88	ND	5.61	2.3	ND
OLD-36-24BR	Mar-04	3.80	0.027	0.04	NM	NM	0.58	ND	NM	5.48	4.73	22.70	135	15	8.90	2.5	ND
OLD-36-24BR	Jun-04	0.38	0.040	ND	NM	79.2	0.10	0.026 U	19.6	5.52	8.74	26.60	135	17.3	3.01	2.3	ND
OLD-36-08BR	Jun-03	0.11	ND	0.66	ND	ND	5.00	8.23	-116	5.19	88.48	27.62	228	52.8	ND	3.2	34.9
OLD-36-08BR	Sep-03	1.75	ND	1.80	ND	ND	5.28	14.40	-201	4.98	32.49	28.13	165	62.5	6.46	5.5	15.1
OLD-36-08BR	Dec-03	0.47	0.020	0.54	NM	NM	5.34	16.70	-310	5.54	17.65	25.22	ND	54.3	6.67	8.7	1.5
OLD-36-08BR	Mar-04	NM	0.005	1.20	NM	ND	2.49	12.20	-122	5.64	13.20	23.45	233	66.9	6.94	4.1	ND
OLD-36-08BR	Jun-04	0.38	0.025	0.80	NM	2 U	5.00	9.98	-181	4.93	13.12	26.28	220	56.2	4.69	2.6	ND
OLD-36-10BR	Jun-03	0.30	0.02 U	1.00	ND	ND	ND	0.93	-48	5.98	7.30	25.90	188	65.5	6.98	NS	ND
OLD-36-10BR	Sep-03	0.00	0.02 U	ND	ND	55	2.00	0.56	-228	6.28	8.75	26.78	113	65.1	6.37	3.9	ND
OLD-36-10BR	Dec-03	0.58	0.02 U	0.11	NM	17.3	0.30	0.05	-282	5.89	7.78	25.70	137	52	10.10	6.8	ND
OLD-36-10BR	Mar-04	NM	0.010	0.13	NM	17.9	1.49	ND	-37	4.63	7.46	23.92	93	55	5.25	2.4	ND
OLD-36-10BR	Jun-04	0.39	0.0035 U	0.80	NM	15.7	1.22	0.16	-104	5.60	10.02	25.27	119	59.8	4.59	2.5	ND
OLD-36-22BR	Jun-03	2.87	0.074	0.60	ND	ND	ND	ND	89	4.28	4.97	26.04	187	22	7.30	NS	ND
OLD-36-22BR	Sep-03	0.79	0.199	0.07	ND	65	ND	ND	55	4.25	7.73	29.45	188	ND	5.62	5.8	ND
OLD-36-22BR	Dec-03	0.48	0.020	0.09	NM	NM	0.40	0.23	-180	4.61	5.11	26.56	61	ND	5.63	2.6	ND
OLD-36-22BR	Mar-04	1.00	0.013	0.48	NM	40.4	0.10	ND	NM	4.87	6.57	23.30	156	5.3	8.25	2.4	ND
OLD-36-22BR	Jun-04	0.10	0.0035 U	0.07	NM	29.4	0.62	0.15	-43	4.24	10.39	25.52	124	12.6	6.19	2.5	ND
OLD-36-20BR	Jun-03	1.75	3.840	0.60	ND	ND	ND	ND	29	5.82	7.61	25.01	177	62.5	8.65	NS	ND
OLD-36-20BR	Sep-03	0.00	1.860	0.01	ND	50	ND	ND	167	6.12	10.30	26.35	193	105	15	7.1	ND
OLD-36-20BR	Dec-03	1.12	0.960	0.03	NM	33	0.10	ND	222	5.93	10.95	25.50	105	106	19.10	2.2	ND
OLD-36-20BR	Mar-04	1.40	3.171	0.02	NM	40.9	0.26	ND	NM	6.44	8.22	22.70	126	110	21.70	2.2	ND
OLD-36-20BR	Jun-04	0.39	1.310	0.02	NM	41.6	ND	0.026 U	40	6.19	10.74	24.54	113	120	18.80	2.4	ND
ZONE C																	
OLD-36-23CR	Jun-03	0.66	ND	1.80	ND	ND	0.50	0.09	69	4.22	5.27	26.75	159	ND	ND	NS	ND
OLD-36-23CR	Sep-03	0.10	ND	1.80	ND	ND	2.00	ND	-60	4.39	4.81	28.14	111	ND	0.51	4.3	ND
OLD-36-23CR	Dec-03	0.75	0.020	1.80	NM	28.8	0.31	ND	52	4.47	4.88	25.76	106	ND	0.55	2.5	ND
OLD-36-23CR	Mar-04	0.90	0.013	2.30	NM	32	ND	ND	NM	4.19	4.07	23.50	120	108	6.24	2.4	ND
OLD-36-23CR	Jun-04	0.49	0.0035 U	0.75	NM	27.3	0.50	0.026 U	-12	3.98	5.78	25.91	215	1 U	5.91	2.2	ND
OLD-36-11CR	Jun-03	0.29	0.022	0.60	ND	ND	0.10	0.30	-4	5.50	8.10	25.86	154	40	ND	NS	ND
OLD-36-11CR	Sep-03	0.00	ND	ND	ND	55	0.10	0.93	-196	5.98	7.81	25.98	140	42.2	8.94	4.8	ND
OLD-36-11CR	Dec-03	0.66	0.020	ND	NM	NM	ND	0.39	-282	5.72	7.38	25.71	105	45.1	6.26	2.5	ND
OLD-36-11CR	Mar-04	NM	ND	ND	NM	ND	ND	0.35	-34	5.89	7.55	23.45	ND	46.2	6.39	2.3	ND
OLD-36-11CR	Jun-04	0.36	0.0035 U	0.40	NM	22.6	0.62	1.04	-98	5.71	8.68	25.22	103	89.5	5.10	2.5	ND
OLD-36-09CR	Jun-03	0.85	0.012	2.40	ND	ND	2	1.38	-52	4.21	5.29	26.23	200	ND	13.50	3.1	ND
OLD-36-09CR	Sep-03	0.00	ND	2.00	ND	200	2	2.55	-57	4.17	8.78	26.74	193	ND	7.09	5.6	ND
OLD-36-09CR	Dec-03	0.66	ND	1.09	NM	14.2	1	ND	-244	4.42	4.51	23.98	104	ND	5.14	2.4	ND
OLD-36-09CR	Mar-04	NM	ND	1.80	NM	14.1	2.9	3.16	47	4.63	5.55	23.92	148	ND	6.36	2.7	ND
OLD-36-09CR	Jun-04	0.49	0.0035 U	1.60	NM	9	2	3.23	-80	4.21	5.50	26.84	161	1 U	6.77	2.4	ND

TABLE 4-3

REDUCTIVE DECHLORINATION PROCESS SECONDARY INDICATORS
JUNE 2003 THROUGH JUNE 2004
STUDY AREA 36 - MAIN BASE

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

Station ID	Monitoring Event	Dissolved Oxygen* (mg/L)	Nitrate & Nitrite (mg/L)	Ferrous Iron* (mg/L)	Mn* (mg/L)	Sulfate* (mg/L)	Sulfide & H_2S* (mg/L)	Methane (mg/L)	ORP* (mV)	pH* (SU)	TOC (mg/L)	Temp* (Celsius)	CO_2* (mg/L)	Alkalinity (mg/L)	Chloride (mg/L)	Dissolved Hydrogen (nM/L)	Volatile Fatty Acids (mg/L)
OLD-36-18CR	Jun-03	2.78	0.030	2.8	ND	ND	ND	0.19	42	4.39	3.95	26.17	84	2.6	ND	3.5	ND
OLD-36-18CR	Sep-03	0.00	ND	2.0	ND	50	0.30	0.14	-10	4.44	3.03	27.07	122	2.4	ND	11.4	ND
OLD-36-18CR	Dec-03	0.32	0.020	2.5	NM	21.2	0.10	ND	137	4.56	7.25	25.44	74	ND	ND	7.8	ND
OLD-36-18CR	Mar-04	NM	0.006	0.91	NM	22.4	ND	ND	181	4.47	5.37	24.95	NM	ND	3.69	2.2	ND
OLD-36-18CR	Jun-04	0.59	0.0035 U	1.74	NM	19.1	0.52	0.026 U	161	4.24	10.12	27.42	NM	8.1	3.44	2.2	ND
OLD-36-25CR	Jun-03	0.05	ND	1.8	ND	ND	0.50	ND	-124	4.26	2.99	26.76	120	ND	ND	2.7	25U
OLD-36-25CR	Sep-03	0.12	ND	1.0	ND	80	0.50	ND	-57	4.22	3.24	25.58	110	ND	ND	4.1	ND
OLD-36-25CR	Dec-03	0.89	ND	1.05	NM	NM	2.00	ND	70	4.14	2.83	23.95	111	ND	ND	6.6	ND
OLD-36-25CR	Mar-04	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
OLD-36-25CR	Jun-04	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
OLD-36-36CR	Jun-03	0.67	ND	1.0	ND	90	0.50	ND	-160	4.61	7.43	29.51	122	1.8	5 U	NS	ND
OLD-36-36CR	Sep-03	0.15	ND	1.0	ND	75	ND	ND	-167	5.64	4.61	28.52	90	39.6	5 U	4.9	ND
OLD-36-36CR	Dec-03	0.47	ND	0.80	NM	54.8	2.50	ND	-116	6.36	5.53	25.50	88	91.1	5 U	2.3	ND
OLD-36-36CR	Mar-04	NM	0.063	0.15	NM	73.2	0.27	ND	130	6.18	4.76	23.13	99	43.6	4.99	2.8	0.89
OLD-36-36CR	Jun-04	0.54	0.0035 U	0.21	NM	58.1	NA	0.026 U	87	5.56	6.71	27.36	142	87.8	4.52	2.1	ND
OLD-36-35CR	Jun-03	1.28	ND	1.00	ND	ND	0.50	0.29	-122	5.04	12.12	34.09	486	4.4	6.75	2.8	ND
OLD-36-35CR	Sep-03	0.00	ND	1.20	ND	125	0.20	0.20	-127	5.21	13.83	28.29	202	6.6	6.60	5	ND
OLD-36-35CR	Dec-03	1.03	ND	0.80	NM	NM	1	0.16	-240	4.24	14.93	24.99	121	2.3	6.94	2.4	ND
OLD-36-35CR	Mar-04	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
OLD-36-35CR	Jun-04	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS

NOTES:
ND - Not detected
NM - Not measured
NS - Not sampled
"U" - qualifier indicates a non-detect value.
Alkalinity background = 20.4 mg/L for "A" and "B" zones and 27 mg/L for "C" zone.
Chloride background = 15 mg/L for "A" and "B" zones and 20 mg/L for "C" zone.
CO_2 background = 65 mg/L for "A" and "B" zones and 40 mg/L for "C" zone.
*Field test kits were used to measure ferrous iron, manganese, sulfate, H_2S, and CO_2. DO, ORP, pH, and temperature were measured during well purging.
IRA groundwater sampling results collected by CH2M Hill for December 2002 and March 2003 were reported by Terraine, Inc. with the results from the June 2003 sampling event. Natural attenuation parameters however were not reported.
Wells are listed in upgradient to downgradient flow direction.

TABLE 4-4

REDUCTIVE DECHLORINATION PROCESS PRIMARY AND SECONDARY INDICATORS
JUNE 2004 MONITORING EVENT
STUDY AREA 36 - MAIN BASE

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

Station ID	Date	PCE (µg/L)	TCE (µg/L)	cis-1,2-DCE (µg/L)	Vinyl Chloride (µg/L)	Ethene & Ethane (mg/L)*	Dissolved Oxygen (mg/L)	Nitrate & Nitrite (mg/L)	Ferrous Iron (mg/L)	Sulfate (mg/L)	Sulfide & H_2S (mg/L)	Methane (mg/L) *	ORP (mV)	pH (SU)	TOC (mg/L)	Temp (Celsius)	CO_2 (mg/L)	Alkalinity (mg/L)	Chloride (mg/L)	Dissolved Hydrogen (nM/L)	Volatile Fatty Acids (mg/L)
ZONE A																					
OLD-36-33AR	06/13/04	1 U	1 U	1 U	1 U	0.026 U	1.15	1.17	ND	87.2	0.10	0.026 U	-10.10	6.62	9.48	27.83	78	16.8	13.90	2.5	ND
OLD-36-07AR	06/13/04	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
OLD-36-19AR	06/13/04	1 U	1 U	1 U	1 U	0.026 U	2.37	3.74	ND	52.6	0.10	0.026 U	23	6.48	11.61	25.43	98	158	18.30	2.3	ND
OLD-36-01AR	06/13/04	1 U	1 U	1 U	1 U	0.026 U	1.24	1.94	0.10	23.3	0.52	0.40	22.6	6.82	12.38	25.71	69	154	17.40	2.3	ND
OLD-36-02AR	06/13/04	1 U	12.9	1 U	1 U	0.026 U	0.91	0.406	ND	32.4	0.1 U	0.026 U	79	6.12	14.19	26.97	108	178	10.10	2.6	ND
ZONE B																					
OLD-36-24BR	06/13/04	1 U	1 U	1 U	1 U	0.026 U	0.38	0.040	ND	79.2	0.10	0.026 U	19.6	5.52	8.74	26.60	135	17.3	3.01	2.3	ND
OLD-36-08BR	06/13/04	1 U	1.0 U	61	1 U	0.026 U	0.38	0.025	0.80	2.0 U	5.0	10.0	-181	4.93	13.12	26.28	220	56.2	4.69	2.6	ND
OLD-36-10BR	06/13/04	1 U	1.48	7.61	1 U	0.026 U	0.39	0.0035 U	0.80	15.7	1.22	0.16	-104.2	5.60	10.02	25.27	119	59.8	4.59	2.5	ND
OLD-36-22BR	06/13/04	1 U	1.0 U	1.0 U	1 U	0.026 U	0.1	0.0035 U	ND	29.4	0.62	0.15	-43	4.24	10.39	25.52	124	12.6	6.19	2.5	ND
OLD-36-20BR	06/13/04	1 U	1 U	1 U	1 U	0.026 U	0.39	1.31	ND	41.6	0.1 U	0.026 U	40.4	6.19	10.74	24.54	113	120	18.80	2.4	ND
ZONE C																					
OLD-36-23CR	06/13/04	7.62	1.56	1 U	1 U	0.026 U	0.49	0.0035 U	1.80	27.3	0.50	0.026 U	-12	3.98	5.78	25.91	215	1 U	5.91	2.2	ND
OLD-36-11CR	06/13/04	1 U	1 U	1.9	1 U	0.026 U	0.36	0.0035 U	0.40	22.6	0.62	1.04	-98.1	5.71	8.68	25.22	103	89.5	5.10	2.5	ND
OLD-36-09CR	06/13/04	1 U	43.0	14.9	1 U	0.026 U	0.49	0.0035 U	1.60	8.97	2.00	3.23	-80	4.21	5.50	26.84	161	1 U	6.77	2.4	ND
OLD-36-18CR	06/13/04	1 U	1 U	1 U	1 U	0.026 U	0.59	0.0035 U	NM	19.1	0.5	0.0 U	161	4.24	10.12	27.42	NM	8.1	3.44	2.2	ND
OLD-36-36CR	06/13/04	1 U	1 U	1 U	1 U	0.026 U	0.54	0.0035 U	0.60	58.1	0.10 U	0.03 U	87	5.56	6.71	27.36	142	87.8	4.52	2.1	ND

NOTES:
* Sample taken June 16, 2004.
ND = Not Detected
NM = Not measured due to equipment malfunction
NS = Not Sampled (Vegetable oil in well -07AR)
Alkalinity background = 20.4 mg/L for "A" and "B" zones and 27 mg/L for "C" zone.
Chloride background = 15 mg/L for "A" and "B" zones and 20 mg/L for "C" zone.
CO_2 background = 65 mg/L for "A" and "B" zones and 40 mg/L for "C" zone.
Field test kits were used to measure ferrous iron, manganese, sulfate, H_2S, and CO_2. DO, ORP, pH, and temperature were measured during well purging.
Wells listed in upgradient to downgradient flow direction.

TABLE 4-5

REDUCTIVE DECHLORINATION PROCESS SCREENING
JUNE 2004 MONITORING EVENT
STUDY AREA 36 - MAIN BASE

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

Station ID	Date	PCE (µg/L)	TCE (µg/L)	cis-1,2-DCE (µg/L)	Vinyl Chloride (µg/L)	Ethene & Ethane (mg/L)	Dissolved Oxygen (mg/L)	Nitrate & Nitrite (mg/L)	Ferrous Iron (mg/L)	Sulfate (mg/L)	Sulfide & H_2S (mg/L)	Methane	ORP (mV)	pH (SU)	TOC (mg/L)	Temp (Celsius)	CO_2 (mg/L)	Alkalinity (mg/L)	Chloride (mg/L)	Dissolved Hydrogen (nM/L)	Volatile Fatty Acids (mg/L)	BTEX (mg/L)	MNA Score
OLD-36-10BR	06/13/04	1 U	1.48	7.61	1 U	0.026 U	0.39	0.0035 U	0.8	15.7	1.22	0.162	-104.2	5.6	10.02	25.27	119	59.8	4.59	2.5	ND	0.026 U	
Score		0	0	2	0	0	3	2	0.0	2	3	0.0	2	0	0	1	0	1	0	3	0	0	17
OLD-36-08BR	06/13/04	1 U	1 U	61	1 U	0.13 U	0.38	0.025	0.8	2 U	5	9.98	-181	4.93	13.2	26.28	220	56.2	4.69	2.6	ND	ND	
Score		0	0	2	0	0	3	2	0	2	3	3	2	-2	0	1	1	1	0	3	0	0	19
OLD-36-09CR	06/13/04	1 U	43	14.9	1 U	0.026 U	0.49	0.0035 U	1.6	8.97	2	3.23	-80	4.21	5.5	26.84	161	I U	6.77	2.4	ND	0.026 U	
Score		0	0	2	0	0	3	2	3	2	3	3	1	-2	0	1	1	0	0	3	0	0	20
OLD-36-23CR	06/13/04	7.62	1.56	1 U	1 U	0.026 U	0.49	0.0035 U	1.8	27.3	0.5	0.026 U	-12	3.98	5.78	25.91	215	1 U	5.91	2.2	ND	ND	
Score		0	2	0	0	0	3	2	3	0	0	0	1	-2	0	1	1	0	0	3	0	0	12

NOTES:
ND = Not Detected
Alkalinity background = 20.4 mg/L for "A" and "B" zones and 27 mg/L for "C" zone.
Chloride background = 15 mg/L for "A" and "B" zones and 20 mg/L for "C" zone.
CO_2 background = 65 mg/L for "A" and "B" zones and 40 mg/L for "C" zone.
"U" - qualifier indicates a non-detect value.

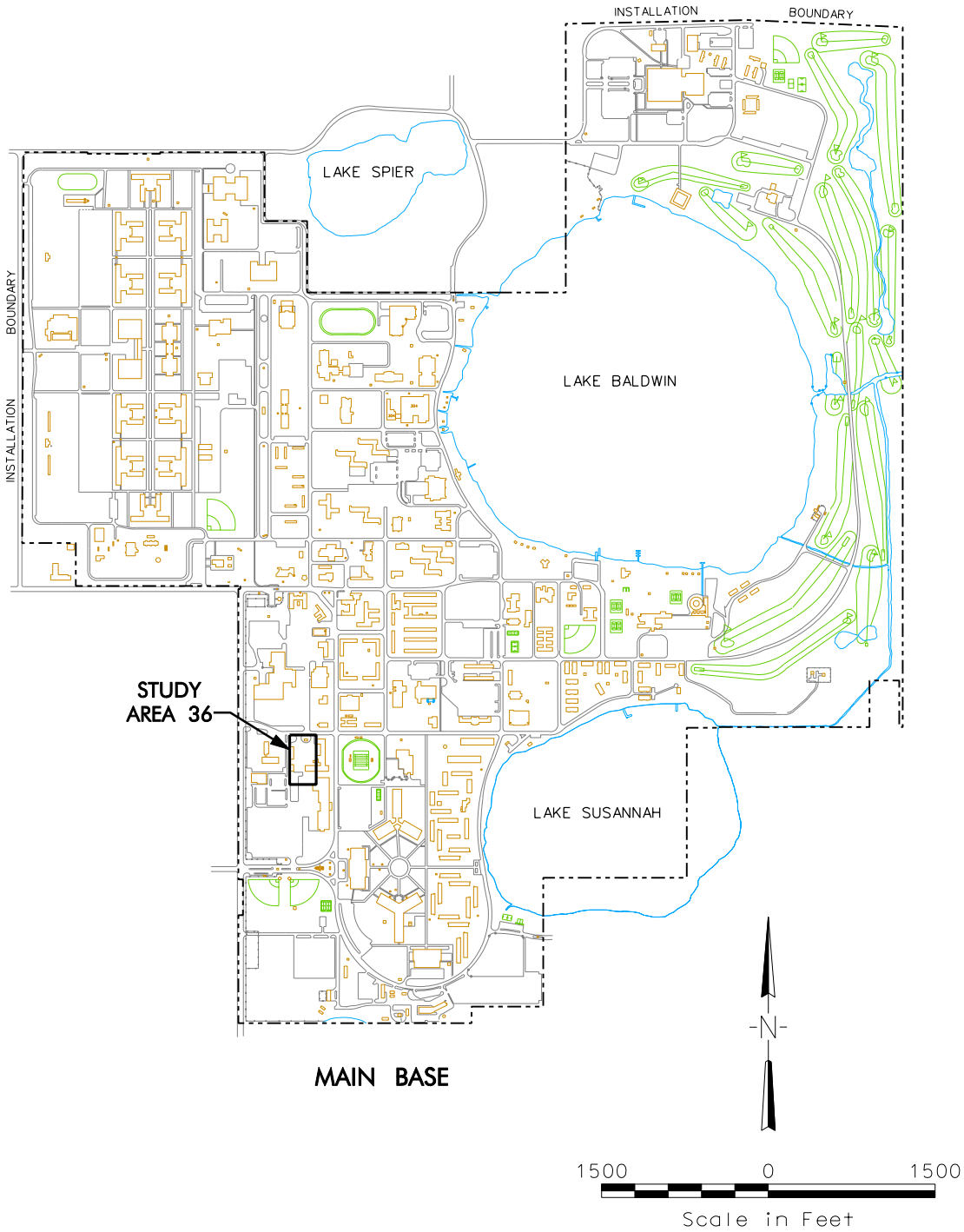
SCORING:

0 to 5	Inadequate evidence
6 to 14	Limited evidence
15 to 20	Adequate evidence
> 20	Strong evidence

Score for presence of TCE in 23CR assumes PCE released; TCE is daughter product;score = 2.
Score for Presence of TCE in 9C assumes TCE released; score = 0

FIGURES

CAD FILE NO./DATE: P:\Oak Ridge Drafting\NTC Orlando\ou3-051H.dgn 05-05-04 JFF



DRAWN BY JFF DATE 05-05-04		SITE LOCATION MAP STUDY AREA 36 MAIN BASE NAVAL TRAINING CENTER ORLANDO, FLORIDA	CONTRACT NO. N62467-94-D-0888
CHECKED BY TKG DATE 05-05-04			OWNER NO. N4443
REVISED BY --- DATE ---------			APPROVED BY --- DATE ---------
SCALE AS NOTED	NAVFAC		DRAWING NO. FIGURE 1-1 / REV. 0

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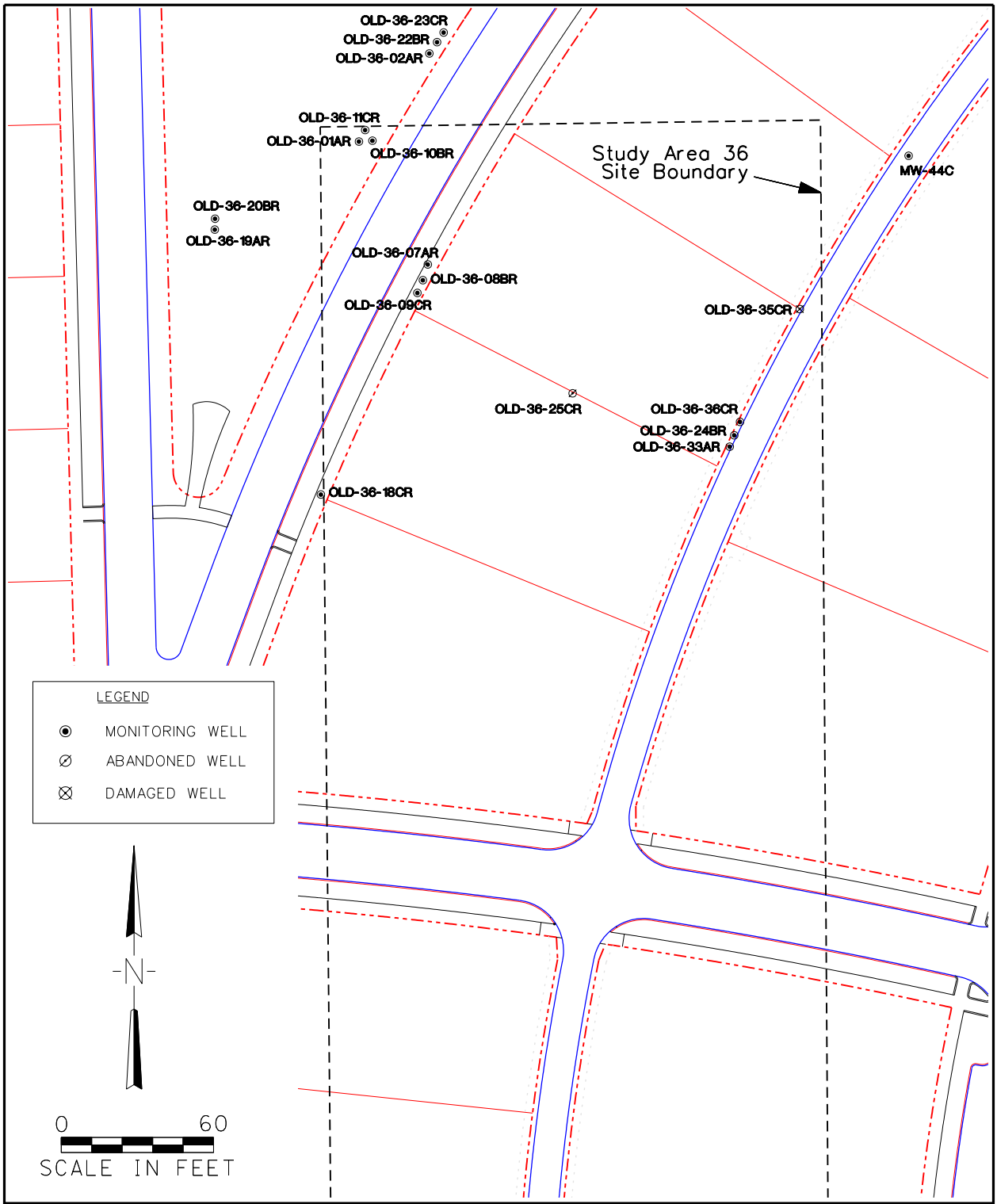

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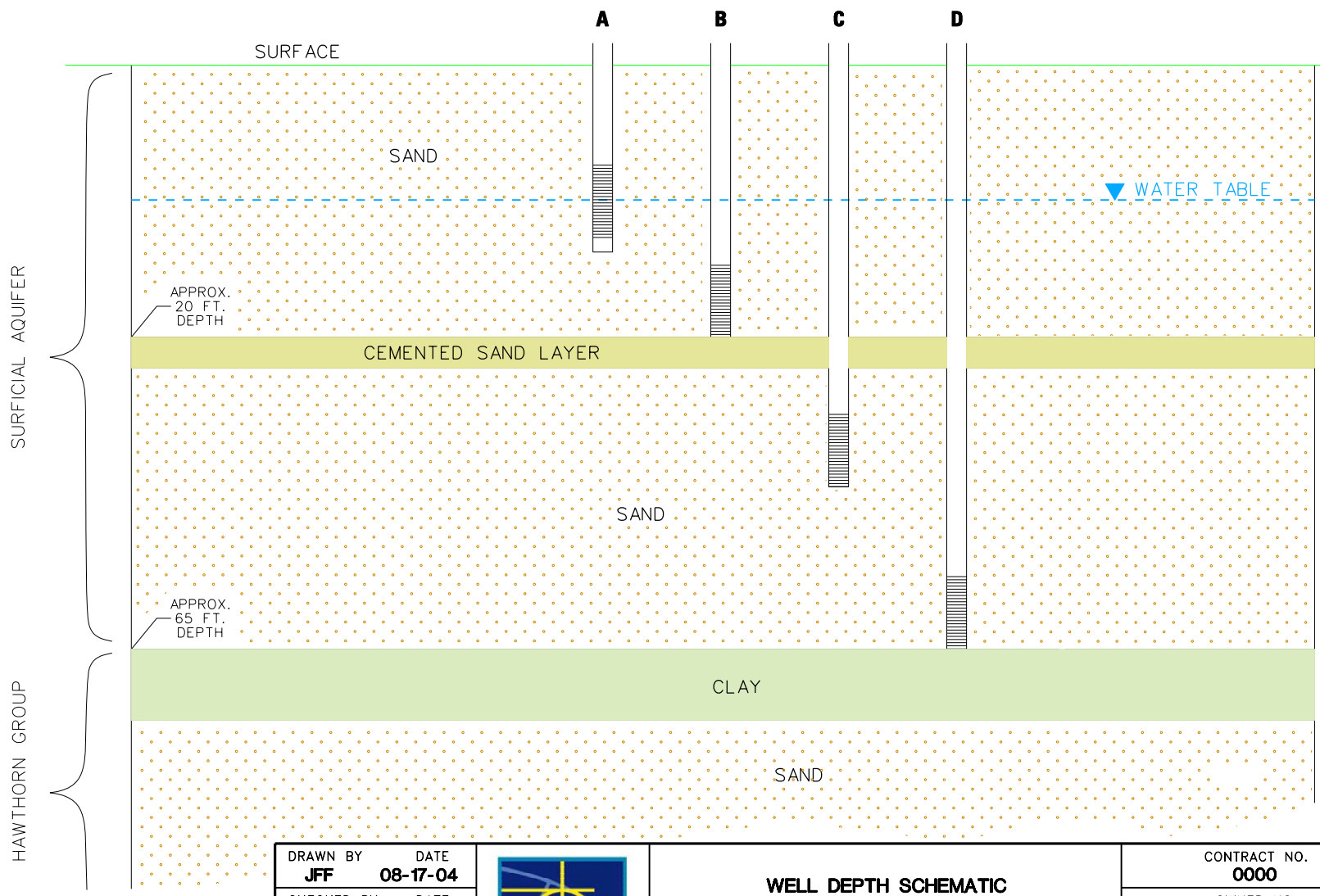
CHECKED BY TKG	DATE 10-04-04		OWNER NO. N4443
REVISED BY ---	DATE --------		APPROVED BY --- / DATE --------
SCALE AS NOTED			DRAWING NO. FIGURE 1-2 / REV. 0

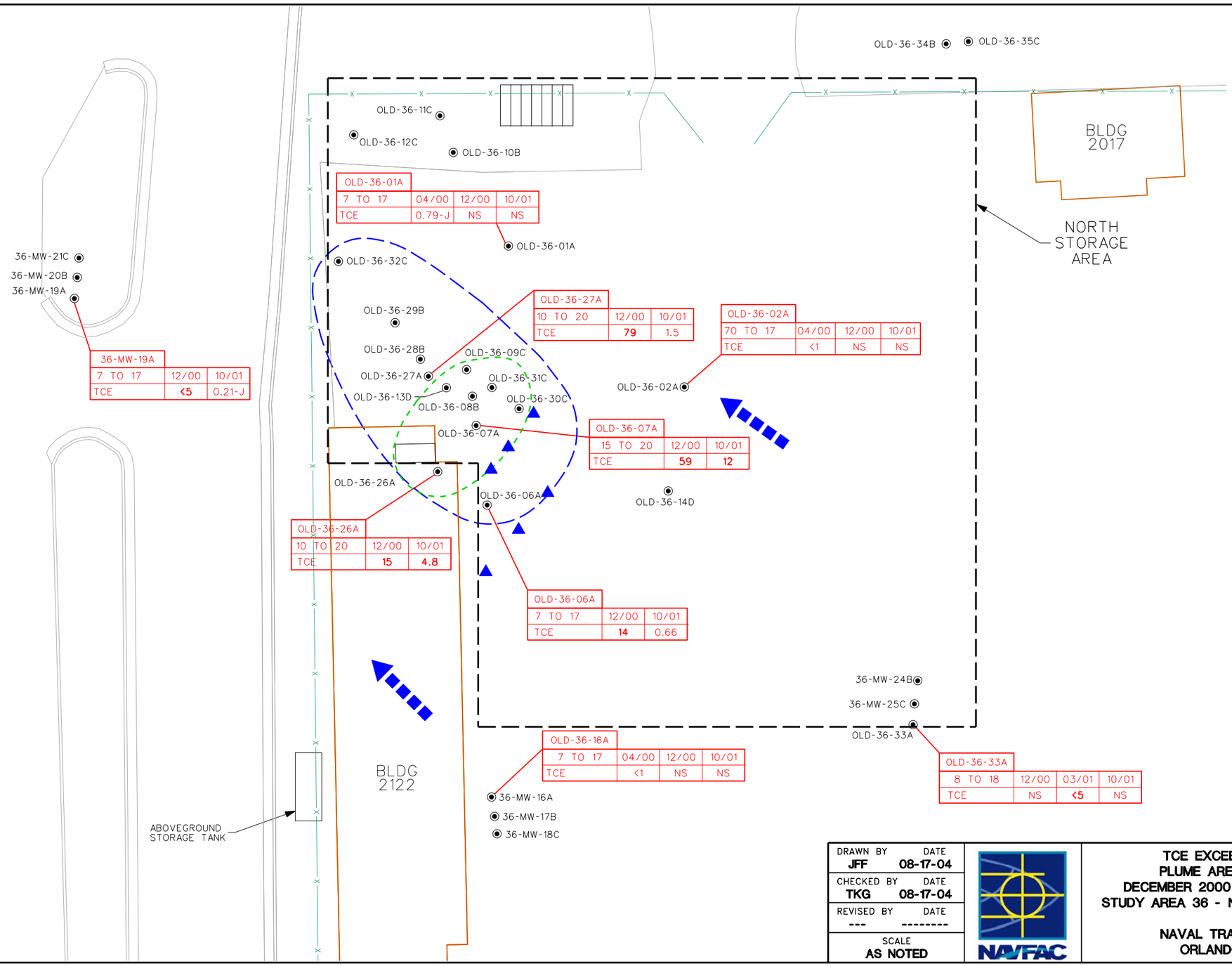
CAD FILE NO./DATE: P:\Oak Ridge Drafting\NTC Orlando\sa36-019.dgn 08-17-04 JFF



NOTE:
"C" AND "D" WELLS MAY OR MAY NOT BE DOUBLE CASED DEPENDING ON LOCATION.

DRAWN BY JFF	DATE 08-17-04	WELL DEPTH SCHEMATIC STUDY AREA 36 - NORTH STORAGE YARD NAVAL TRAINING CENTER ORLANDO, FLORIDA	CONTRACT NO. 0000
CHECKED BY TKG	DATE 08-17-04		OWNER NO. 0000
REVISED BY ---	DATE --------		APPROVED BY --- / DATE --------
SCALE NOT TO SCALE			DRAWING NO. FIGURE 2-1 / REV. 0

CAD FILE NO./DATE: P:\Oak Ridge Drafting\NTC Orlando\sa36-016h.dgn 08-17-04 JFF



LEGEND

OCTOBER 2001 PLUME AREA

DECEMBER 2000 PLUME AREA

GROUNDWATER FLOW DIRECTION

MONITORING WELL

INJECTION POINT

WELL I.D. — SAMPLE COLLECTION DATE

OLD-36-01A		
20 TO 25	12/00	10/01
TCE	7.2	8.9

ANALYTE — ANALYTE CONCENTRATION[1,2] — SCREENED INTERVAL TO NEAREST FOOT

NOT SAMPLED	NS
ESTIMATED VALUE	J
TRICHLOROETHENE (SEE NOTE)	TCE

1-CONCENTRATION IN MICROGRAMS PER LITER (ug/L)
2-BOLD CONCENTRATION INDICATES EXCEEDANCE

NOTE:
GROUNDWATER CLEANUP TARGET LEVEL FOR TCE IS 3 ug/L.

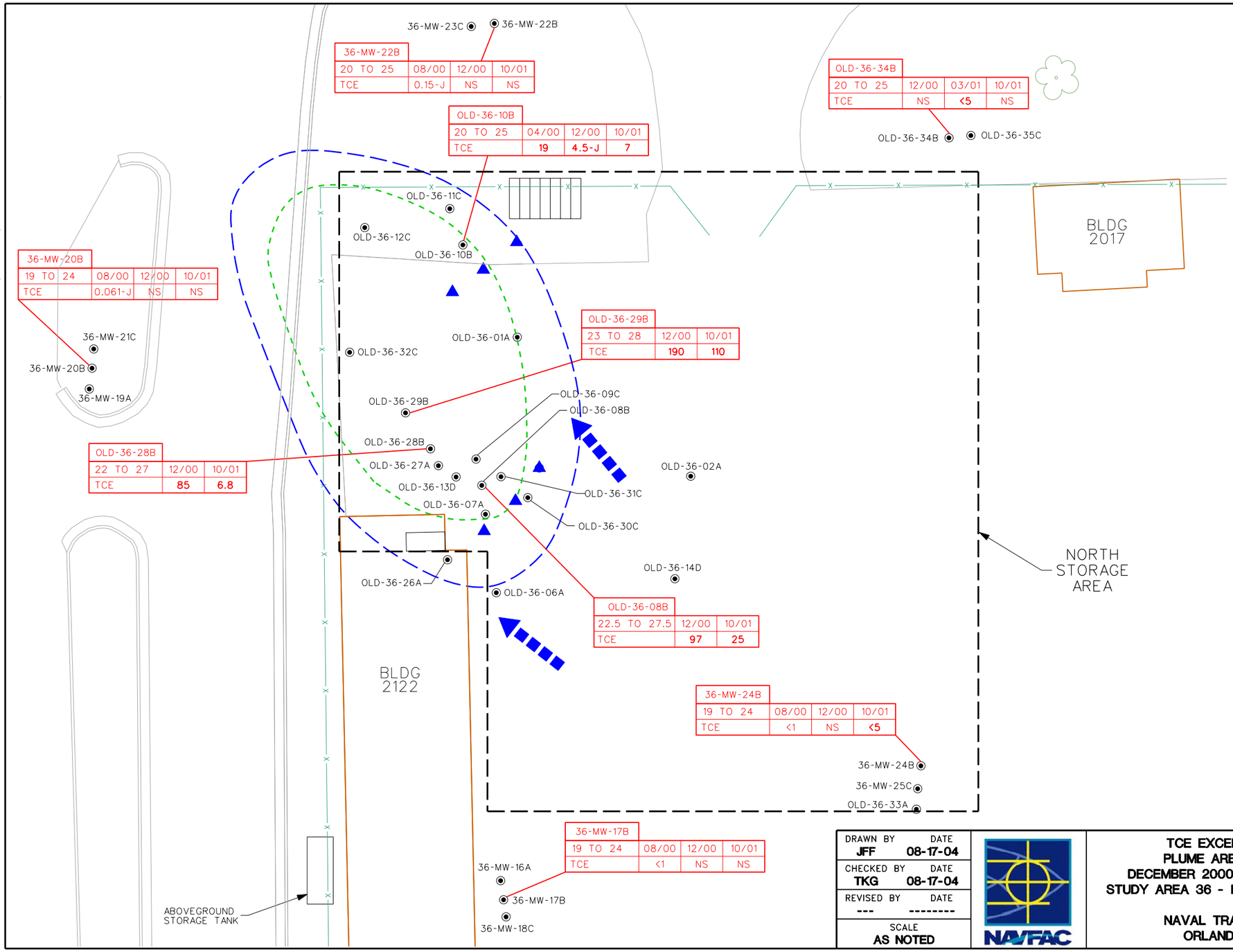
ALL SITE STRUCTURES HAVE BEEN REMOVED AND ALL WELLS HAVE BEEN ABANDONED.

-N-

20 0 20
SCALE IN FEET

DRAWN BY JFF	DATE 08-17-04	TCE EXCEEDANCES AND PLUME AREA IN ZONE "A" DECEMBER 2000 TO OCTOBER 2001 STUDY AREA 36 - NORTH STORAGE YARD	CONTRACT NO. 0000
CHECKED BY TKG	DATE 08-17-04		OWNER NO. 0000
REVISED BY ---	DATE --------	NAVAL TRAINING CENTER ORLANDO, FLORIDA	APPROVED BY --- / DATE --------
SCALE AS NOTED			DRAWING NO. FIGURE 3-1 / REV. 0

CAD FILE NO./DATE: P:\Oak Ridge Drafting\NTC Orlando\sa36-17h.dgn 08-17-04 JFF



LEGEND

OCTOBER 2001 PLUME AREA

DECEMBER 2000 PLUME AREA

GROUNDWATER FLOW DIRECTION

MONITORING WELL

INJECTION POINT

WELL I.D. — SAMPLE COLLECTION DATE

OLD-36-10B		
20 TO 25	12/00	10/01
TCE	7.2	8.9

ANALYTE — SCREENED INTERVAL TO NEAREST FOOT — ANALYTE CONCENTRATION[1,2]

NOT SAMPLED	NS
ESTIMATED VALUE	J
TRICHLOROETHENE (SEE NOTE)	TCE

1-CONCENTRATION IN MICROGRAMS PER LITER (µg/L)
2-BOLD CONCENTRATION INDICATES EXCEEDANCE

NOTE:
GROUNDWATER CLEANUP TARGET LEVEL FOR TCE IS 3 µg/L.

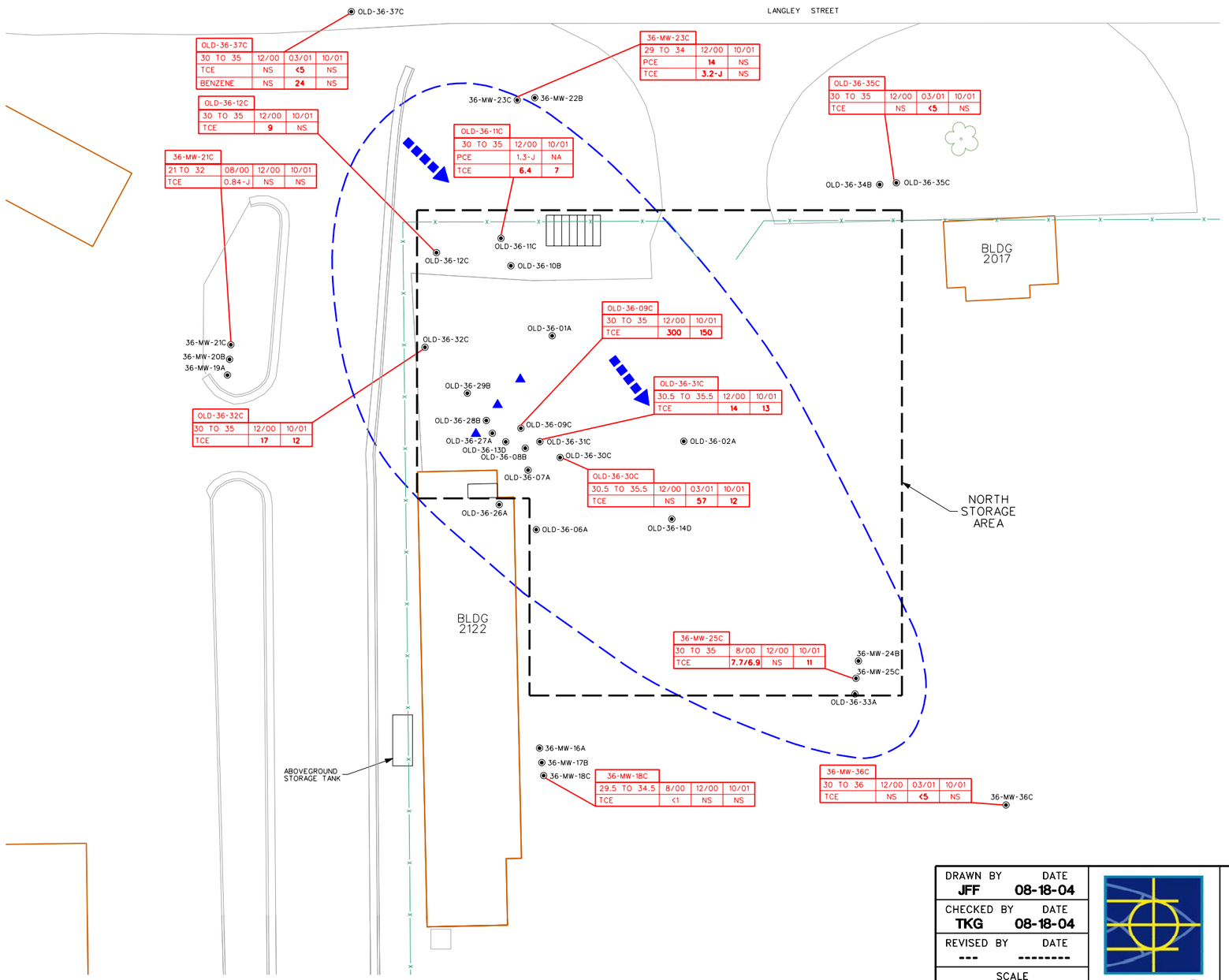
ALL SITE STRUCTURES HAVE BEEN REMOVED AND ALL WELLS HAVE BEEN ABANDONED.

-N-

20 0 20
SCALE IN FEET

DRAWN BY JFF	DATE 08-17-04	TCE EXCEEDANCES AND PLUME AREA IN ZONE "B" DECEMBER 2000 TO OCTOBER 2001 STUDY AREA 36 - NORTH STORAGE YARD	CONTRACT NO. 0000
CHECKED BY TKG	DATE 08-17-04		OWNER NO. 0000
REVISED BY ---	DATE --------	NAVAL TRAINING CENTER ORLANDO, FLORIDA	APPROVED BY --- / DATE --------
SCALE AS NOTED			DRAWING NO. FIGURE 3-2 / REV. 0

CAD FILE NO./DATE: P:\Oak Ridge Drafting\NTC Orlando\sa36-018h.dgn 08-18-04 JFF



LEGEND

DECEMBER 2000/ OCTOBER 2001 PLUME AREA

GROUNDWATER FLOW DIRECTION

MONITORING WELL

INJECTION POINT

WELL I.D. — SAMPLE COLLECTION DATE

OLD-36-10C		
20 TO 25	12/00	10/01
TCE	7.2	8.9

ANALYTE — ANALYTE CONCENTRATION[1,2] — SCREENED INTERVAL TO NEAREST FOOT

NOT SAMPLED	NS
ESTIMATED VALUE	J
TRICHLOROETHENE (SEE NOTE)	TCE

1-CONCENTRATION IN MICROGRAMS PER LITER (µg/L)
2-BOLD CONCENTRATION INDICATES EXCEEDANCE

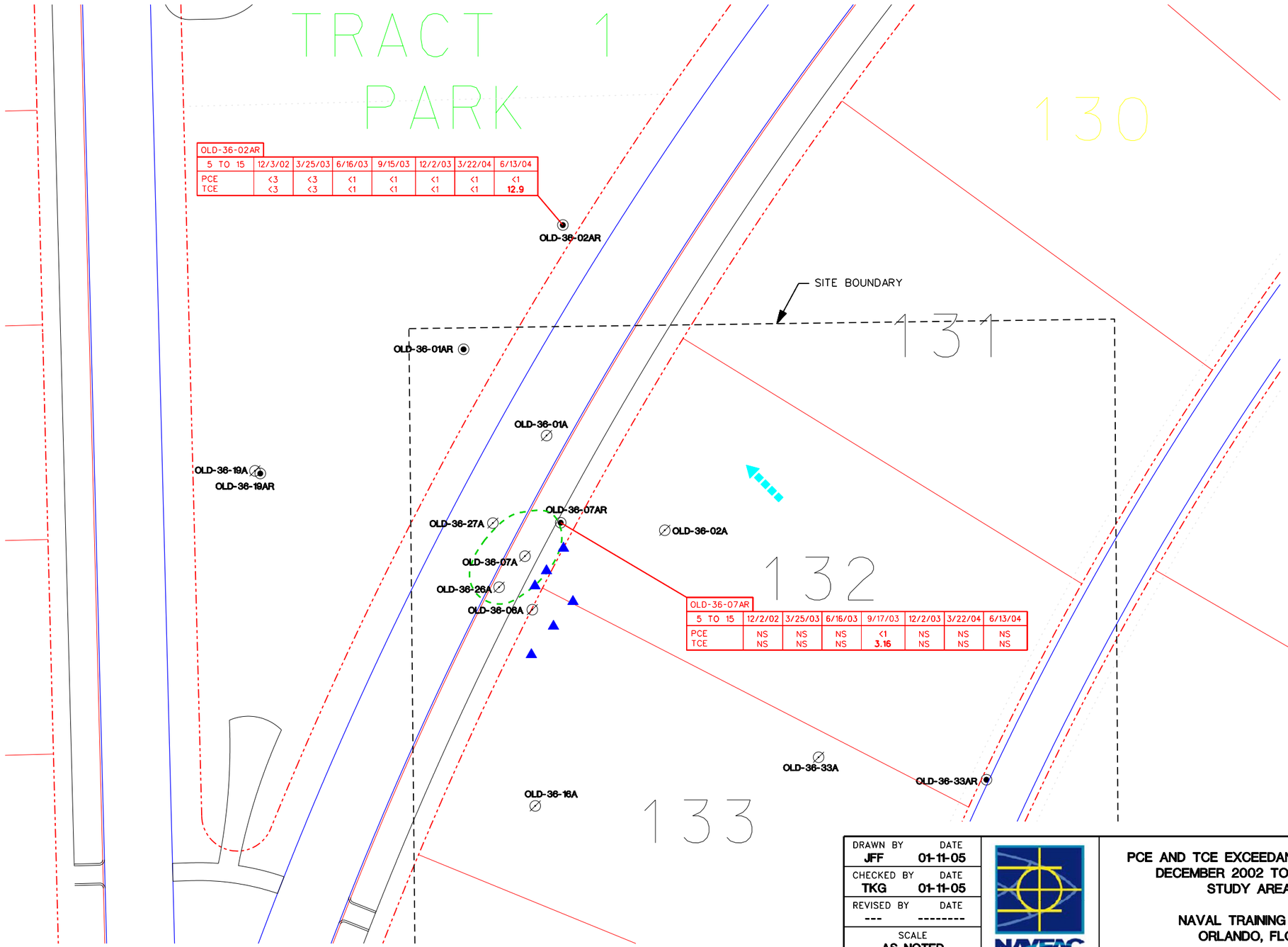
NOTES:
GROUNDWATER CLEANUP TARGET LEVEL FOR PCE/TCE IS 3 µg/L.
GROUNDWATER CLEANUP TARGET LEVEL FOR BENZENE IS 1 µg/L.
ALL SITE STRUCTURES HAVE BEEN REMOVED AND ALL WELLS HAVE BEEN ABANDONED.

N

30 0 30
SCALE IN FEET

DRAWN BY JFF	DATE 08-18-04	PCE/TCE EXCEEDANCES AND PLUME AREA IN ZONE "C" DECEMBER 2000 TO OCTOBER 2001 STUDY AREA 36 - NORTH STORAGE YARD	CONTRACT NO. 0000
CHECKED BY TKG	DATE 08-18-04		OWNER NO. 0000
REVISED BY ---	DATE --------	NAVAL TRAINING CENTER ORLANDO, FLORIDA	APPROVED BY --- DATE --------
SCALE AS NOTED			DRAWING NO. FIGURE 3-3 REV. 0

CAD FILE NO./DATE: P:\Oak Ridge Drafting\NTC Orlando\sa36-072H.dgn 01-11-05 JFF



OLD-36-02AR							
5 TO 15	12/3/02	3/25/03	6/16/03	9/15/03	12/2/03	3/22/04	6/13/04
PCE	<3	<3	<1	<1	<1	<1	<1
TCE	<3	<3	<1	<1	<1	<1	**12.9**

OLD-36-07AR							
5 TO 15	12/2/02	3/25/03	6/16/03	9/17/03	12/2/03	3/22/04	6/13/04
PCE	NS	NS	NS	<1	NS	NS	NS
TCE	NS	NS	NS	**3.16**	NS	NS	NS

LEGEND

MONITORING WELL
ABANDONED WELL
DAMAGED WELL
INJECTION POINT
OCTOBER 2001 PLUME AREA
GROUNDWATER FLOW DIRECTION (APPROX.)

SCREEN INTERVAL TO NEAREST FOOT — SAMPLE COLLECTION DATE

1 TO 10	9/17/03
PCE	<1
TCE	**12.9**

ANALYTE — ANALYTE CONCENTRATION [a,b]

NOT SAMPLED NS

a-CONCENTRATION IN MICROGRAMS PER LITER (µg/L)
b-BOLD CONCENTRATION INDICATES EXCEEDANCE

SCREENING CRITERIA

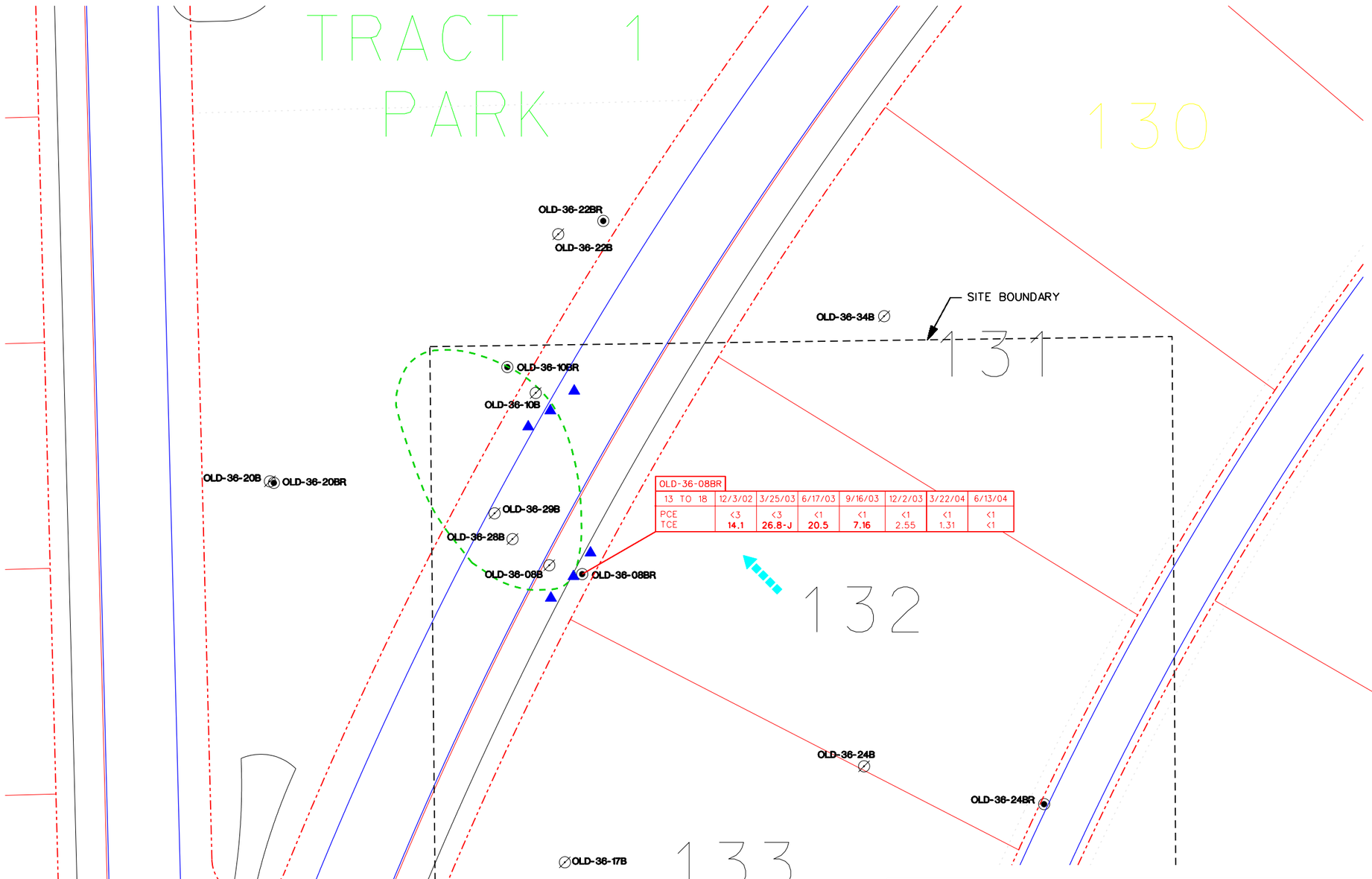
ANALYTE	ABBREVIATION	GCTL[a]
Tetrachloroethene	PCE	3
Trichloroethene	TCE	3

GCTL=GROUNDWATER CLEANUP TARGET LEVEL

NOTES: 1. DATA ARE SHOWN FOR LOCATIONS WITH SCREENING CRITERIA EXCEEDANCES SINCE DECEMBER 2002.
2. WELL 07AR ONLY SAMPLED ON 9/17/03 DUE TO PRESENCE OF VEGETABLE OIL IN WELL DURING ALL OTHER MONITORING EVENTS.

DRAWN BY JFF	DATE 01-11-05	PCE AND TCE EXCEEDANCES IN ZONE A DECEMBER 2002 TO JUNE 2004 STUDY AREA 36 NAVAL TRAINING CENTER ORLANDO, FLORIDA	CONTRACT NO. N62467-94-D-0888
CHECKED BY TKG	DATE 01-11-05		OWNER NO. N4443
REVISED BY ---	DATE --------		APPROVED BY --- / DATE --------
SCALE AS NOTED			DRAWING NO. FIGURE 4-1 / REV. 0

CAD FILE NO./DATE: P:\Oak Ridge Drafting\NTC Orlando\sa36-073H.dgn 01-12-05 JFF



OLD-36-08BR								
13 TO 18	12/3/02	3/25/03	6/17/03	9/16/03	12/2/03	3/22/04	6/13/04
PCE	<3	<3	<1	<1	<1	<1	<1
TCE	**14.1**	**26.8-J**	**20.5**	**7.16**	2.55	1.31	<1

LEGEND

MONITORING WELL
ABANDONED WELL
DAMAGED WELL
INJECTION POINT
OCTOBER 2001 PLUME AREA
GROUNDWATER FLOW DIRECTION (APPROX.)

SCREEN INTERVAL TO NEAREST FOOT — SAMPLE COLLECTION DATE

1 TO 10	9/16/03
PCE	<1
TCE	**12.9-J**

ANALYTE — ANALYTE CONCENTRATION [a,b]

ESTIMATED CONCENTRATION — J

a-CONCENTRATION IN MICROGRAMS PER LITER (µg/L)
b-BOLD CONCENTRATION INDICATES EXCEEDANCE

SCREENING CRITERIA

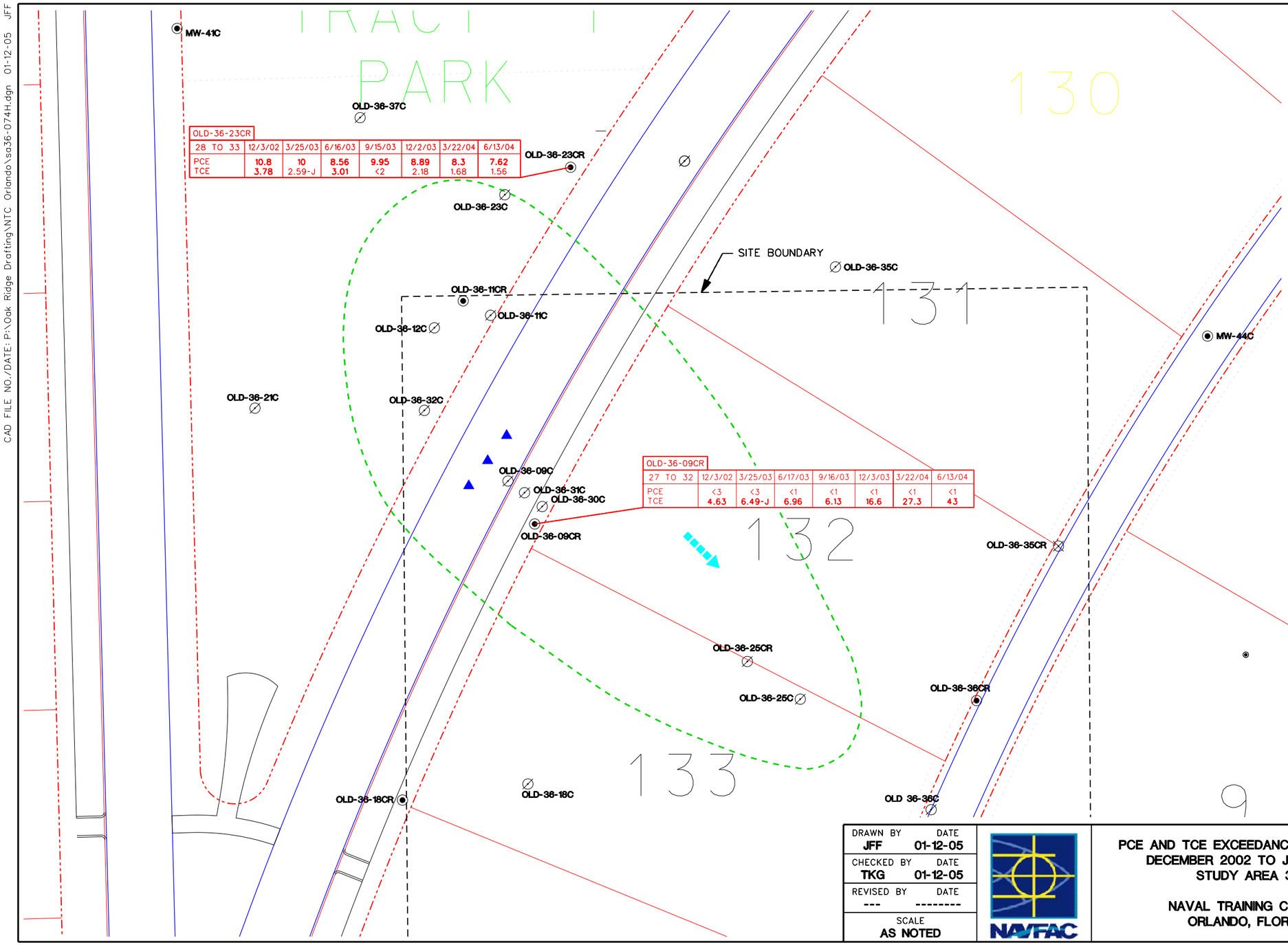
ANALYTE	ABBREVIATION	GCTL[a]
Tetrachloroethene	PCE	3
Trichloroethene	TCE	3

GCTL=GROUNDWATER CLEANUP TARGET LEVEL

NOTE: DATA ARE SHOWN FOR LOCATIONS WITH SCREENING CRITERIA EXCEEDANCES SINCE DECEMBER 2002.

DRAWN BY JFF	DATE 01-12-05	PCE AND TCE EXCEEDANCES IN ZONE B DECEMBER 2002 TO JUNE 2004 STUDY AREA 36 NAVAL TRAINING CENTER ORLANDO, FLORIDA	CONTRACT NO. N62467-94-D-0888
CHECKED BY TKG	DATE 01-12-05		OWNER NO. N4443
REVISED BY ---	DATE --------		APPROVED BY --- / DATE --------
SCALE AS NOTED			DRAWING NO. FIGURE 4-2 / REV. 0

CAD FILE NO./DATE: P:\Oak Ridge Drafting\NTC Orlando\sa36-074H.dgn 01-12-05 JFF



OLD-36-23CR							
28 TO 33	12/3/02	3/25/03	6/16/03	9/15/03	12/2/03	3/22/04	6/13/04
PCE	**10.8**	**10**	**8.56**	**9.95**	**8.89**	**8.3**	**7.62**
TCE	**3.78**	2.59-J	**3.01**	<2	2.18	1.68	1.56

OLD-36-09CR							
27 TO 32	12/3/02	3/25/03	6/17/03	9/16/03	12/3/03	3/22/04	6/13/04
PCE	<3	<3	<1	<1	<1	<1	<1
TCE	**4.63**	**6.49-J**	**6.96**	**6.13**	**16.6**	**27.3**	**43**

LEGEND

MONITORING WELL
ABANDONED WELL
DAMAGED WELL
INJECTION POINT
OCTOBER 2001 PLUME AREA
GROUNDWATER FLOW DIRECTION (APPROX.)

SCREEN INTERVAL TO NEAREST FOOT — SAMPLE COLLECTION DATE

1 TO 10	9/16/03
PCE	<1
TCE	**12.9-J**

ANALYTE — ANALYTE CONCENTRATION [a,b]

ESTIMATED CONCENTRATION J

a-CONCENTRATION IN MICROGRAMS PER LITER (µg/L)
b-BOLD CONCENTRATION INDICATES EXCEEDANCE

SCREENING CRITERIA

ANALYTE	ABBREVIATION	GCTL[a]
Tetrachloroethene	PCE	3
Trichloroethene	TCE	3

GCTL=GROUNDWATER CLEANUP TARGET LEVEL

NOTE: DATA ARE SHOWN FOR LOCATIONS WITH SCREENING CRITERIA EXCEEDANCES SINCE DECEMBER 2002.

-N-

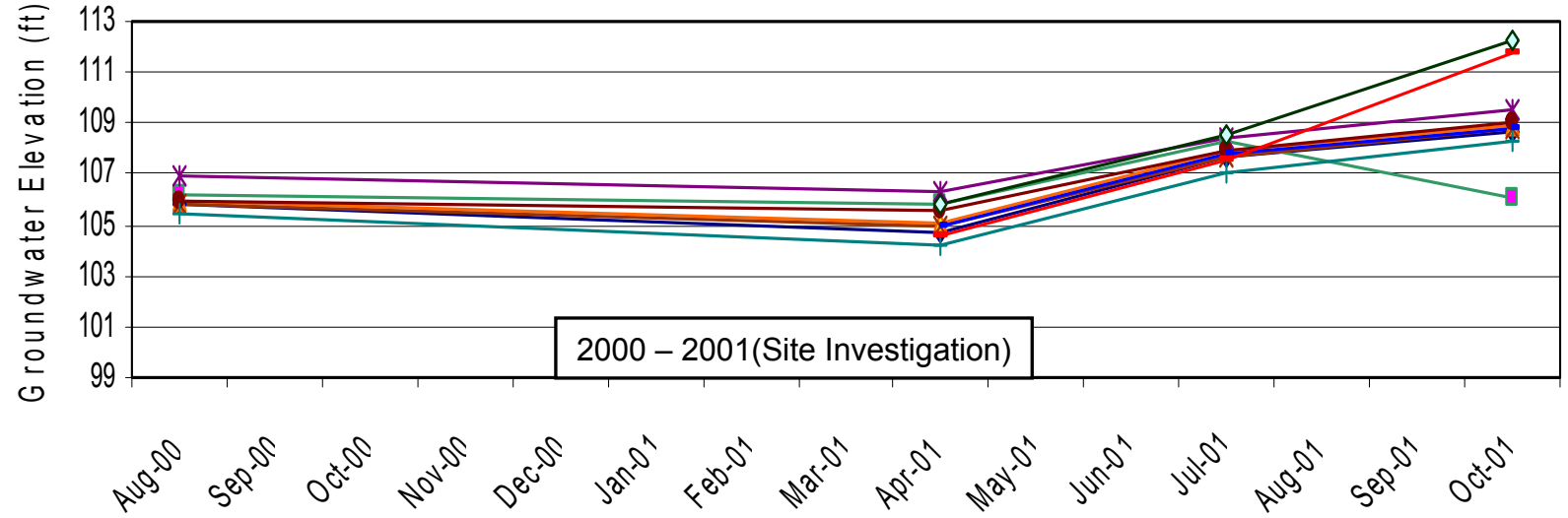
0 30
SCALE IN FEET

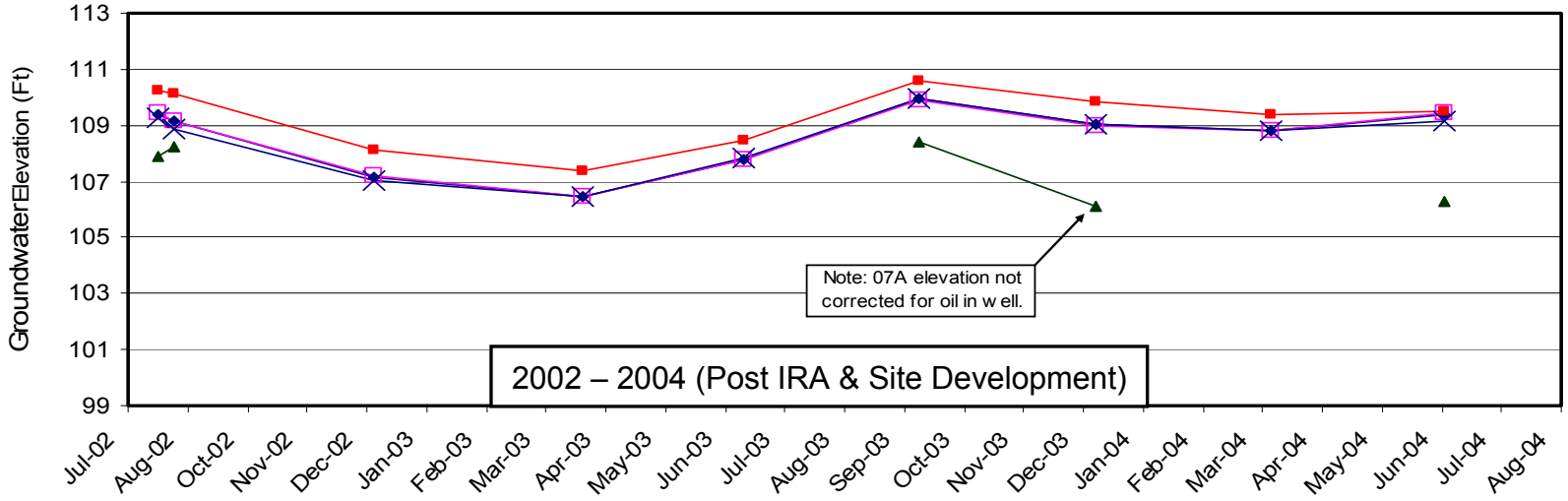
DRAWN BY JFF	DATE 01-12-05	PCE AND TCE EXCEEDANCES IN ZONE C DECEMBER 2002 TO JUNE 2004 STUDY AREA 36	CONTRACT NO. N62467-94-D-0888
CHECKED BY TKG	DATE 01-12-05		OWNER NO. N4443
REVISED BY ---	DATE --------	NAVAL TRAINING CENTER ORLANDO, FLORIDA	APPROVED BY --- DATE --------
SCALE AS NOTED		NAVFAC	DRAWING NO. FIGURE 4-3 REV. 0

APPENDIX A

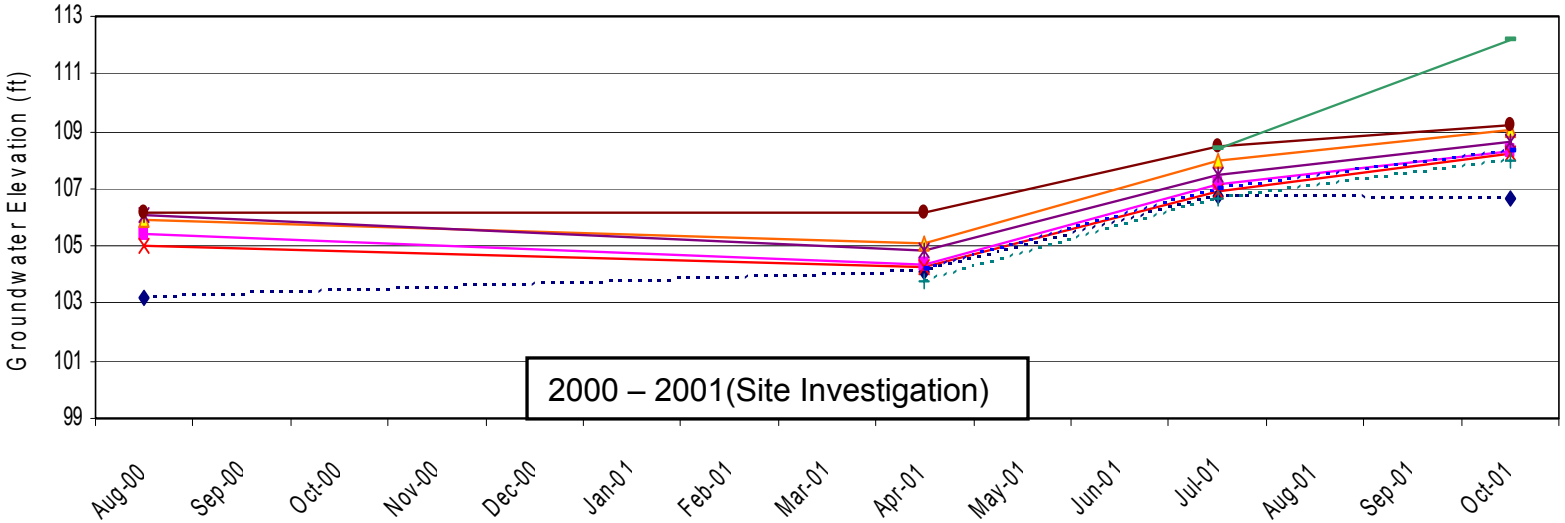
WELL HYDROGRAPHS
AND GROUNDWATER CONTOUR MAPS

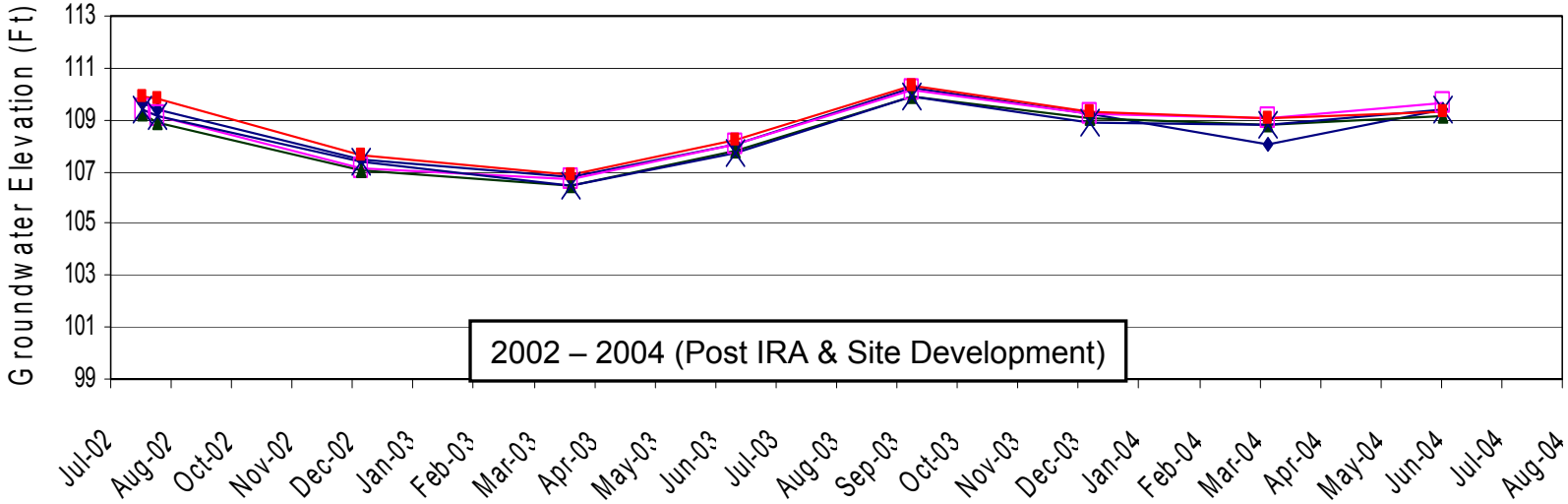
Hydrographs - Zone A
Study Area 36



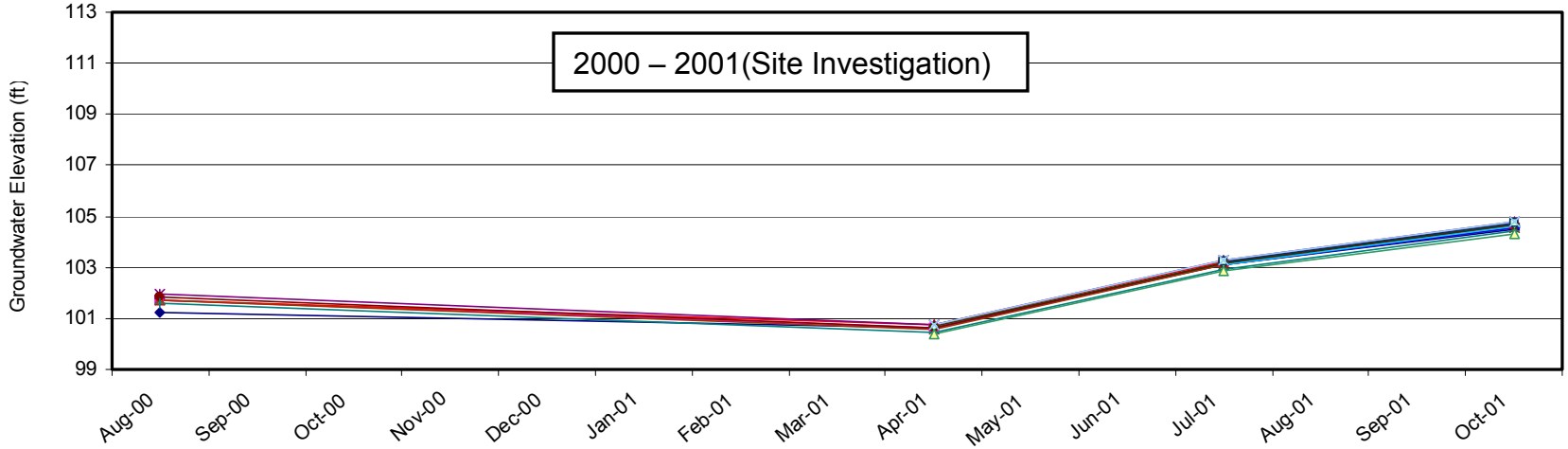


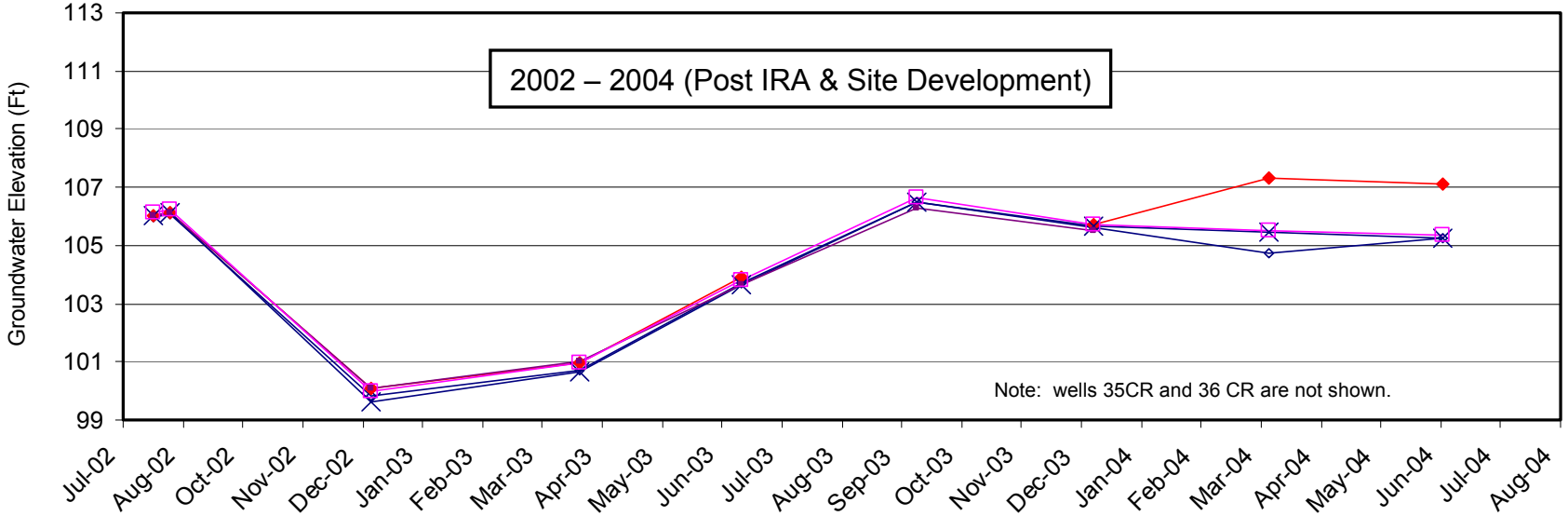
Hydrographs - Zone B
Study Area 36

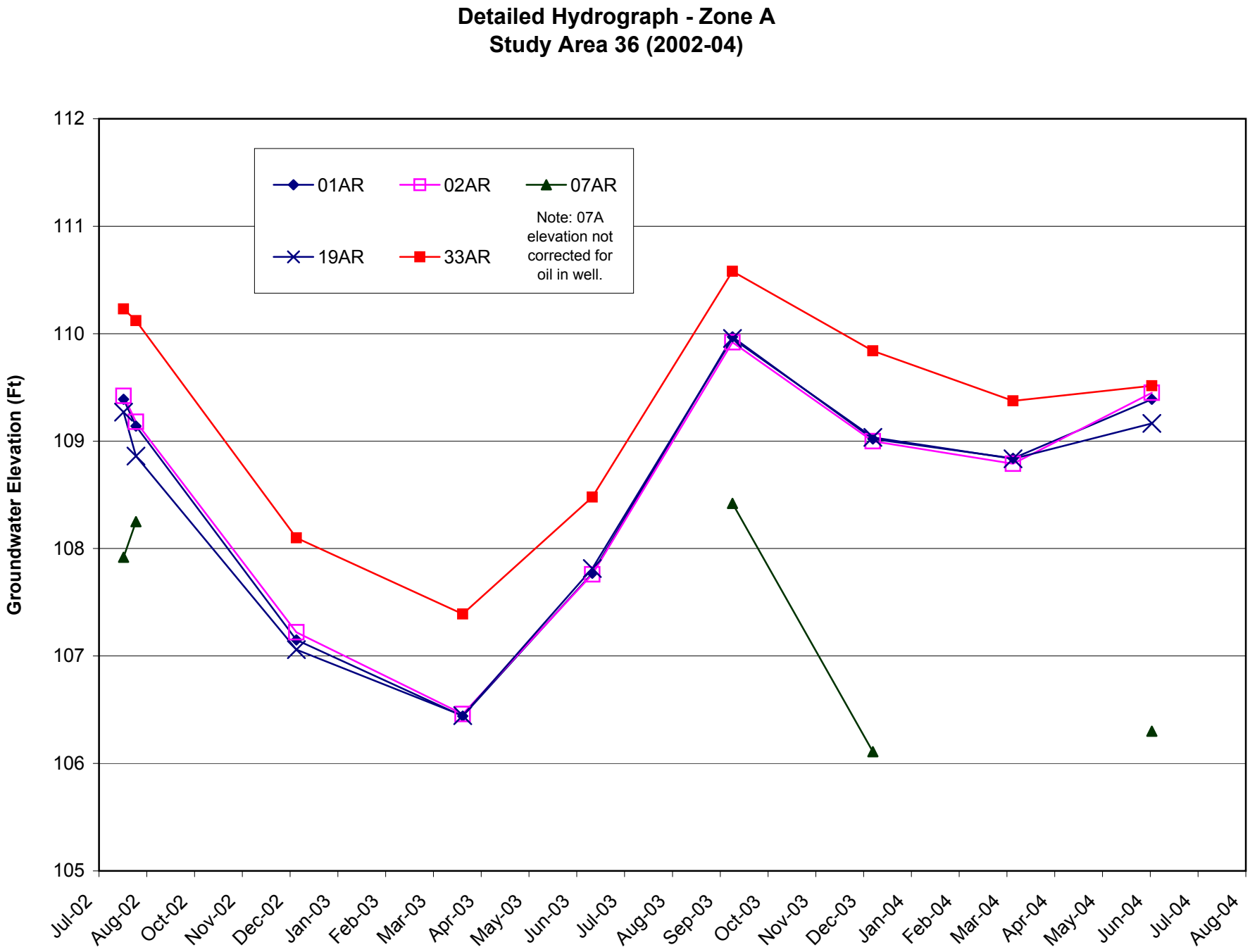


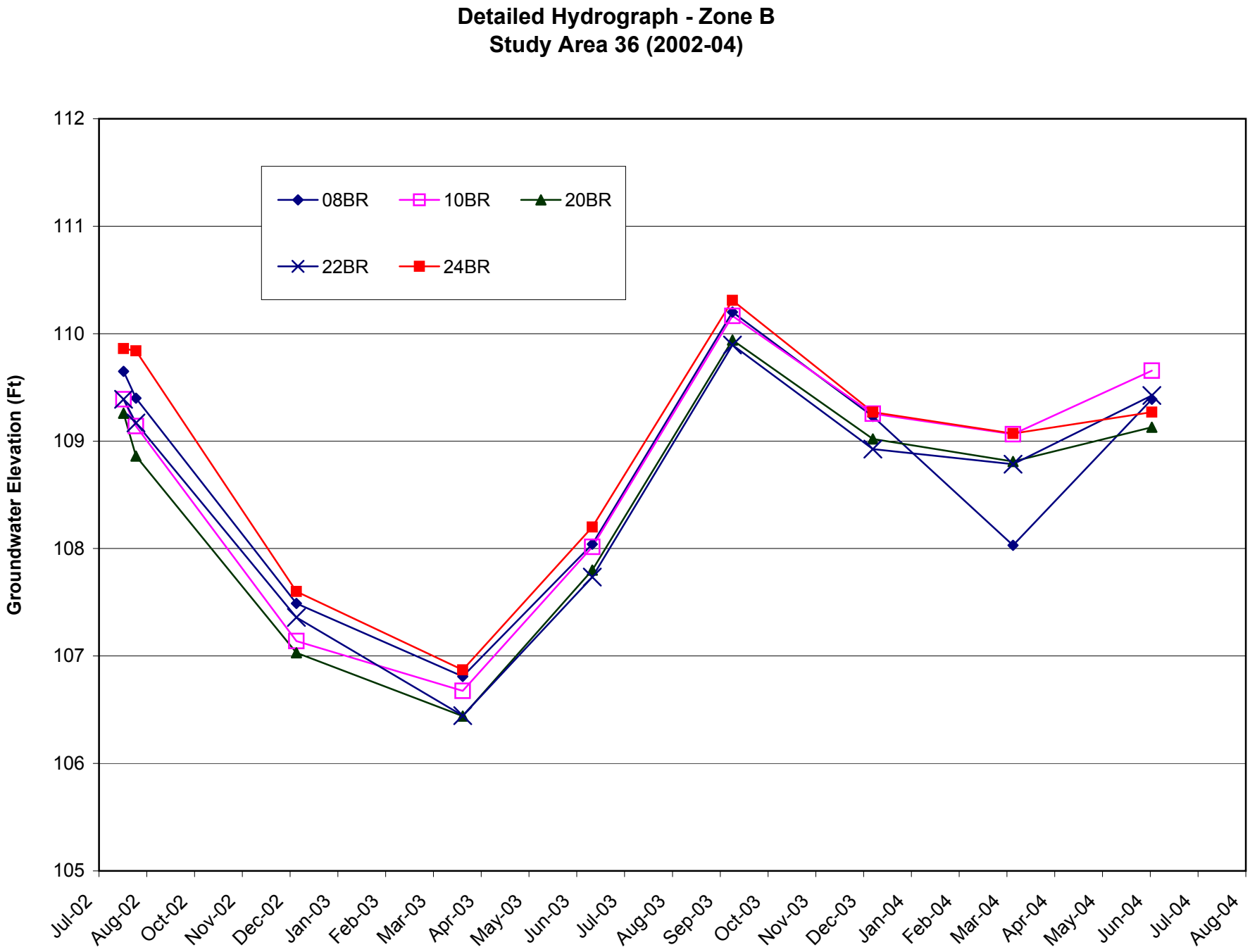


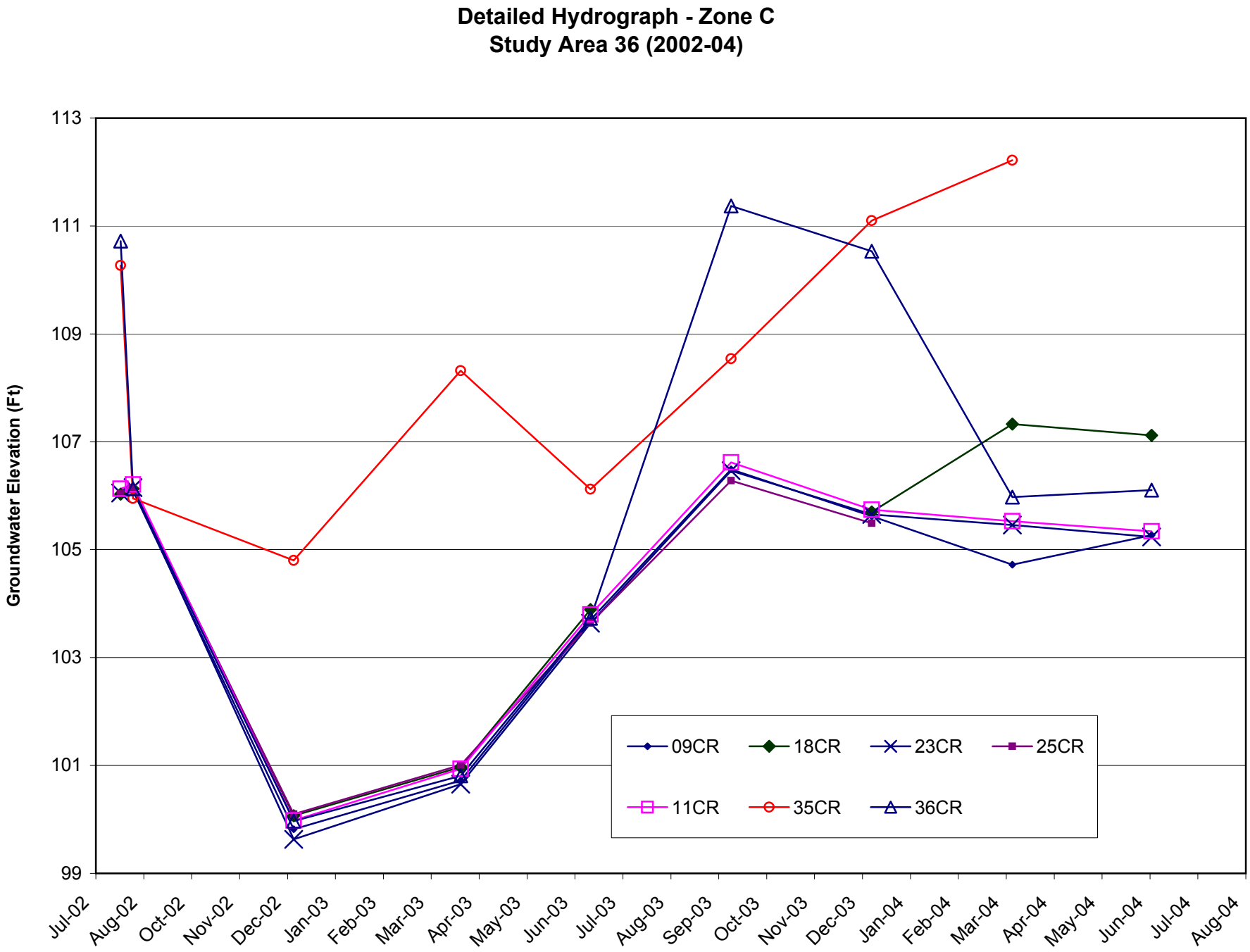
Hydrographs - Zone C
Study Area 36

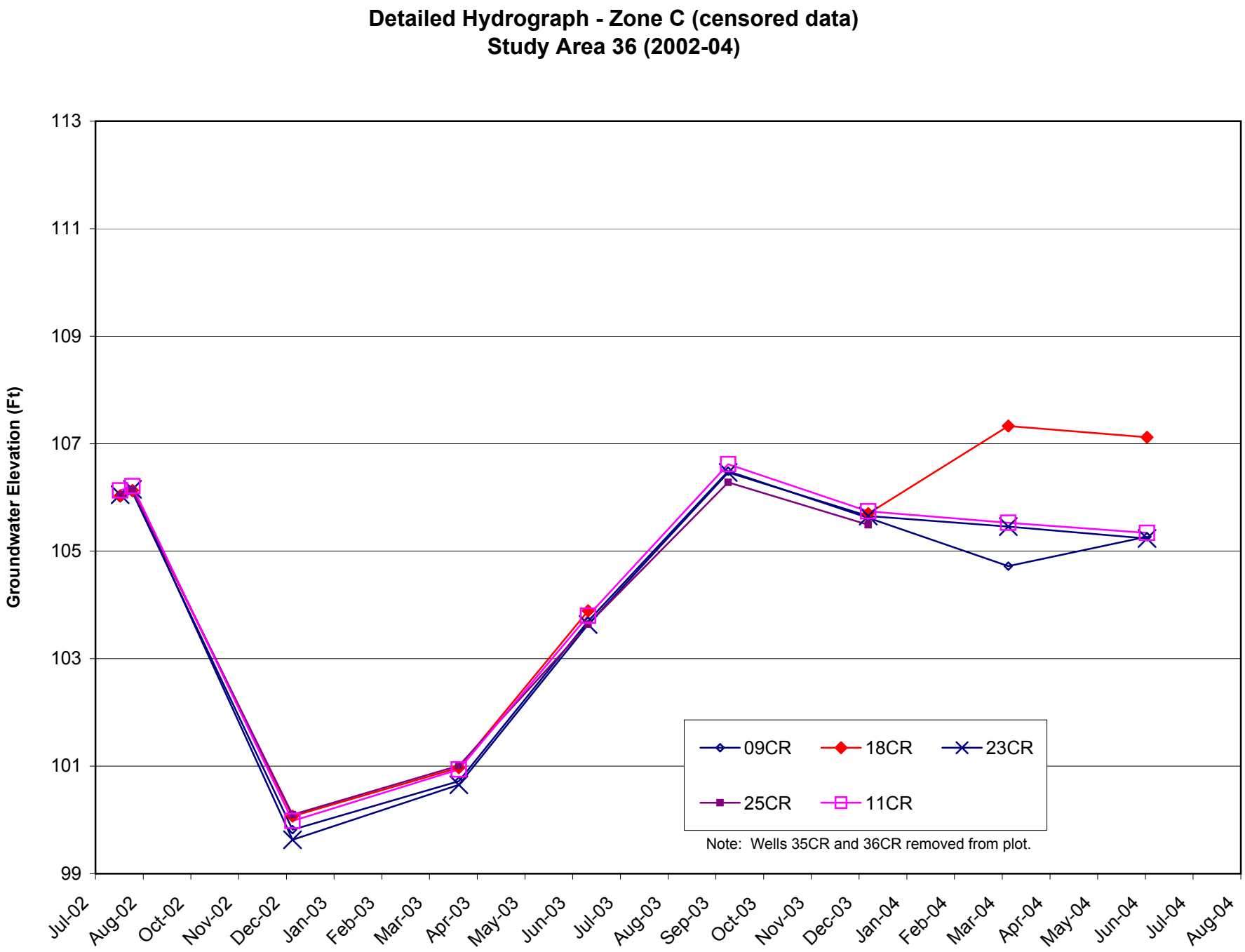


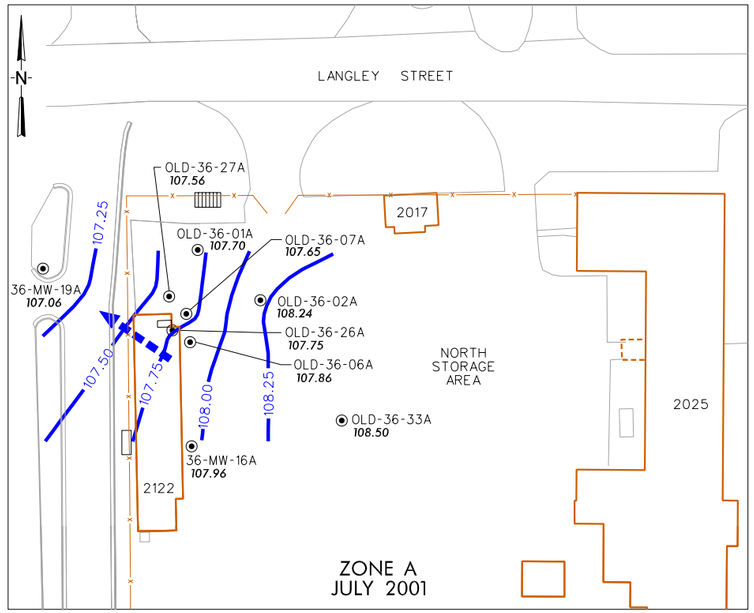


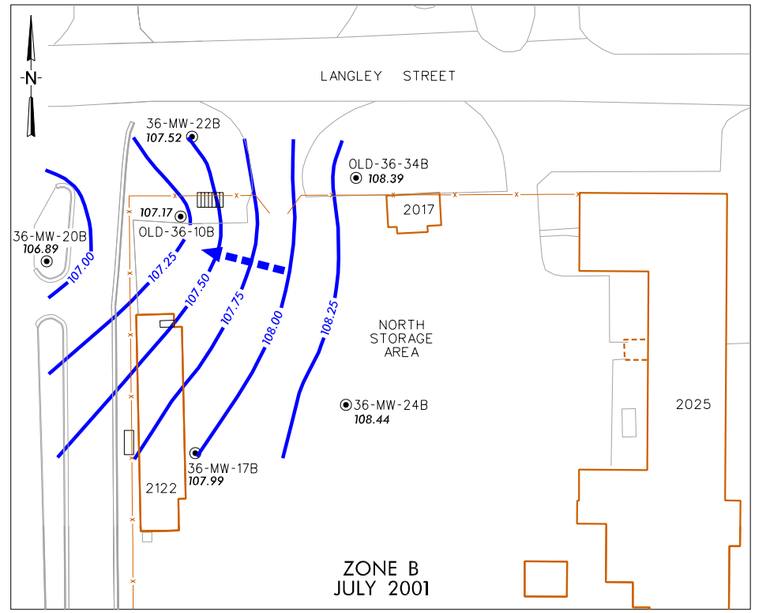

Detailed Hydrograph - Zone A
Study Area 36 (2002-04)
Groundwater Elevation (Ft)
112
111
110
109
108
107
106
105
01AR
02AR
07AR
19AR
33AR
Note: 07A elevation not corrected for oil in well.
Jul-02
Aug-02
Oct-02
Nov-02
Dec-02
Jan-03
Feb-03
Mar-03
Apr-03
May-03
Jun-03
Jul-03
Aug-03
Sep-03
Oct-03
Nov-03
Dec-03
Jan-04
Feb-04
Mar-04
Apr-04
May-04
Jun-04
Jul-04
Aug-04

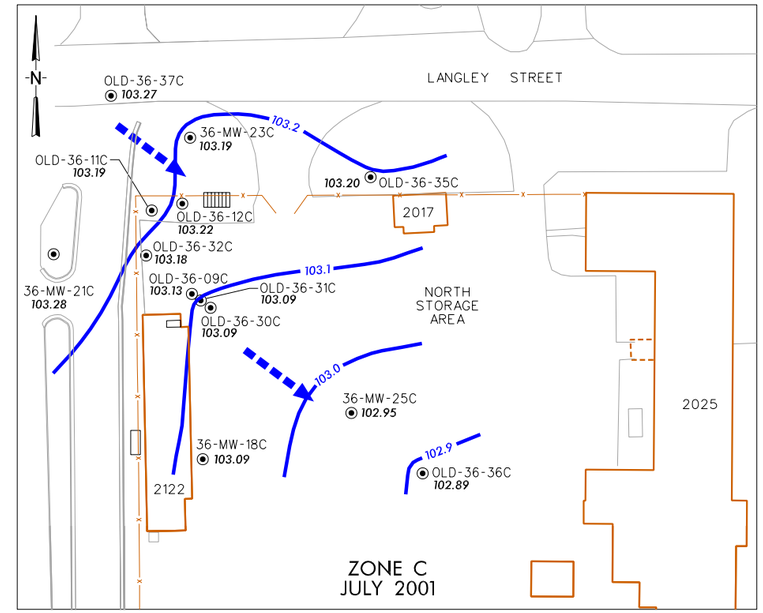

Detailed Hydrograph - Zone B
Study Area 36 (2002-04)
Groundwater Elevation (Ft)
112
111
110
109
108
107
106
105
08BR
10BR
20BR
22BR
24BR
Jul-02
Aug-02
Oct-02
Nov-02
Dec-02
Jan-03
Feb-03
Mar-03
Apr-03
May-03
Jun-03
Jul-03
Aug-03
Sep-03
Oct-03
Nov-03
Dec-03
Jan-04
Feb-04
Mar-04
Apr-04
May-04
Jun-04
Jul-04
Aug-04

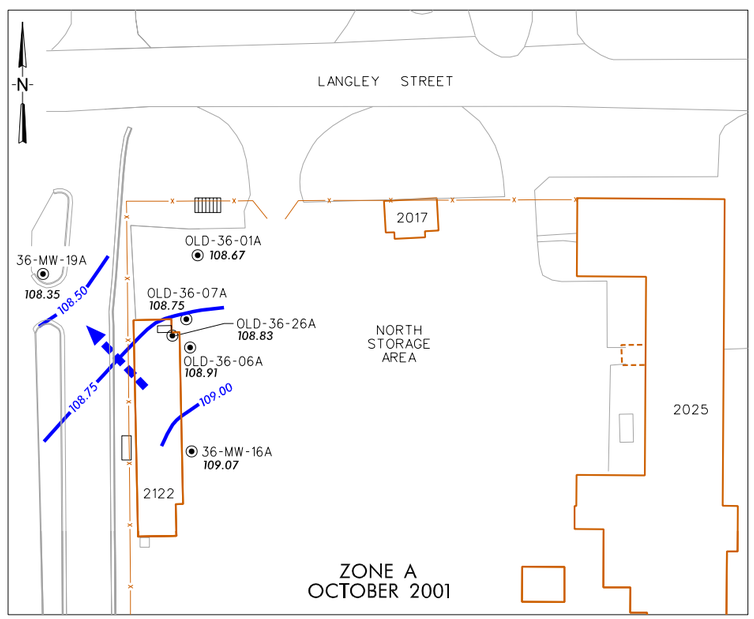

Detailed Hydrograph - Zone C
Study Area 36 (2002-04)
Groundwater Elevation (Ft)
113
111
109
107
105
103
101
99
Jul-02
Aug-02
Oct-02
Nov-02
Dec-02
Jan-03
Feb-03
Mar-03
Apr-03
May-03
Jun-03
Jul-03
Aug-03
Sep-03
Oct-03
Nov-03
Dec-03
Jan-04
Feb-04
Mar-04
Apr-04
May-04
Jun-04
Jul-04
Aug-04
09CR
18CR
23CR
25CR
11CR
35CR
36CR

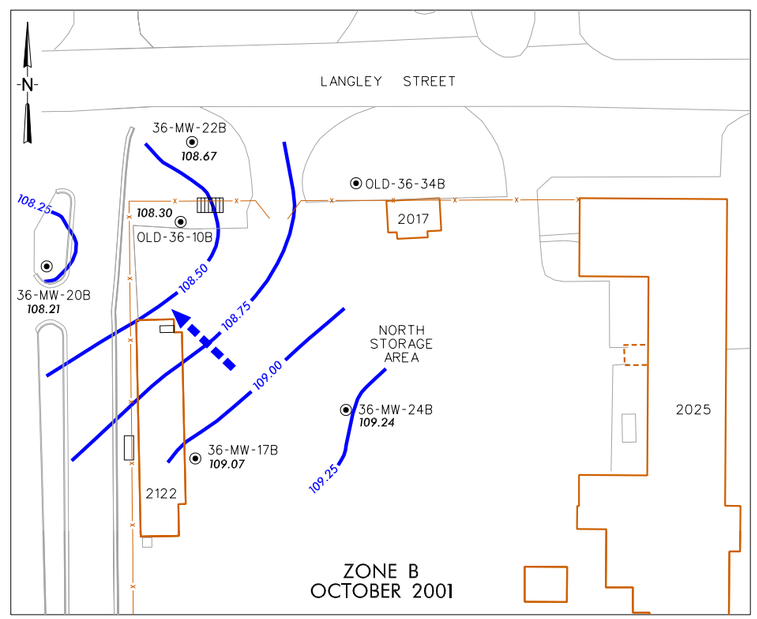

Detailed Hydrograph - Zone C (censored data)
Study Area 36 (2002-04)
Groundwater Elevation (Ft)
113
111
109
107
105
103
101
99
Jul-02
Aug-02
Oct-02
Nov-02
Dec-02
Jan-03
Feb-03
Mar-03
Apr-03
May-03
Jun-03
Jul-03
Aug-03
Sep-03
Oct-03
Nov-03
Dec-03
Jan-04
Feb-04
Mar-04
Apr-04
May-04
Jun-04
Jul-04
Aug-04
09CR
18CR
23CR
25CR
11CR
Note: Wells 35CR and 36CR removed from plot.

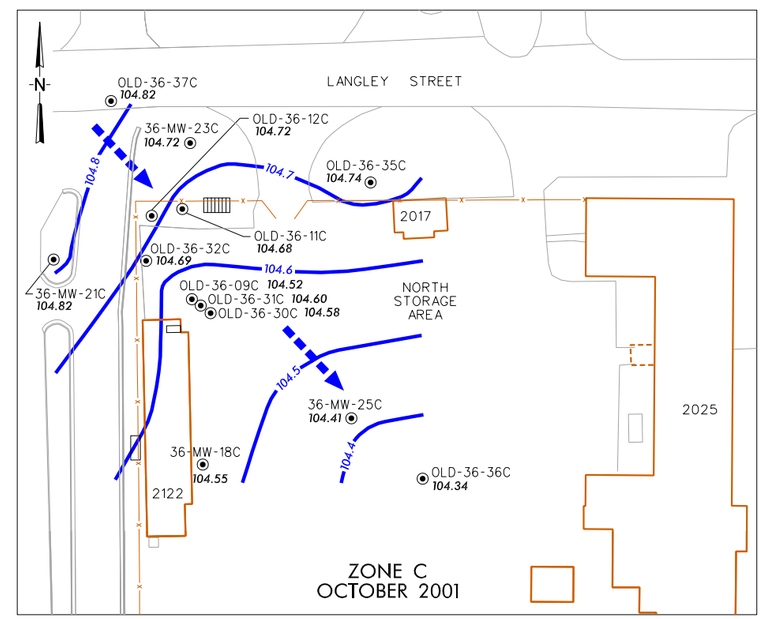












LEGEND

- MONITORING WELL
- 104.25 GROUNDWATER CONTOUR
- FLOW DIRECTION

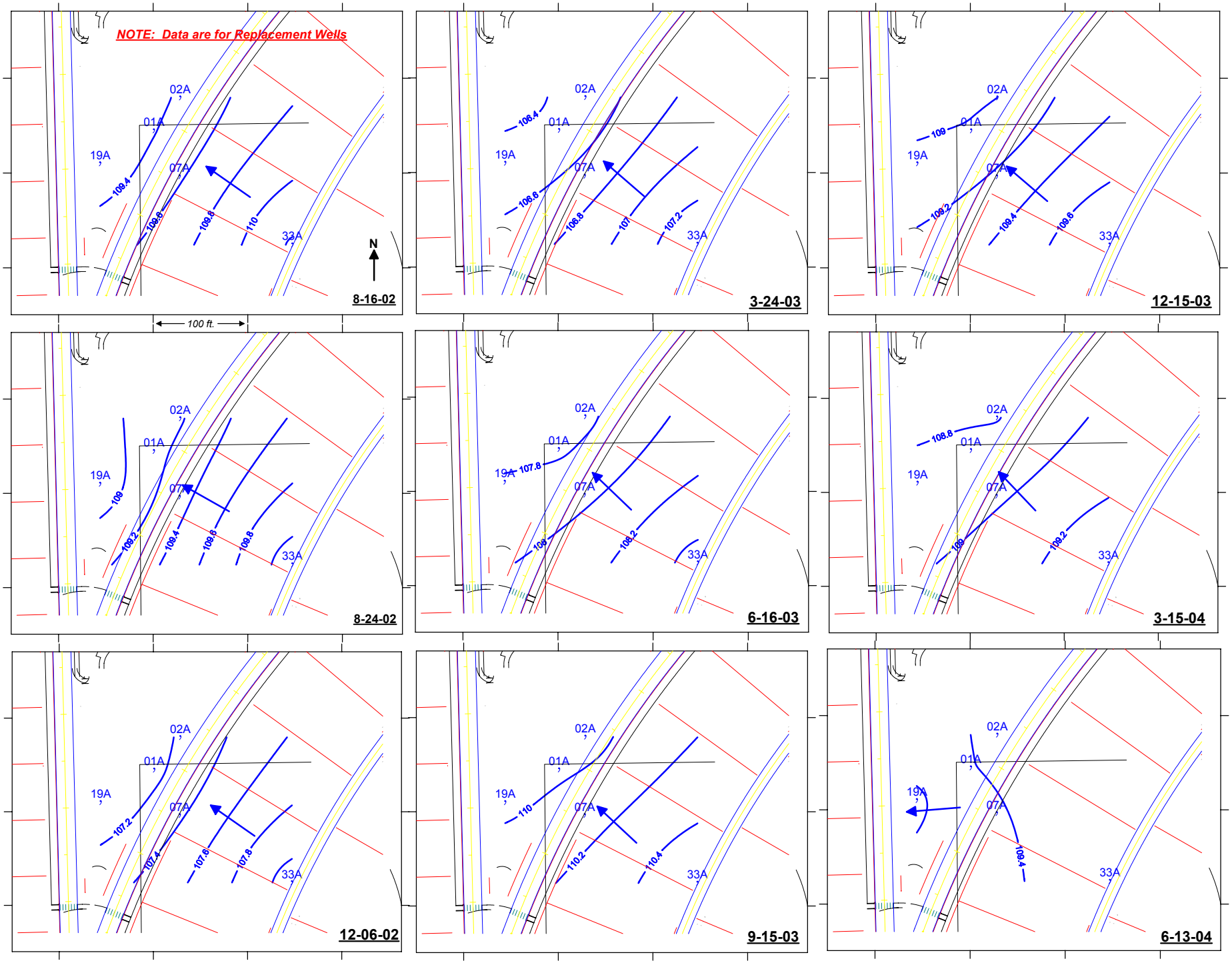
80 0 80
SCALE IN FEET

FIGURE 4-1
GROUNDWATER ELEVATION CONTOURS
ZONES A, B, AND C
JULY AND OCTOBER 2001
STUDY AREA 36 - MAIN BASE

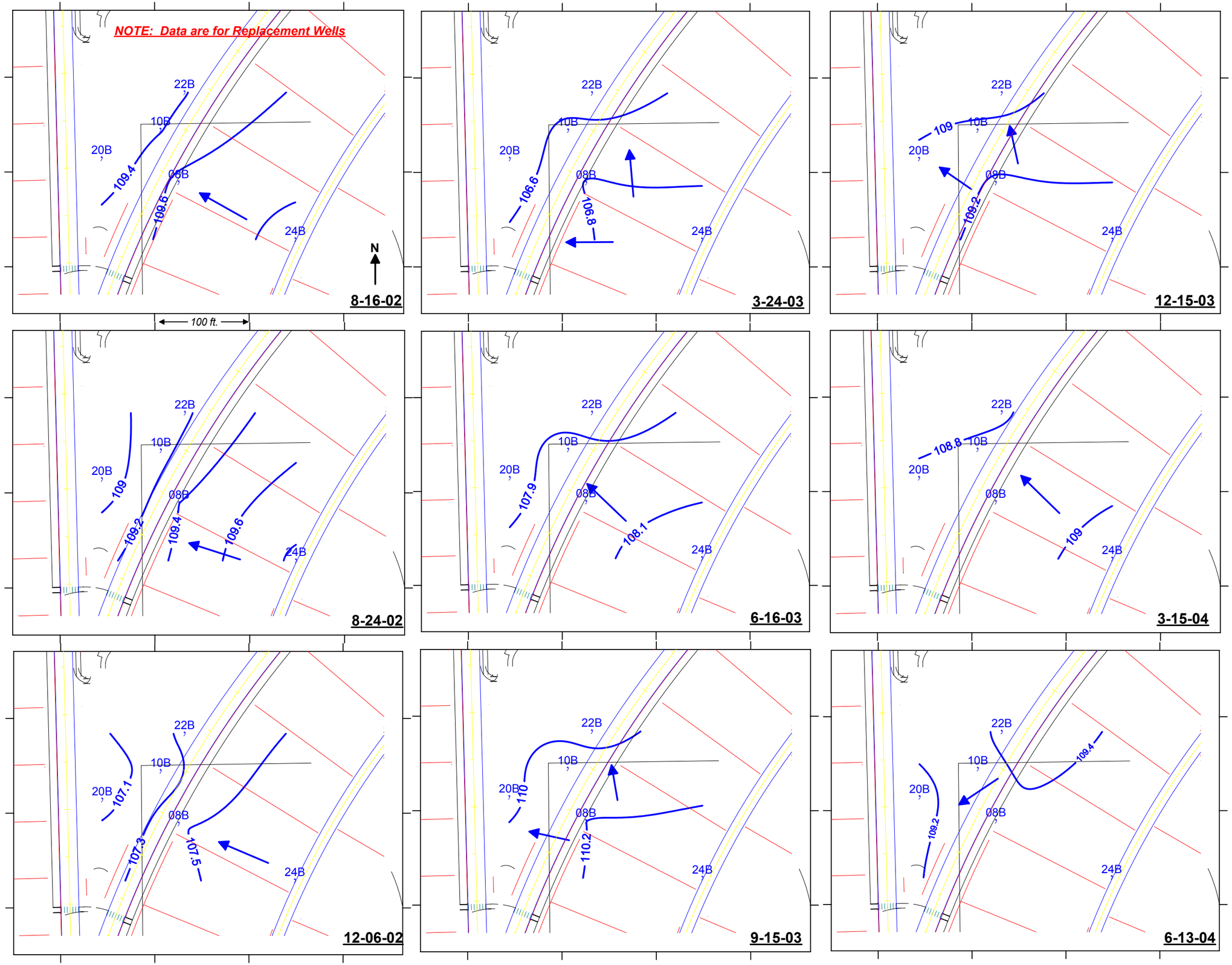
NAVAL TRAINING CENTER
ORLANDO, FLORIDA

n11x17h.dgn

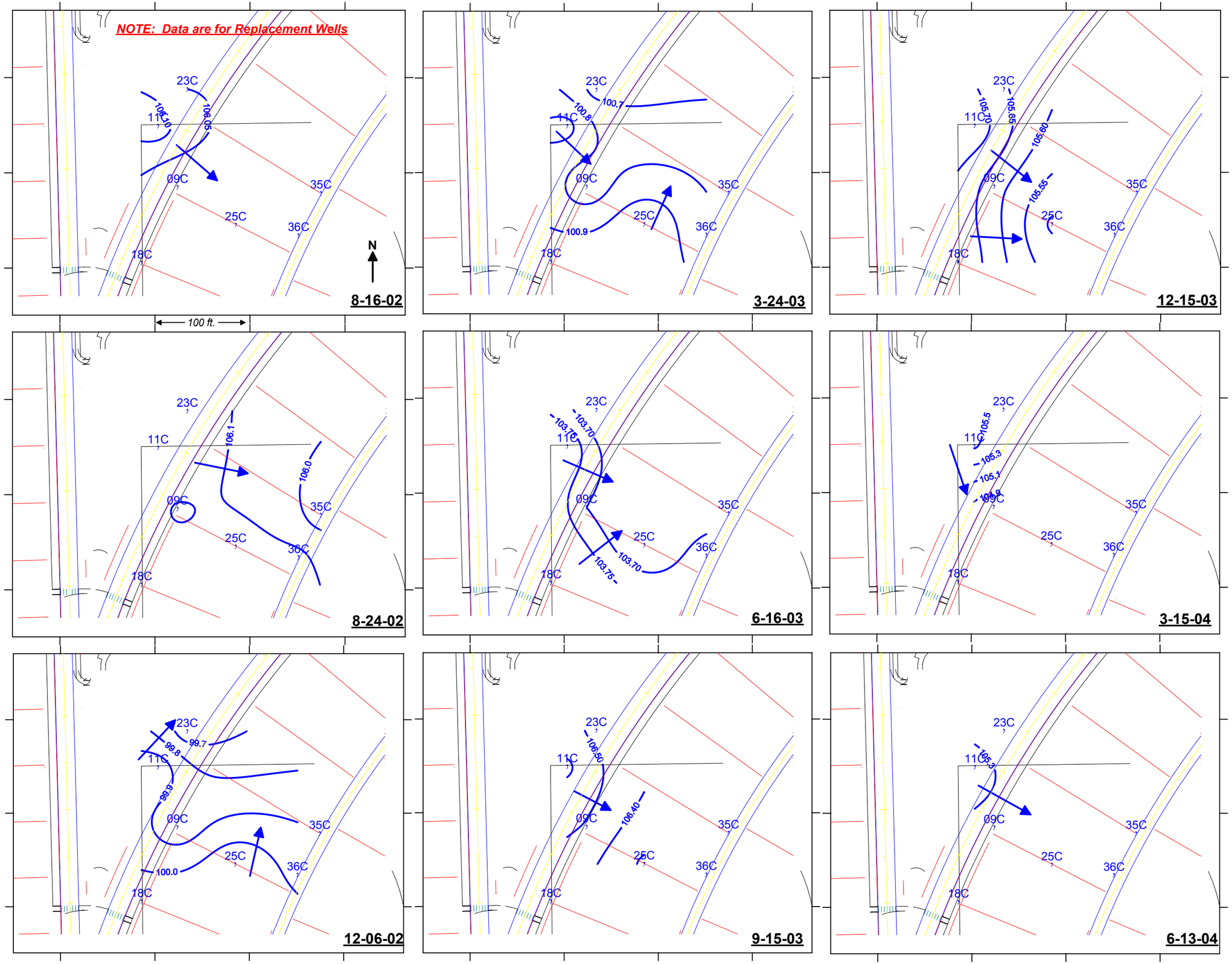
CAD FILE NO./DATE: k:\dgn\navy\orlando\sites\sa36\sa36-035.dgn 8-1-02 SITE INVESTIGATION REPORT



POTENTIOMETRIC SURFACE MAPS 2002 - 2004
ZONE A, STUDY AREA 36
NTC ORLANDO, FL



POTENTIOMETRIC SURFACE MAPS 2002 - 2004
ZONE B, STUDY AREA 36
NTC ORLANDO, FL



POTENTIOMETRIC SURFACE MAPS 2002 - 2004
ZONE C, STUDY AREA 36
NTC ORLANDO, FL

APPENDIX B

GROUNDWATER AND CONTAMINANT VELOCITY CALCULATIONS

CLIENT NTC Orlando, Study Area 36		JOB NUMBER N7457
SUBJECT Groundwater and Contaminant Velocity Calculations (June and September 2003 water levels)		
BASED ON See Below		DRAWING NUMBER
BY A. Jenkins; updated by L. Campbell	CHECKED BY P. Juriasingani; updates checked by ATJ	DATE 12/07/04; 1/13/05

Problem: Determine the groundwater seepage velocity, contaminant velocity, and dissolved vegetable oil velocity for the A, B, and C aquifer zones at SA-36. Based upon original calculations dated 4/2/02, the revised calculations will use June and September 2003 water level measurements. Water level data reflects post-development influences (e.g., pond and residential housing development)

Solution: The following formulas may be used to calculate the desired velocities.

GW Seepage Velocity, Vs = Ki/Ne

Where K = hydraulic conductivity
i = hydraulic gradient
Ne = aquifer effective porosity

Contaminant Velocity, Vc = Vs/R

Where R, coefficient of retardation = 1 + (Db)(Kd)/N

Where Db = aquifer dry bulk density
Kd = partition coefficient
N = aquifer total porosity

The above formulas are based on advection and adsorption/desorption of contaminants, but ignore the potential effects of dispersion and biodegradation.

It is assumed for the purposes of this calculation that dissolved vegetable oil (representative chemical formula, $C_{18}H_{34}O_3$) will move through the aquifer at a retarded rate similar to contaminants that fall under the category of Total Recoverable Petroleum Hydrocarbons (i.e., C_5 – C_{40} range). Therefore, the above contaminant velocity formula will be applied to the dissolved vegetable oil velocity.

Given: Two sets of of water level measurements (June and September 2003) were used to map the potentiometric surfaces for the A, B, and C aquifer zones at SA-36. Based on these contour maps, the following horizontal hydraulic gradients were determined:

Aquifer Zone	June 2003 Gradient	September 2003 Gradient	Average Gradient 2003
A	0.035	0.003	0.0033
B	0.002	0.001	0.0015
C	0.001	0.003	0.002

Slug tests were conducted at the site by CCI during December 2000 as part of the implementation of the IRA. The following hydraulic conductivity results were derived from the slug test analyses:

Aquifer Zone	K, average (ft/day)
A	6.3
B	6
C	4.4

The total porosity and effective porosity, and the dry bulk density of the aquifer formation at SA-36 have not been determined by site specific testing or analyses of samples. Therefore, the following literature values for fine sand (Wiedemeier, et al, 1996), which is the predominant aquifer material for aquifer zones A and C, will be used for the velocity calculations:

Parameter (Zones A & C)	Range	Value Used
Total Porosity	0.26 – 0.53	0.35
Effective Porosity	0.1 – 0.3	0.25
Dry Bulk Density	1.37 – 1.81 g/cc	1.7 g/cc

Because aquifer zone B contains more silt and clay and is cemented, the material is assumed to have greater total porosity, lower effective porosity, and to have somewhat lower dry bulk density. The following literature values for silt and clay will be used for the velocity calculations:

Parameter (Zone B)	Range	Value Used
Total Porosity	0.34 – 0.61	0.45
Effective Porosity	0.1 – 0.2	0.2
Dry Bulk Density	1 – 2.4 g/cc	1.4 g/cc

The primary contaminants of concern (COCs) for transport through the aquifer at SA-36 are PCE, TCE, and DCE. Also, vegetable oil has been injected as a source for dissolved organic carbon in the aquifer to enhance microbial degradation of the COCs. To calculate the velocity of these constituents it is necessary to determine the partition coefficient, Kd, for each. The Kd can be estimated as the octanol-water partitioning coefficient, Koc, for each constituent multiplied by the fraction of organic carbon, foc, in the aquifer. Published values (FDEP 1999) of Koc for the above constituents are as follows:

Constituent	Koc (L/kg)
PCE	1.55 E+02
TCE	1.66 E+02
cis-1,2-DCE	3.55 E+01
Vegetable Oil	1.58 E+03*

Koc value for vegetable oil was not found; surrogate value for Total Recoverable Petroleum Hydrocarbons is shown for calculations purposes.

A site-specific concentration for foc in the aquifer at SA-36 has not been determined. The BioScreen Model documentation reports that a typical range is 0.0002 to 0.02. ASTM (1995) states that if the site foc is unknown, a value of 0.001 is often used.

CLIENT NTC Orlando, Study Area 36		JOB NUMBER N7457
SUBJECT Groundwater and Contaminant Velocity Calculations (June and September 2003 water levels)		
BASED ON See Below		DRAWING NUMBER
BY A. Jenkins; updated by L. Campbell	CHECKED BY P. Juriasingani; updates checked by ATJ	DATE 12/07/04; 1/13/05

Calculations:

Groundwater Seepage Velocity, Vs:

Aquifer Zone	K (ft/day)	Gradient	Ne	Vs (ft/day)	Vs (ft/year)
A	6.3	0.0033	0.25	0.083	30
B	6	0.0015	0.2	0.045	16
C	4.4	0.002	0.25	0.035	13

Contaminant Seepage Velocity, Vc:

Aquifer Zone A	Vs (ft/day)	Db (g/cc)	Kd (L/kg)*	N	R	Vc (ft/day)	**Vc (ft/year)**
PCE	0.083	1.7	0.155	0.35	1.8	0.046	**17**
TCE	0.083	1.7	0.166	0.35	1.8	0.046	**17**
cis-DCE	0.083	1.7	0.036	0.35	1.2	0.069	**25**

Aquifer Zone B	Vs (ft/day)	Db (g/cc)	Kd (L/kg)	N	R	Vc (ft/day)	**Vc (ft/year)**
PCE	0.045	1.4	0.155	0.45	1.5	0.03	**11**
TCE	0.045	1.4	0.166	0.45	1.5	0.03	**11**
Cis-DCE	0.045	1.4	0.036	0.45	1.1	0.04	**15**

Aquifer Zone C	Vs (ft/day)	Db (g/cc)	Kd (L/kg)	N	R	Vc (ft/day)	**Vc (ft/year)**
PCE	0.035	1.7	0.155	0.35	1.8	0.02	**7**
TCE	0.035	1.7	0.166	0.35	1.8	0.02	**7**
Cis-DCE	0.035	1.7	0.036	0.35	1.2	0.03	**11**

* Kd = Koc X foc

Dissolved Vegetable Oil Seepage Velocity, Vo:

Aquifer Zone A	Vs (ft/day)	Db (g/cc)	Kd (L/kg)	N	R	Vo (ft/day)	**Vo (ft/year)**
Dissolved Oil	0.083	1.7	1.58	0.35	8.7	0.0095	**3.5**

Aquifer Zone B	Vs (ft/day)	Db (g/cc)	Kd (L/kg)	N	R	Vo (ft/day)	**Vo (ft/year)**
Dissolved Oil	0.045	1.4	1.58	0.45	5.9	0.0076	**2.8**

Aquifer Zone C	Vs (ft/day)	Db (g/cc)	Kd (L/kg)	N	R	Vo (ft/day)	**Vo (ft/year)**
Dissolved Oil	0.035	1.7	1.58	0.35	8.7	0.004	**1.5**

APPENDIX C

ANAEROBIC REDUCTIVE DECHLORINATION PROCESS DESCRIPTION

C.1 ANAEROBIC REDUCTIVE DECHLORINATION

This section provides a brief summary of the anaerobic reductive dechlorination process for chlorinated VOCs. It also describes how the introduction of additional electron donor material (e.g., vegetable oil) can stimulate or accelerate the reductive dechlorination process.

C.1.1 Biodegradation of Chlorinated VOCs

Reductive dechlorination is one of several degradation processes by which chlorinated VOCs are transformed to environmentally innocuous compounds such as carbon dioxide, ethene, ethane, and chloride. In the presence of a suitable electron donor (e.g., hydrogen), suitable microbes, and favorable geochemical conditions, a hydrogen atom can replace a chlorine atom on a chlorinated ethene molecule. This rigorously studied microbial process occurs under anaerobic (oxygen-deficient) conditions. Hydrogen can be generated when organic carbon ferments. This organic supply can come from naturally occurring organic carbon in aquifer sediments or anthropogenic (man-made) carbon sources such as hydrocarbon contaminants (e.g., benzene, toluene), aliphatic petroleum compounds, and other substances, including vegetable oil.

It is widely recognized that, in the presence of hydrogen, TCE (C_2HCl_3), can be reduced to dichloroethene (DCE or $C_2H_2Cl_2$). While various DCE isomers (e.g., 1,1-DCE, *cis*-1,2-DCE, and trans-1,2-DCE) can be produced, it is well documented that *cis*-1,2-DCE is the most common degradation product of TCE. DCE can then be reduced to vinyl chloride (VC or C_2H_3Cl), which, in turn, can be reduced to ethene (C_2H_4) and potentially ethane (C_2H_6), or via mineralization, to carbon dioxide (CO_2), water (H_2O), and chloride ions (Cl^-).

Although degradation of DCE and VC can occur via anaerobic reductive dechlorination, this process is generally slow and can be limited by a number of factors. In fact, at many sites, DCE and VC levels have been shown to persist where reductive dechlorination is inefficient or ineffective.

C.1.1.1 Enhanced Bioremediation

As stated earlier, one of the requirements for reductive dechlorination is having a sufficient supply of electron donors. Enhanced bioremediation is a technology that enhances the natural biodegradation of contaminants by supplying a carbon substrate to the subsurface. This carbon substrate is broken down and therefore supplies hydrogen to the subsurface. One of the many carbon substrates that have been demonstrated to foster the reductive dechlorination process is food-grade vegetable oil, an inexpensive, innocuous carbon source that is not regulated as a contaminant by the USEPA. The separate phase nature of vegetable oil allows for slow dissolution into groundwater, making it a slow release carbon source. Other important factors influencing the availability of the carbon source from vegetable oil include

1) Sequestration (i.e., partitioning of contaminants from sorbed or aqueous phase into the oil); and 2) the oil acts as a contaminant surfactant, sorbing contaminants in the oil. Indigenous microorganisms, primarily bacteria, metabolize the vegetable oil and produce hydrogen. Because the higher concentration of hydrogen allows the natural dechlorination processes to occur at a faster rate, vegetable oil serves to enhance the rate of the transformation that would otherwise occur under natural conditions (i.e., natural attenuation). Note that the same biodegradation process occurs in the presence of vegetable oil as it does under natural attenuation. Thus, a continuous, long-term supply of electron donor is available for microbial activity. Based upon numerous studies and technical experience, vegetable oil has been shown to supply electron donor material for 2 years or longer. Because of the low solubility of vegetable oil, the potential exists that a single oil injection could provide sufficient carbon to drive reductive dechlorination for many years.

C.1.1.2 Bioremediation Indicators

There are several lines of evidence by which the biodegradation processes can be measured. Because the biodegradation processes in natural attenuation are the same as in enhanced bioremediation, similar measures of performance can be used to demonstrate whether enhanced bioremediation is effectively reducing contamination. The first line of evidence is to demonstrate a trend of decreasing contaminant mass and/or concentration. More specifically, demonstrating a decrease of the parent compounds (PCE, TCE, etc.) coupled with the generation or increase of daughter or breakdown products (*cis*-1,2-DCE, VC, ethene, etc.) is useful. It is important to note that because dechlorination occurs sequentially, dechlorination of TCE may result in a temporary increase, then decrease, of the various daughter products.

A secondary line of evidence includes the use of geochemistry data to indirectly illustrate that biodegradation is occurring. Natural attenuation (i.e., geochemical) parameters are generally used to evaluate the suitability of geochemical conditions for biodegradation and to determine if bioremediation is occurring. The complex relationship among many of these parameters is described in the following sections.

C.1.1.3 Natural Attenuation Parameters

Dissolved Oxygen: Dissolved oxygen (DO) acts as a primary substrate or co-substrate during the initial stages of metabolism. For chlorinated hydrocarbon degradation, anaerobic pathways are more efficient. If DO concentrations are greater than 0.5 to 1.0 milligrams per liter (mg/L), anaerobic bacteria cannot exist and reductive dechlorination will not occur.

Nitrate/Nitrite: After DO has been depleted through aerobic respiration, anaerobes will utilize nitrate (NO_3^-) as an electron acceptor to anaerobically degrade hydrocarbons (denitrification). This process reduces nitrate to nitrite (NO_2) and generates carbon dioxide. Nitrate concentrations above 0.5 mg/L indicate nitrate reduction, possibly at the expense of TCE reduction.

Dissolved Manganese: After DO and nitrate have been depleted, anaerobic microbes will utilize manganese (Mn^{+4}) as an electron acceptor to anaerobically degrade hydrocarbons, generating manganese (Mn^{+2}) and carbon dioxide.

Ferric Iron/Ferrous Iron: After DO, nitrate, and manganese reduction, anaerobic microbes will utilize ferric iron (Fe^{+3}) as an electron acceptor (iron reduction), generating ferrous iron (Fe^{+2}) and carbon dioxide. Ferric iron is not typically analyzed, thus, the presence or increase in concentration of ferrous iron (Fe^{+2}) and carbon dioxide are indicators of iron reduction.

Sulfate/Sulfide: After DO, nitrate, manganese, and ferric iron have been utilized, anaerobic microbes will utilize sulfate (SO_4^-) as an electron acceptor, resulting in sulfide and carbon dioxide increases. Sulfate reduction, along with methanogenesis, is one of the most important reduction pathways responsible for biodegradation of chlorinated hydrocarbons. Decreases in sulfate concentrations and increases in sulfide concentrations often suggest anaerobic, reducing conditions. Sulfide can be present in many forms, the three primary forms being the sulfide ion (S^{-2}) or dissolved hydrogen sulfide as either H_2S or HS.

Phosphate: Similar in mechanism to sulfate reduction (but to a lesser degree), phosphate (PO_4^-) reduction is an anaerobic biodegradation process whereby bacteria can use phosphate as an electron acceptor. Phosphate along with nitrogen are also regarded as nutrients for biodegradation.

Dissolved Carbon Dioxide: Methanogenesis occurs after oxygen, nitrate, manganese, ferric iron, and sulfate have been utilized. It is one of the most important reduction pathways responsible for chlorinated VOC degradation. During methanogenesis, bacteria utilize carbon dioxide as an electron acceptor, generating methane as a byproduct. Carbon dioxide is produced by every terminal electron acceptor process.

Dissolved Methane: Because methane is not a chemical component of solvents, its presence at concentrations greater than background provides strong evidence of methanogenic fermentation (and carbon dioxide utilization). Background concentrations of methane are important because some natural sources of methane exist.

Dissolved Hydrogen: Hydrogen is produced as a result of fermentation of organic carbon. Hydrogen is then utilized by respiratory microbes such as nitrate reducers, iron reducers, sulfate reducers, and

methane producers. Each microbe utilizes hydrogen more or less efficiently, leading to either a buildup or a decrease of hydrogen concentration. The hydrogen concentration, therefore, can provide an indication of the reduction process that is most prevalent in the subsurface at any one location. A value greater than 5 nanomoles per liter (nM) indicates methanogenesis, a desirable process by-product. Values in the range 0.2 – 0.8 nm/L range are more indicative of Fe^{+3} reduction.

Dissolved Ethene/Ethane: As discussed earlier, ethene and possibly ethane signify the final degradation step of chlorinated ethenes. Concentrations of ethene (greater than 0.01 mg/L) and ethane (greater than 0.1 mg/L) provide strong evidence of such degradation.

Total Alkalinity: Groundwater pH decreases as a result of both aerobic and anaerobic biodegradation. As carbon dioxide is produced by microbial activity, dissolution of rock minerals occur, which increases the alkalinity, expressed as calcium carbonate ($CaCO_3$). As a result, there is a positive correlation between microbial metabolism and alkalinity.

Chloride: Chloride concentrations are used to evaluate biodegradation because chloride is released into groundwater during dechlorination of chlorinated VOCs. Therefore, an increase in chloride concentration in the downgradient direction is direct evidence of dechlorination.

Oxidation-Reduction Potential: The oxidation-reduction potential (ORP) of groundwater (Eh) is a measure of the relative tendency of the groundwater solution to accept or donate electrons and the amount of energy released during electron transfer. The Eh (in millivolts; mV) can provide evidence of the type of biodegradation processes that are active in a particular plume or area within a plume. Eh should be used only as a qualitative indicator of the overall oxidation-reduction state.

C.1.1.4 Breakdown Products

TOC and other metabolic acids (e.g., volatile fatty acids) would be expected to increase following the breakdown of vegetable oil in the subsurface. The generation of these acids is favorable as it represents essentially hydrogen storage molecules, and their accumulation indicates that there is significant hydrogen in the system for dechlorination.

Vegetable oil can be oxidized to pyruvic acid ($C_3H_4O_3$) and hydrogen is released. Pyruvic acid may then convert to acetic acid ($C_2H_4O_2$) followed by the generation of butyric acid ($C_4H_8O_2$) and propionic acid ($C_3H_6O_2$).

C.1.1.5 Regulatory Requirements

USEPA Region 4 describes natural attenuation as follows:

> "Region 4 acknowledges that natural attenuation due to advection, adsorption, biological degradation, dispersion, and volatilization can effectively reduce contaminant toxicity, mobility, or volume to levels that are protective of human health and the ecosystem."

The agency recognizes the utility of other processes, but stresses that biological degradation is important to the timely destruction of chlorinated solvents like TCE. The USEPA also describes the following provisions of an appropriate remedial action as "understood" (USEPA, 1999):

- Measures must be taken to stop the continued addition of contaminants to groundwater.
- All portions of a plume must be remediated to meet Maximum Contaminant Levels (MCLs) or non-zero Maximum Contaminant Level Goals (MCLGs) (GCTLs in Florida).
- An on-site, downgradient compliance boundary must be established beyond which accepted limits cannot be exceeded.

Navy guidance further states that the two most effective lines of evidence for natural attenuation are:

- Historical groundwater data showing a stable or shrinking contaminant plume.
- Groundwater geochemical data showing that aquifer conditions are suitable for biodegradation (Navy, 1998).

APPENDIX D

PROCESS USED TO EVALUATE GROUNDWATER MONITORING DATA AT SA 36

SCORING PROCESS FOR EVALUATION OF NATURAL ATTENUATION IN A GROUNDWATER PLUME

Step 1 Tabulate the groundwater sampling results.

Step 2 Evaluate the change in electron acceptor and donator concentrations.

Step 3 Plot the electron acceptor and donor values through the flow path of the plume (i.e., Upgradient → Source → Ingradient → Downgradient).

Step 4 Evaluate the change in contaminant (PCE, TCE) concentrations along with daughter product [*cis*-1,2-DCE, VC and methane/ethane/ethane (MEE)] and chloride formation.

Step 5 Score the contamination source well according to the Air Force Center for Environmental Excellence (AFCEE) protocol outlined in the *Draft EPA Region 4 Suggested Practices for Evaluation of a Site for Natural Attenuation (Biological Degradation) of Chlorinated Solvents* (USEPA, 1999). This scoring process evaluates the degree to which natural attenuation is occurring in a groundwater plume by applying a numeric value to each of the primary and secondary indicator parameters (see Table 4-1) in the contamination source well on the basis of the parameter's role in the reductive dechlorination process.

APPENDIX E

SITE INVESTIGATION ANALYTICAL DATA (ABANDONED WELLS)

TABLE E-1

ABANDONED WELLS
STUDY AREA 36 - MAIN BASE

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

Well Designation	CAS Number	Screening Criteria Florida GCTL[a]	OLD-36-01A							OLD-36-02A				OLD-36-02A
Sample ID			36G00101-111797	36G00101-111797-D	36H00101-111797	36H00101-111797-D	36G00102-070198	36G00103-120398	NTC36G01A10-041700	36G00201-111797	36H00201-111797	36G00202-063098	36G00203-120498	NTC36G02A10-041600
Sample Date			11/17/97	11/17/97	11/17/97	11/17/97	07/01/98	12/03/98	04/17/00	11/17/97	11/17/97	06/30/98	12/04/98	04/16/00
Volatile Organics (µg/L)														
1,1-Dichloroethene	75-35-4	7	1 U	1 U	--	--	0.5 U	5 U	1 U	1 U	--	0.5 U	5 U	1 U
1,2,3-Trichlorobenzene	87-61-6	70	--	--	--	--	0.5 U	5 U	--	--	--	0.5 U	5 U	--
1,2,4-Trichlorobenzene	120-82-1	70	1 UJ	1 UJ	--	--	0.5 U	5 U	--	1 UJ	--	0.5 U	5 U	--
1,2,4-Trimethylbenzene	95-63-6	10	--	--	--	--	0.5 U	5 U	--	--	--	0.5 U	5 U	--
1,2-Dichlorobenzene	95-50-1	600	1 U	1 U	--	--	0.5 U	5 U	--	1 U	--	0.5 U	5 U	--
1,2-Dichloroethane	107-06-2	3	1 U	1 U	--	--	0.5 U	5 U	1 U	1 U	--	0.5 U	5 U	1 U
1,3,5-Trimethylbenzene	108-67-8	10	--	--	--	--	0.5 U	5 U	--	--	--	0.5 U	5 U	--
4-Isopropyltoluene	99-87-6	*	--	--	--	--	0.5 U	5 U	--	--	--	0.5 U	5 U	--
Acetone	67-64-1	700	5 UR	5 UR	--	--	--	--	10 UR	5 UR	--	--	--	10 UR
Benzene	71-43-2	1	1 U	1 U	--	--	0.5 U	5 U	1 U	1 U	--	0.5 U	5 U	1 U
Carbon Disulfide	75-15-0	700	1 UJ	1 U	--	--	--	--	1 U	1 UJ	--	--	--	1 U
Chloroform	67-66-3	5.7	1 U	1 U	--	--	0.5 U	5 U	1 U	1 U	--	0.5 U	5 U	1 U
Chloromethane	74-87-3	2.7	1 U	1 U	--	--	0.5 U	10 U	1 U	1 U	--	0.5 U	10 U	1 U
cis-1,2-Dichloroethene	156-59-2	70	5	4	--	--	3.4	3.2	2	1 U	--	0.5 U	2.5 U	1 U
Ethylbenzene	100-41-4	30	1 U	1 U	--	--	0.5 U	5 U	1 U	1 U	--	0.5 U	5 U	1 U
Hexachlorobutadiene	87-68-3	0.5	--	--	--	--	0.5 U	5 U	--	--	--	0.5 U	5 U	--
Methylene Chloride	75-09-2	5	2 U	2 U	--	--	0.5 U	1.6 J	1 U	2 U	--	0.5 U	1.6 J	1 U
N-Butylbenzene	104-51-8	*	--	--	--	--	0.5 U	5 U	--	--	--	0.5 U	5 U	--
Naphthalene	91-20-3	20	--	--	--	--	0.5 U	5 U	--	--	--	0.34 J	5 U	--
Sec-Butylbenzene	135-98-8	*	--	--	--	--	0.5 U	5 U	--	--	--	0.5 U	5 U	--
Tetrachloroethene	127-18-4	3	0.4 J	0.4 J	--	--	0.32 J	5 U	0.3 J	1 U	--	0.5 U	5 U	1 U
Toluene	108-88-3	40	1 U	1 U	--	--	0.5 U	5 U	1 U	1 U	--	0.5 U	5 U	1 U
Total Xylenes	1330-20-7	20	1 U	1 U	--	--	--	--	1 U	1 U	--	--	--	1 U
Trans-1,2-Dichloroethene	156-60-5	100	1 U	1 U	--	--	0.5 U	2.5 U	0.16 J	1 U	--	0.5 U	2.5 U	1 U
Trichloroethene	79-01-6	3	1	0.8 J	--	--	0.65	1.2 J	0.79 J	1 U	--	0.22 J	5 U	1 U
Vinyl Chloride	75-01-4	1	1 U	1 U	--	--	0.5 U	10 U	1 U	1 U	--	0.5 U	10 U	1 U
Semivolatile Organics (µg/L)														
Hexachlorobutadiene	87-68-3	0.5	10 U	10 U	--	--	--	--	--	10 U	--	--	--	--
Naphthalene	91-20-3	20	10 U	10 U	--	--	--	--	--	10 U	--	--	--	--
Pesticides/PCBs (µg/L)														
beta-BHC	319-85-7	0.02	0.05 UJ	0.05 UJ	--	--	--	--	--	0.0072 J	--	--	--	--
gamma-BHC (Lindane)	58-89-9	0.2	0.05 UJ	0.004 J	--	--	--	--	--	0.05 UJ	--	--	--	--
Inorganics (µg/L)														
Aluminum	7429-90-5	200	1530	1480	665	715	--	--	--	6660	5020	--	--	--
Antimony	7440-36-0	6	3.3 UJ	5.2 J	6.4 J	3.8 J	--	--	1.6 U	3.8 J	3.6 J	--	--	--
Barium	7440-39-3	2000	7.1 U	6.8 U	5.9 U	5.9 U	--	--	--	25.7 J	20.7 U	--	--	--
Calcium	7440-70-2	*	8560	8130	8000	8190	--	--	--	44000	41600	--	--	--
Chromium	7440-47-3	100	3.3 J	3.6 J	2 U	2 U	--	--	--	11.6	8.4 J	--	--	--
Cobalt	7440-48-4	420	1 UJ	1.1 J	1 U	1 U	--	--	--	2.4 J	1.3 J	--	--	--
Copper	7440-50-8	1000	2.6 J	2.2 UJ	2.2 U	2.2 U	--	--	--	7.3 J	5.6 J	--	--	--
Iron	7439-89-6	300	211	211	149	160	--	--	--	909	723	--	--	--
Lead	7439-92-1	15	1.2 U	1.2 U	1.2 U	1.2 U	--	--	--	6.1	4.6	--	--	--
Magnesium	7439-95-4	*	2310 J	2230 J	2200 J	2220 J	--	--	--	2110 J	2060 J	--	--	--
Mercury	7439-97-6	2	0.1 U	0.1 U	0.1 U	0.1 U	--	--	--	0.21	0.1 U	--	--	--
Nickel	7440-02-0	100	2.6 J	2.3 UJ	2.3 U	2.3 U	--	--	--	3 J	2.3 U	--	--	--
Potassium	7440-09-7	*	1800 J	1790 J	1760 J	1850 J	--	--	--	1340 J	1320 J	--	--	--
Sodium	7440-23-5	160000	5930 J	5920 J	6410 J	6630 J	--	--	--	4600 J	4640 J	--	--	--
Vanadium	7440-62-2	49	3.3 J	2.7 J	2.3 J	2.2 J	--	--	--	11.1 J	7.5 J	--	--	--
Zinc	7440-66-6	5000	12.5 J	2.9 UJ	5.7 UJ	8.7 UJ	--	--	--	13.7 J	3.3 U	--	--	--
Petroleum Hydrocarbons (µg/L)														
Total Petroleum Hydrocarbons	--	5000	1000 U	--	--	--	--	--	--	1000 U	--	--	--	--
Dissolved Gases (nM/L)														
Hydrogen	1333-74-0	*	--	--	--	--	--	--	--	--	--	--	--	--
Miscellaneous Parameters (mg/L)														
Acetic Acid	64-19-7	*	--	--	--	--	--	--	--	--	--	--	--	--
Alkalinity	T-005	*	--	--	--	--	--	--	--	--	--	--	--	--
Bromide	24959-67-9	*	--	--	--	--	--	--	--	--	--	--	--	--
Butanoic Acid	107-92-6	*	--	--	--	--	--	--	--	--	--	--	--	--
Chloride	16887-00-6	250000	--	--	--	--	--	--	--	--	--	--	--	--
Ethane	74-84-0	*	--	--	--	--	--	0.5 U	--	--	--	--	0.5 U	--
Ethene	74-85-1	*	--	--	--	--	--	0.5 U	--	--	--	--	0.5 U	--
Methane	74-82-8	*	--	--	--	--	--	0.011	--	--	--	--	0.031	--
Nitrate	14797-55-8	10000	--	--	--	--	--	--	--	--	--	--	--	--
Nitrite/Nitrate	--	*	--	--	--	--	--	--	--	--	--	--	--	--
Propionic Acid	79-09-4	*	--	--	--	--	--	--	--	--	--	--	--	--
Sodium	7440-23-5	160000	--	--	--	--	--	--	--	--	--	--	--	--
Sulfide	18496-25-8	*	--	--	--	--	--	--	--	--	--	--	--	--
Total Dissolved Solids	--	500000	--	--	--	--	--	--	--	--	--	--	--	--
Total Organic Carbon	7440-44-0	*	--	--	--	--	--	7	--	--	--	--	4	--
Total Suspended Solids	--	*	6	6	--	--	--	--	--	13	--	--	--	--

TABLE E-1

ABANDONED WELLS
STUDY AREA 36 - MAIN BASE

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

Well Designation	CAS Number	Screening Criteria Florida GCTL[a]	OLD-36-03		OLD-36-04		OLD-36-05		OLD-36-06A					
Sample ID			36G00301-111897	36H00301-111897	36G00401-111897	36H00401-111897	36G00501-111897	36H00501-111897	36G00601-111797	36H00601-111797	36G00602-063098	36G00603-120398	NTC36G06A10-041600	017-OLD-36-06A-Q4-00
Sample Date			11/18/97	11/18/97	11/18/97	11/18/97	11/18/97	11/18/97	11/17/97	11/17/97	06/30/98	12/03/98	04/16/00	12/04/00
Volatile Organics (µg/L)														
1,1-Dichloroethene	75-35-4	7	1 U	--	1 U	--	1 U	--	1 U	--	0.5 U	5 U	1 U	6 U
1,2,3-Trichlorobenzene	87-61-6	70	--	--	--	--	--	--	--	--	0.34 J	5 U	--	1.5 U
1,2,4-Trichlorobenzene	120-82-1	70	1 UJ	--	1 UJ	--	1 UJ	--	1 UJ	--	0.24 J	5 U	--	2 U
1,2,4-Trimethylbenzene	95-63-6	10	--	--	--	--	--	--	--	--	0.5 U	5 U	--	6.5 U
1,2-Dichlorobenzene	95-50-1	600	1 U	--	1 U	--	1 U	--	1 U	--	0.5 U	5 U	--	1.5 U
1,2-Dichloroethane	107-06-2	3	1 U	--	1 U	--	1 U	--	1 U	--	0.5 U	5 U	1 U	3 U
1,3,5-Trimethylbenzene	108-67-8	10	--	--	--	--	--	--	--	--	0.5 U	5 U	--	2.5 U
4-Isopropyltoluene	99-87-6	*	--	--	--	--	--	--	--	--	0.5 U	5 U	--	6 U
Acetone	67-64-1	700	5 UR	--	5 UR	--	5 UR	--	5 UR	--	--	--	10 UR	--
Benzene	71-43-2	1	1 U	--	1 U	--	1 U	--	1 U	--	0.5 U	5 U	1 U	2 U
Carbon Disulfide	75-15-0	700	1 U	--	1 U	--	1 U	--	1 UJ	--	--	--	1 U	--
Chloroform	67-66-3	5.7	1 U	--	1 U	--	1 U	--	1 U	--	0.5 U	5 U	1 U	1.5 U
Chloromethane	74-87-3	2.7	1 U	--	1 U	--	1 U	--	1 U	--	0.5 U	10 U	1 U	6.5 U
cis-1,2-Dichloroethene	156-59-2	70	1 U	--	1 U	--	1 U	--	1 U	--	0.5 U	2.5 U	1 U	6 U
Ethylbenzene	100-41-4	30	1 U	--	1 U	--	1 U	--	1 U	--	0.5 U	5 U	1 U	3 U
Hexachlorobutadiene	87-68-3	0.5	10 U	--	10 U	--	10 U	--	10 U	--	0.27 J	5 U	--	5.5 U
Methylene Chloride	75-09-2	5	2 U	--	2 U	--	2 U	--	2 U	--	0.5 U	2 J	1 U	1.5 U
N-Butylbenzene	104-51-8	*	--	--	--	--	--	--	--	--	0.1 J	5 U	--	5.5 U
Naphthalene	91-20-3	20	10 U	--	10 U	--	10 U	--	10 U	--	0.33 J	5 U	--	2 U
Sec-Butylbenzene	135-98-8	*	--	--	--	--	--	--	--	--	0.5 U	5 U	--	6.5 U
Tetrachloroethene	127-18-4	3	1 U	--	1 U	--	1 U	--	1 U	--	0.33 J	5 U	0.25 J	7 U
Toluene	108-88-3	40	1 U	--	1 U	--	1 U	--	1 U	--	0.5 U	5 U	1 U	5.5 U
Total Xylenes	1330-20-7	20	1 U	--	1 U	--	1 U	--	1 U	--	--	--	1 U	5 U
Trans-1,2-Dichloroethene	156-60-5	100	1 U	--	1 U	--	1 U	--	1 U	--	0.5 U	2.5 U	1 U	3 U
Trichloroethene	79-01-6	3	1 U	--	1 U	--	1 U	--	19	--	13	6.6	14	14
Vinyl Chloride	75-01-4	1	1 U	--	1 U	--	1 U	--	1 U	--	0.5 U	10 U	1 U	5.5 U
Semivolatile Organics (µg/L)														
Hexachlorobutadiene	87-68-3	0.5	--	--	--	--	--	--	--	--	--	--	--	--
Naphthalene	91-20-3	20	--	--	--	--	--	--	--	--	--	--	--	--
Pesticides/PCBs (µg/L)														
beta-BHC	319-85-7	0.02	0.05 U	--	0.05 U	--	0.05 UJ	--	0.05 U	--	--	--	--	--
gamma-BHC (Lindane)	58-89-9	0.2	0.05 U	--	0.05 U	--	0.0036 J	--	0.05 U	--	--	--	--	--
Inorganics (µg/L)														
Aluminum	7429-90-5	200	71.1 J	38.3 J	375	457	1390	192 J	813	274	--	--	--	--
Antimony	7440-36-0	6	6 J	4.3 J	8.9 J	5.2 J	3.3 U	3.3 U	4.3 J	5.7 J	--	--	--	--
Barium	7440-39-3	2000	16.6 U	15.9 U	4.6 U	6 U	7.2 U	4.4 U	14 U	12.9 U	--	--	--	--
Calcium	7440-70-2	*	43300	41900	18400	16900	12300	11300	12800	12300	--	--	--	--
Chromium	7440-47-3	100	2 U	2 U	2 U	2 U	3.2 J	2 U	2 U	2 U	--	--	--	--
Cobalt	7440-48-4	420	1 U	1 U	1 U	1 U	1 J	1 U	1 U	1 U	--	--	--	--
Copper	7440-50-8	1000	2.2 U	2.2 U	2.2 U	2.2 U	3.2 J	2.2 U	2.2 U	2.5 J	--	--	--	--
Iron	7439-89-6	300	35.3 U	35.3 U	35.3 U	35.3 U	131	44.4 J	402	343	--	--	--	--
Lead	7439-92-1	15	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	--	--	--	--
Magnesium	7439-95-4	*	781 J	764 J	382 J	338 J	706 J	647 J	2780 J	2760 J	--	--	--	--
Mercury	7439-97-6	2	0.1 U	0.1 U	0.1 U	0.1 U	0.11 J	0.1 U	0.1 U	0.1 U	--	--	--	--
Nickel	7440-02-0	100	2.3 U	2.3 U	2.3 U	2.3 U	2.3 U	2.3 U	2.3 U	2.3 U	--	--	--	--
Potassium	7440-09-7	*	424 J	413 J	644 J	588 J	610 J	563 J	2570 J	2430 J	--	--	--	--
Sodium	7440-23-5	160000	1510 J	1480 J	1280 J	1080 J	2640 J	2190 J	6470 J	6160 J	--	--	--	--
Vanadium	7440-62-2	49	5.7 J	5.4 J	5.7 J	6 J	4.5 J	1.7 U	2.9 J	1.7 U	--	--	--	--
Zinc	7440-66-6	5000	2.3 U	2 U	20.5	5.8 U	3.3 U	3.8 U	4.7 U	5.9 U	--	--	--	--
Petroleum Hydrocarbons (µg/L)														
Total Petroleum Hydrocarbons	--	5000	1000 U	--	1000 U	--	1000 U	--	1000 U	--	--	--	--	1000 U
Dissolved Gases (nM/L)														
Hydrogen	1333-74-0	*	--	--	--	--	--	--	--	--	--	--	--	--
Miscellaneous Parameters (mg/L)														
Acetic Acid	64-19-7	*	--	--	--	--	--	--	--	--	--	--	--	1 U
Alkalinity	T-005	*	--	--	--	--	--	--	--	--	--	--	--	1.5
Bromide	24959-67-9	*	--	--	--	--	--	--	--	--	--	--	--	1 U
Butanoic Acid	107-92-6	*	--	--	--	--	--	--	--	--	--	--	--	1 U
Chloride	16887-00-6	250000	--	--	--	--	--	--	--	--	--	--	--	4.2
Ethane	74-84-0	*	--	--	--	--	--	--	--	--	--	0.5 U	--	0.01 U
Ethene	74-85-1	*	--	--	--	--	--	--	--	--	--	0.5 U	--	0.01 U
Methane	74-82-8	*	--	--	--	--	--	--	--	--	--	0.0015	--	0.01 U
Nitrate	14797-55-8	10000	--	--	--	--	--	--	--	--	--	--	--	--
Nitrite/Nitrate	--	*	--	--	--	--	--	--	--	--	--	--	--	0.33
Propionic Acid	79-09-4	*	--	--	--	--	--	--	--	--	--	--	--	1 U
Sodium	7440-23-5	160000	--	--	--	--	--	--	--	--	--	--	--	4.1
Sulfide	18496-25-8	*	--	--	--	--	--	--	--	--	--	--	--	--
Total Dissolved Solids	--	500000	--	--	--	--	--	--	--	--	--	--	--	110
Total Organic Carbon	7440-44-0	*	--	--	--	--	--	--	--	--	--	5	--	10.7
Total Suspended Solids	--	*	5 U	--	5 U	--	11	--	5 U	--	--	--	--	--

TABLE E-1

ABANDONED WELLS
STUDY AREA 36 - MAIN BASE

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

Well Designation	CAS Number	Screening Criteria Florida GCTL[a]	OLD-36-06A			OLD-36-07A						OLD-3
Sample ID			017-OLD-36-06A-Q1-01	017-OLD-36-06A-Q3-01	17-OLD-36-06A-Q4-01	36G00701-063098	36G00701-063098-D	36G00702-120398	NTC36G07A10-041600	017-OLD-36-07A-Q4-00	017-OLD-36-07A-Q1-01	017-OLD-36-07A-Q3-01
Sample Date			03/14/01	08/01/01	10/25/01	06/30/98	06/30/98	12/03/98	04/16/00	12/01/00	03/14/01	07/31/01
Volatile Organics (µg/L)												
1,1-Dichloroethene	75-35-4	7	6 U	6 U	0.3 U	1 U	1 U	5 U	1.7 U	6 U	30 U	6 U
1,2,3-Trichlorobenzene	87-61-6	70	1.5 U	1.5 U	0.3 U	0.38 J	1 U	5 U	--	1.5 U	7.5 U	1.5 U
1,2,4-Trichlorobenzene	120-82-1	70	2 U	2 U	0.3 U	0.3 J	1 U	5 U	--	2 U	10 U	2 U
1,2,4-Trimethylbenzene	95-63-6	10	6.5 U	6.5 U	0.3 U	1 U	1 U	5 U	--	6.5 U	32 U	6.5 U
1,2-Dichlorobenzene	95-50-1	600	1.5 U	1.5 U	0.3 U	1 U	1 U	5 U	--	1.5 U	7.5 U	1.5 U
1,2-Dichloroethane	107-06-2	3	3 U	3 U	0.3 U	1 U	1 U	5 U	1.7 U	3 U	15 U	3 U
1,3,5-Trimethylbenzene	108-67-8	10	2.5 U	2.5 U	0.3 U	1 U	1 U	5 U	--	2.5 U	12 U	2.5 U
4-Isopropyltoluene	99-87-6	*	6 U	6 U	0.3 U	1 U	1 U	5 U	--	6 U	30 U	6 U
Acetone	67-64-1	700	--	--	--	--	--	--	17 UR	--	--	--
Benzene	71-43-2	1	1 U	1 U	0.3 U	1 U	1 U	5 U	1.7 U	2 U	5 U	1 U
Carbon Disulfide	75-15-0	700	--	--	--	--	--	--	1.7 U	--	--	--
Chloroform	67-66-3	5.7	1.5 U	1.5 U	0.3 U	1 U	1 U	5 U	1.7 U	1.5 U	7.5 U	1.5 U
Chloromethane	74-87-3	2.7	6.5 U	6.5 U	0.3 U	1 U	1 U	10 U	1.7 U	6.5 U	32 U	6.5 U
cis-1,2-Dichloroethene	156-59-2	70	6 U	6 U	0.18 J	1 U	1 U	2.5 U	0.3 J	6 U	30 U	0.78 J
Ethylbenzene	100-41-4	30	3 U	3 U	0.3 U	1 U	1 U	5 U	1.7 U	3 U	15 U	3 U
Hexachlorobutadiene	87-68-3	0.5	5.5 U	5.5 U	0.3 U	0.36 J	1 U	5 U	--	5.5 U	28 U	5.5 U
Methylene Chloride	75-09-2	5	0.64 J	1.5 U	0.3 U	1 U	1 U	1.5 J	1.7 U	1.5 U	5.2 J	1.5 U
N-Butylbenzene	104-51-8	*	5.5 U	5.5 U	0.3 U	1 U	1 U	5 U	--	5.5 U	28 U	5.5 U
Naphthalene	91-20-3	20	2 U	2 U	0.3 U	0.4 J	1 U	5 U	--	2 U	10 U	2 U
Sec-Butylbenzene	135-98-8	*	6.5 U	6.5 U	0.3 U	1 U	1 U	5 U	--	6.5 U	32 U	6.5 U
Tetrachloroethene	127-18-4	3	7 U	7 U	0.3 U	1 U	1 U	5 U	1.7 U	7 U	35 U	7 U
Toluene	108-88-3	40	5.5 U	1.2 J	0.3 U	1 U	1 U	5 U	1.7 U	5.5 U	28 U	1.1 J
Total Xylenes	1330-20-7	20	5 U	5 U	--	--	--	--	1.7 U	5 U	25 U	5 U
Trans-1,2-Dichloroethene	156-60-5	100	3 U	3 U	0.3 U	1 U	1 U	2.5 U	1.7 U	3 U	15 U	3 U
Trichloroethene	79-01-6	3	9.5	5 U	0.66	73	57	120	34	59	35	11
Vinyl Chloride	75-01-4	1	5.5 U	5.5 U	0.3 U	1 U	1 U	10 U	1.7 U	5.5 U	28 U	5.5 U
Semivolatile Organics (µg/L)												
Hexachlorobutadiene	87-68-3	0.5	--	--	--	--	--	--	--	--	--	--
Naphthalene	91-20-3	20	--	--	--	--	--	--	--	--	--	--
Pesticides/PCBs (µg/L)												
beta-BHC	319-85-7	0.02	--	--	--	--	--	--	--	--	--	--
gamma-BHC (Lindane)	58-89-9	0.2	--	--	--	--	--	--	--	--	--	--
Inorganics (µg/L)												
Aluminum	7429-90-5	200	--	--	--	--	--	--	--	--	--	--
Antimony	7440-36-0	6	--	--	--	--	--	--	--	--	--	--
Barium	7440-39-3	2000	--	--	--	--	--	--	--	--	--	--
Calcium	7440-70-2	*	--	--	--	--	--	--	--	--	--	--
Chromium	7440-47-3	100	--	--	--	--	--	--	--	--	--	--
Cobalt	7440-48-4	420	--	--	--	--	--	--	--	--	--	--
Copper	7440-50-8	1000	--	--	--	--	--	--	--	--	--	--
Iron	7439-89-6	300	--	--	--	--	--	--	--	--	--	--
Lead	7439-92-1	15	--	--	--	--	--	--	--	--	--	--
Magnesium	7439-95-4	*	--	--	--	--	--	--	--	--	--	--
Mercury	7439-97-6	2	--	--	--	--	--	--	--	--	--	--
Nickel	7440-02-0	100	--	--	--	--	--	--	--	--	--	--
Potassium	7440-09-7	*	--	--	--	--	--	--	--	--	--	--
Sodium	7440-23-5	160000	--	--	--	--	--	--	--	--	--	--
Vanadium	7440-62-2	49	--	--	--	--	--	--	--	--	--	--
Zinc	7440-66-6	5000	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons (µg/L)												
Total Petroleum Hydrocarbons	--	5000	420 J	1000 U	100 U	--	--	--	--	440 J	400 J	1000 U
Dissolved Gases (nM/L)												
Hydrogen	1333-74-0	*	--	--	2	--	--	--	--	--	--	--
Miscellaneous Parameters (mg/L)												
Acetic Acid	64-19-7	*	1 U	1 U	--	--	--	--	--	1 U	1 U	1 U
Alkalinity	T-005	*	6	10	71	--	--	--	--	16	16	13
Bromide	24959-67-9	*	--	--	--	--	--	--	--	1 U	--	--
Butanoic Acid	107-92-6	*	1 U	1 U	--	--	--	--	--	1 U	1 U	1 U
Chloride	16887-00-6	250000	8.4	1.9	73	--	--	--	--	6.2	7.7	3.2
Ethane	74-84-0	*	0.017	0.43	--	--	--	0.5 U	--	0.01 U	0.024	0.11
Ethene	74-85-1	*	0.013	0.36	--	--	--	0.5 U	--	0.01 U	0.021	0.077
Methane	74-82-8	*	0.0017	0.069	--	--	--	0.0042	--	0.01 U	0.0047	1.7
Nitrate	14797-55-8	10000	0.09	2.98	0.5	--	--	--	--	0.2	0.09	0.5
Nitrite/Nitrate	--	*	--	--	0.5	--	--	--	--	--	--	--
Propionic Acid	79-09-4	*	1 U	1 U	--	--	--	--	--	1 U	1 U	4.7
Sodium	7440-23-5	160000	--	--	--	--	--	--	--	5.4	--	--
Sulfide	18496-25-8	*	1 U	1 U	1 U	--	--	--	--	--	1 U	1 U
Total Dissolved Solids	--	500000	150	190 J	180	--	--	--	--	110	170	120 J
Total Organic Carbon	7440-44-0	*	12	14	21	--	--	3	--	12.5	11	10
Total Suspended Solids	--	*	--	--	--	--	--	--	--	--	--	--

TABLE E-1

ABANDONED WELLS
STUDY AREA 36 - MAIN BASE

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

Well Designation	CAS Number	Screening Criteria Florida GCTL[a]	5-07A	OLD-36-08B							OLD-36-09C		
Sample ID			17-OLD-36-07A-Q4-01	36G00801-063098	36G00801-120398	NTC36G08B10-041600	017-OLD-36-08B-Q4-00	017-OLD-36-08B-Q1-01	017-OLD-36-08B-Q3-01	17-OLD-36-08B-Q4-01	36G00901-070198	36G00902-120398	NTC36G09C10-041600
Sample Date			10/25/01	06/30/98	12/03/98	04/16/00	12/04/00	03/15/01	08/01/01	10/25/01	07/01/98	12/03/98	04/16/00
Volatile Organics (µg/L)													
1,1-Dichloroethene	75-35-4	7	0.3 U	5 U	5 U	1.7 U	6 U	6 U	6 U	0.3 U	5 U	12 U	6.2 U
1,2,3-Trichlorobenzene	87-61-6	70	0.3 U	5 U	5 U	--	1.5 U	1.5 U	1.5 U	0.3 U	5 U	12 U	--
1,2,4-Trichlorobenzene	120-82-1	70	0.3 U	5 U	5 U	--	2 U	2 U	2 U	0.3 U	5 U	12 U	--
1,2,4-Trimethylbenzene	95-63-6	10	0.3 U	5 U	5 U	--	6.5 U	6.5 U	6.5 U	0.3 U	5 U	12 U	--
1,2-Dichlorobenzene	95-50-1	600	0.3 U	5 U	5 U	--	1.5 U	1.5 U	1.5 U	0.3 U	5 U	12 U	--
1,2-Dichloroethane	107-06-2	3	0.3 U	5 U	5 U	1.7 U	3 U	3 U	3 U	0.3 U	5 U	12 U	6.2 U
1,3,5-Trimethylbenzene	108-67-8	10	0.3 U	5 U	5 U	--	2.5 U	2.5 U	2.5 U	0.3 U	5 U	12 U	--
4-Isopropyltoluene	99-87-6	*	0.3 U	5 U	5 U	--	0.8 J	6 U	0.88 J	0.35	5 U	12 U	--
Acetone	67-64-1	700	--	--	--	17 UR	--	--	--	--	--	--	170 J
Benzene	71-43-2	1	0.78	5 U	5 U	1.7 U	2 U	1 U	1 U	0.3 U	5 U	12 U	6.2 U
Carbon Disulfide	75-15-0	700	--	--	--	1.7 U	--	--	--	--	--	--	1.8 J
Chloroform	67-66-3	5.7	0.3 U	5 U	5 U	1.7 U	1.5 U	1.5 U	1.5 U	0.3 U	5 U	12 U	6.2 U
Chloromethane	74-87-3	2.7	0.3 U	5 U	10 U	1.7 U	6.5 U	6.5 U	0.6 J	0.3 U	5 U	25 U	6.2 U
cis-1,2-Dichloroethene	156-59-2	70	37	5 U	2.5 U	1.7 U	6 U	6 U	17	26	5 U	43	47
Ethylbenzene	100-41-4	30	0.3 U	5 U	5 U	1.7 U	3 U	3 U	3 U	0.3 U	5 U	12 U	6.2 U
Hexachlorobutadiene	87-68-3	0.5	0.3 U	5 U	5 U	--	5.5 U	5.5 U	5.5 U	0.3 U	5 U	12 U	--
Methylene Chloride	75-09-2	5	0.3 U	5 U	1.7 J	1.7 U	1.5 U	1.5 U	1.5 U	0.3 U	5 U	2.2 J	6.2 U
N-Butylbenzene	104-51-8	*	0.3 U	5 U	5 U	--	5.5 U	5.5 U	5.5 U	0.3 U	5 U	12 U	--
Naphthalene	91-20-3	20	0.3 U	5 U	5 U	--	2 U	2 U	2 U	0.3 U	5 U	12 U	--
Sec-Butylbenzene	135-98-8	*	0.3 U	5 U	5 U	--	6.5 U	6.5 U	6.5 U	0.3 U	5 U	12 U	--
Tetrachloroethene	127-18-4	3	0.3 U	5 U	5 U	1.7 U	7 U	7 U	7 U	0.3 U	5 U	12 U	6.2 U
Toluene	108-88-3	40	0.3 U	5 U	5 U	1.7 U	5.5 U	5.5 U	1 J	0.3 U	5 U	12 U	6.2 U
Total Xylenes	1330-20-7	20	--	--	--	1.7 U	5 U	5 U	5 U	--	--	--	6.2 U
Trans-1,2-Dichloroethene	156-60-5	100	0.52	5 U	2.5 U	1.7 U	3 U	3 U	3 U	0.32	5 U	6.2 U	0.46 J
Trichloroethene	79-01-6	3	12	270	40	46	97	35	44	25	260	300	180
Vinyl Chloride	75-01-4	1	0.3 U	5 U	10 U	1.7 U	5.5 U	5.5 U	5.5 U	0.3 U	5 U	25 U	6.2 U
Semivolatile Organics (µg/L)													
Hexachlorobutadiene	87-68-3	0.5	--	--	--	--	--	--	--	--	--	--	--
Naphthalene	91-20-3	20	--	--	--	--	--	--	--	--	--	--	--
Pesticides/PCBs (µg/L)													
beta-BHC	319-85-7	0.02	--	--	--	--	--	--	--	--	--	--	--
gamma-BHC (Lindane)	58-89-9	0.2	--	--	--	--	--	--	--	--	--	--	--
Inorganics (µg/L)													
Aluminum	7429-90-5	200	--	--	--	--	--	--	--	--	--	--	--
Antimony	7440-36-0	6	--	--	--	--	--	--	--	--	--	--	--
Barium	7440-39-3	2000	--	--	--	--	--	--	--	--	--	--	--
Calcium	7440-70-2	*	--	--	--	--	--	--	--	--	--	--	--
Chromium	7440-47-3	100	--	--	--	--	--	--	--	--	--	--	--
Cobalt	7440-48-4	420	--	--	--	--	--	--	--	--	--	--	--
Copper	7440-50-8	1000	--	--	--	--	--	--	--	--	--	--	--
Iron	7439-89-6	300	--	--	--	--	--	--	--	--	--	--	--
Lead	7439-92-1	15	--	--	--	--	--	--	--	--	--	--	--
Magnesium	7439-95-4	*	--	--	--	--	--	--	--	--	--	--	--
Mercury	7439-97-6	2	--	--	--	--	--	--	--	--	--	--	--
Nickel	7440-02-0	100	--	--	--	--	--	--	--	--	--	--	--
Potassium	7440-09-7	*	--	--	--	--	--	--	--	--	--	--	--
Sodium	7440-23-5	160000	--	--	--	--	--	--	--	--	--	--	--
Vanadium	7440-62-2	49	--	--	--	--	--	--	--	--	--	--	--
Zinc	7440-66-6	5000	--	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons (µg/L)													
Total Petroleum Hydrocarbons	--	5000	6500	--	--	--	1000 U	660 J	8100	4400	--	--	--
Dissolved Gases (nM/L)													
Hydrogen	1333-74-0	*	18	--	--	--	--	--	--	13	--	--	--
Miscellaneous Parameters (mg/L)													
Acetic Acid	64-19-7	*	--	--	--	--	1 U	1 U	24	--	--	--	--
Alkalinity	T-005	*	74	--	--	--	24	22	83	67	--	--	--
Bromide	24959-67-9	*	--	--	--	--	1 U	--	--	--	--	--	--
Butanoic Acid	107-92-6	*	--	--	--	--	1 U	1 U	1.9	--	--	--	--
Chloride	16887-00-6	250000	120	--	--	--	7	6.1	7	23	--	--	--
Ethane	74-84-0	*	--	--	0.5 U	--	0.01 U	0.018	0.90	--	--	1.5	--
Ethene	74-85-1	*	--	--	0.5 U	--	0.01 U	0.11	5.6	--	--	1.8	--
Methane	74-82-8	*	--	--	0.17	--	0.09	0.08	8.9	--	--	0.027	--
Nitrate	14797-55-8	10000	0.21	--	--	--	--	1 U	0.01 U	0.18	--	--	--
Nitrite/Nitrate	--	*	0.21	--	--	--	0.1 U	--	--	0.18	--	--	--
Propionic Acid	79-09-4	*	--	--	--	--	1 U	1 U	74	--	--	--	--
Sodium	7440-23-5	160000	--	--	--	--	7.8	--	--	--	--	--	--
Sulfide	18496-25-8	*	1 U	--	--	--	--	1 U	2.9	2.9	--	--	--
Total Dissolved Solids	--	500000	510	--	--	--	100	270	110 J	210	--	--	--
Total Organic Carbon	7440-44-0	*	78	--	4	--	3.55	3	94	83	--	15	--
Total Suspended Solids	--	*	--	--	--	--	--	--	--	--	--	--	--

TABLE E-1

ABANDONED WELLS
STUDY AREA 36 - MAIN BASE

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

Well Designation	CAS Number	Screening Criteria Florida GCTL[a]	OLD-36-09C				OLD-36-10B					OLD-3
Sample ID			017-OLD-36-09C-Q4-00	017-OLD-36-09C-Q1-01	017-OLD-36-09C-Q3-01	17-OLD-36-09C-Q4-01	36G01001-070198	36G01002-120498	NTC36G10B10-041700	017-OLD-36-10B-Q4-00	017-OLD-36-10B-Q1-01	017-OLD-36-10B-Q3-01
Sample Date			12/05/00	03/15/01	07/31/01	10/24/01	07/01/98	12/04/98	04/17/00	12/04/00	03/15/01	08/01/01
Volatile Organics (µg/L)												
1,1-Dichloroethene	75-35-4	7	0.5 J	60 U	6 U	0.29 J	0.5 U	5 U	1 U	6 U	6 U	6 U
1,2,3-Trichlorobenzene	87-61-6	70	1.5 U	15 U	1.5 U	5 U	0.5 U	5 U	--	1.5 U	1.5 U	1.5 U
1,2,4-Trichlorobenzene	120-82-1	70	2 U	20 U	2 U	5 U	0.5 U	5 U	--	2 U	2 U	2 U
1,2,4-Trimethylbenzene	95-63-6	10	6.5 U	65 U	6.5 U	5 U	0.5 U	5 U	--	6.5 U	6.5 U	6.5 U
1,2-Dichlorobenzene	95-50-1	600	1.5 U	15 U	1.5 U	5 U	0.5 U	5 U	--	1.5 U	1.5 U	1.5 U
1,2-Dichloroethane	107-06-2	3	3 U	30 U	3 U	5 U	0.5 U	5 U	1 U	3 U	3 U	3 U
1,3,5-Trimethylbenzene	108-67-8	10	2.5 U	25 U	2.5 U	5 U	0.5 U	5 U	--	2.5 U	2.5 U	2.5 U
4-Isopropyltoluene	99-87-6	*	6 U	60 U	6 U	5 U	0.5 U	5 U	--	6 U	6 U	6 U
Acetone	67-64-1	700	--	--	--	--	--	--	10 UR	--	--	--
Benzene	71-43-2	1	2 U	10 U	1 U	5 U	0.1 J	0.47 J	0.26 J	2 U	1 U	1 U
Carbon Disulfide	75-15-0	700	--	--	--	--	--	--	1 U	--	--	--
Chloroform	67-66-3	5.7	1.5 U	15 U	1.5 U	5 U	0.38 J	5 U	1 U	1.5 U	1.5 U	1.5 U
Chloromethane	74-87-3	2.7	6.5 U	65 U	6.5 U	5 U	0.5 U	10 U	1 U	6.5 U	6.5 U	0.52 J
cis-1,2-Dichloroethene	156-59-2	70	24	20 J	27	57	7.8	9.4	8.9	2.3 J	11	8.5
Ethylbenzene	100-41-4	30	3 U	30 U	3 U	5 U	0.5 U	5 U	1 U	3 U	3 U	3 U
Hexachlorobutadiene	87-68-3	0.5	5.5 U	55 U	5.5 U	5 U	0.5 U	5 U	--	5.5 U	5.5 U	5.5 U
Methylene Chloride	75-09-2	5	9.1	15 U	1.5 U	5 U	0.5 U	1.8 J	1 U	1.5 U	1.5 U	1.5 U
N-Butylbenzene	104-51-8	*	5.5 U	55 U	5.5 U	5 U	0.5 U	5 U	--	5.5 U	5.5 U	5.5 U
Naphthalene	91-20-3	20	2 U	20 U	2 U	5 U	0.5 U	5 U	--	2 U	2 U	2 U
Sec-Butylbenzene	135-98-8	*	6.5 U	65 U	6.5 U	5 U	0.5 U	5 U	--	6.5 U	6.5 U	6.5 U
Tetrachloroethene	127-18-4	3	7 U	70 U	7 U	5 U	0.3 J	5 U	1.5	1.7 J	1.6 J	7 U
Toluene	108-88-3	40	5.5 U	55 U	1.2 J	5 U	0.5 U	5 U	1 U	5.5 U	5.5 U	1 J
Total Xylenes	1330-20-7	20	5 U	50 U	5 U	--	--	--	1 U	5 U	5 U	5 U
Trans-1,2-Dichloroethene	156-60-5	100	3 U	30 U	3 U	0.96	0.5 U	2.5 U	0.2 J	3 U	3 U	3 U
Trichloroethene	79-01-6	3	300	180	140	150	7.2	8.9	19	4.5 J	12	8.2
Vinyl Chloride	75-01-4	1	5.5 U	55 U	5.5 U	0.18 J	0.5 U	10 U	1 U	5.5 U	5.5 U	5.5 U
Semivolatile Organics (µg/L)												
Hexachlorobutadiene	87-68-3	0.5	--	--	--	--	--	--	--	--	--	--
Naphthalene	91-20-3	20	--	--	--	--	--	--	--	--	--	--
Pesticides/PCBs (µg/L)												
beta-BHC	319-85-7	0.02	--	--	--	--	--	--	--	--	--	--
gamma-BHC (Lindane)	58-89-9	0.2	--	--	--	--	--	--	--	--	--	--
Inorganics (µg/L)												
Aluminum	7429-90-5	200	--	--	--	--	--	--	--	--	--	--
Antimony	7440-36-0	6	--	--	--	--	--	--	--	--	--	--
Barium	7440-39-3	2000	--	--	--	--	--	--	--	--	--	--
Calcium	7440-70-2	*	--	--	--	--	--	--	--	--	--	--
Chromium	7440-47-3	100	--	--	--	--	--	--	--	--	--	--
Cobalt	7440-48-4	420	--	--	--	--	--	--	--	--	--	--
Copper	7440-50-8	1000	--	--	--	--	--	--	--	--	--	--
Iron	7439-89-6	300	--	--	--	--	--	--	--	--	--	--
Lead	7439-92-1	15	--	--	--	--	--	--	--	--	--	--
Magnesium	7439-95-4	*	--	--	--	--	--	--	--	--	--	--
Mercury	7439-97-6	2	--	--	--	--	--	--	--	--	--	--
Nickel	7440-02-0	100	--	--	--	--	--	--	--	--	--	--
Potassium	7440-09-7	*	--	--	--	--	--	--	--	--	--	--
Sodium	7440-23-5	160000	--	--	--	--	--	--	--	--	--	--
Vanadium	7440-62-2	49	--	--	--	--	--	--	--	--	--	--
Zinc	7440-66-6	5000	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons (µg/L)												
Total Petroleum Hydrocarbons	--	5000	350 J	2000 J	1100 U	100 U	--	--	--	1000 U	1300 J	1000 U
Dissolved Gases (nM/L)												
Hydrogen	1333-74-0	*	--	--	--	150	--	--	--	--	--	--
Miscellaneous Parameters (mg/L)												
Acetic Acid	64-19-7	*	1 U	1 U	4.3	--	--	--	--	1 U	1 U	1 U
Alkalinity	T-005	*	280	330	180	210	--	--	--	25	32	21
Bromide	24959-67-9	*	1 U	--	--	--	--	--	--	1 U	--	--
Butanoic Acid	107-92-6	*	1 U	1 U	1 U	--	--	--	--	1 U	1 U	1 U
Chloride	16887-00-6	250000	8.9	9.5	8.3	17	--	--	--	6.4	3.3	8.1
Ethane	74-84-0	*	0.01 U	0.21	0.16	--	--	0.5 U	--	0.01 U	0.035	0.062
Ethene	74-85-1	*	0.01 U	0.67	0.43	--	--	0.5 U	--	0.01 U	0.063	0.076
Methane	74-82-8	*	0.036	0.051	1.7	--	--	0.021	--	0.01 U	0.0099	0.49
Nitrate	14797-55-8	10000	--	1 U	0.01 U	0.23	--	--	--	--	1 U	0.01 U
Nitrite/Nitrate	--	*	0.1 U	--	--	0.23	--	--	--	0.1 U	--	--
Propionic Acid	79-09-4	*	1 U	1 U	8.7	--	--	--	--	1 U	1 U	1 U
Sodium	7440-23-5	160000	11	--	--	--	--	--	--	6.6	--	--
Sulfide	18496-25-8	*	--	2.7	3.4	4.2	--	--	--	--	1 U	0.97 J
Total Dissolved Solids	--	500000	390	120	290 J	300	--	--	--	130	210	98 J
Total Organic Carbon	7440-44-0	*	19.8	14	29	35	--	18	--	15.7	17	13
Total Suspended Solids	--	*	--	--	--	--	--	--	--	--	--	--

TABLE E-1

ABANDONED WELLS
STUDY AREA 36 - MAIN BASE

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

Well Designation	CAS Number	Screening Criteria Florida GCTL[a]	6-10B	OLD-36-11C							OLI	
Sample ID			17-OLD-36-10B-Q4-01	36G01101-070198	36G01102-120498	NTC36G11C10-041700	017-OLD-36-11C-Q4-00	017-OLD-36-11C-Q1-01	017-OLD-36-11C-Q3-01	17-OLD-36-11C-Q4-01	36G01201-120498	36G01201-120498-D
Sample Date			10/22/01	07/01/98	12/04/98	04/17/00	12/06/00	03/15/01	08/01/01	10/22/01	12/04/98	12/04/98
Volatile Organics (µg/L)												
1,1-Dichloroethene	75-35-4	7	5 U	0.5 U	5 U	1 U	6 U	6 U	6 U	5 U	5 U	5 U
1,2,3-Trichlorobenzene	87-61-6	70	5 U	0.5 U	5 U	--	1.5 U	1.5 U	1.5 U	5 U	5 U	5 U
1,2,4-Trichlorobenzene	120-82-1	70	5 U	0.5 U	5 U	--	2 U	2 U	2 U	5 U	5 U	5 U
1,2,4-Trimethylbenzene	95-63-6	10	0.24 J	0.42 J	0.93 J	--	6.5 U	6.5 U	6.5 U	0.23 J	5 U	5 U
1,2-Dichlorobenzene	95-50-1	600	5 U	1.6	0.91 J	--	0.7 J	1.5 U	1.5 U	0.68	5 U	5 U
1,2-Dichloroethane	107-06-2	3	5 U	0.5 U	5 U	1 U	3 U	3 U	3 U	5 U	5 U	5 U
1,3,5-Trimethylbenzene	108-67-8	10	5 U	0.13 J	5 U	--	2.5 U	2.5 U	2.5 U	5 U	5 U	5 U
4-Isopropyltoluene	99-87-6	*	5 U	0.5 U	5 U	--	6 U	6 U	6 U	5 U	5 U	5 U
Acetone	67-64-1	700	--	--	--	3.9 J	--	--	--	--	--	--
Benzene	71-43-2	1	0.35	0.5 U	5 U	0.17 J	2 U	1 U	1 U	5 U	5 U	5 U
Carbon Disulfide	75-15-0	700	--	--	--	1 U	--	--	--	--	--	--
Chloroform	67-66-3	5.7	5 U	0.51	5 U	1 U	1.5 U	1.5 U	1.5 U	5 U	5 U	5 U
Chloromethane	74-87-3	2.7	5 U	0.5 U	10 U	1 U	6.5 U	6.5 U	0.61 J	5 U	10 U	10 U
cis-1,2-Dichloroethene	156-59-2	70	16	1.3	2.8	6.6	3.5 J	5.3 J	5 J	3.3	1.8 J	1.9 J
Ethylbenzene	100-41-4	30	5 U	0.5 U	5 U	1 U	3 U	3 U	3 U	5 U	5 U	5 U
Hexachlorobutadiene	87-68-3	0.5	5 U	0.5 U	5 U	--	5.5 U	5.5 U	5.5 U	5 U	5 U	5 U
Methylene Chloride	75-09-2	5	5 U	0.5 U	1.6 J	1 U	0.82 J	1.5 U	1.5 U	5 U	1.4 J	1.8 J
N-Butylbenzene	104-51-8	*	5 U	0.5 U	5 U	--	5.5 U	5.5 U	5.5 U	5 U	5 U	5 U
Naphthalene	91-20-3	20	5 U	0.77 B	5 U	--	2 U	2 U	2 U	5 U	5 U	5 U
Sec-Butylbenzene	135-98-8	*	5 U	0.12 J	5 U	--	6.5 U	6.5 U	6.5 U	5 U	5 U	5 U
Tetrachloroethene	127-18-4	3	5 U	3.3	5.4	2.3	1.3 J	2.5 J	1.9 J	1.6	5 U	5 U
Toluene	108-88-3	40	5 U	0.5 U	5 U	1 U	5.5 U	5.5 U	1.3 J	5 U	5 U	5 U
Total Xylenes	1330-20-7	20	--	--	--	1 U	5 U	5 U	5 U	--	--	--
Trans-1,2-Dichloroethene	156-60-5	100	0.28 J	0.5 U	2.5 U	0.15 J	3 U	3 U	3 U	5 U	2.5 U	2.5 U
Trichloroethene	79-01-6	3	7	0.82	0.96 J	5.1	6.4	10	7.9	7	2.7 J	2.9 J
Vinyl Chloride	75-01-4	1	5 U	0.5 U	10 U	1 U	5.5 U	5.5 U	5.5 U	5 U	10 U	10 U
Semivolatile Organics (µg/L)												
Hexachlorobutadiene	87-68-3	0.5	--	--	--	--	--	--	--	--	--	--
Naphthalene	91-20-3	20	--	--	--	--	--	--	--	--	--	--
Pesticides/PCBs (µg/L)												
beta-BHC	319-85-7	0.02	--	--	--	--	--	--	--	--	--	--
gamma-BHC (Lindane)	58-89-9	0.2	--	--	--	--	--	--	--	--	--	--
Inorganics (µg/L)												
Aluminum	7429-90-5	200	--	--	--	--	--	--	--	--	--	--
Antimony	7440-36-0	6	--	--	--	--	--	--	--	--	--	--
Barium	7440-39-3	2000	--	--	--	--	--	--	--	--	--	--
Calcium	7440-70-2	*	--	--	--	--	--	--	--	--	--	--
Chromium	7440-47-3	100	--	--	--	--	--	--	--	--	--	--
Cobalt	7440-48-4	420	--	--	--	--	--	--	--	--	--	--
Copper	7440-50-8	1000	--	--	--	--	--	--	--	--	--	--
Iron	7439-89-6	300	--	--	--	--	--	--	--	--	--	--
Lead	7439-92-1	15	--	--	--	--	--	--	--	--	--	--
Magnesium	7439-95-4	*	--	--	--	--	--	--	--	--	--	--
Mercury	7439-97-6	2	--	--	--	--	--	--	--	--	--	--
Nickel	7440-02-0	100	--	--	--	--	--	--	--	--	--	--
Potassium	7440-09-7	*	--	--	--	--	--	--	--	--	--	--
Sodium	7440-23-5	160000	--	--	--	--	--	--	--	--	--	--
Vanadium	7440-62-2	49	--	--	--	--	--	--	--	--	--	--
Zinc	7440-66-6	5000	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons (µg/L)												
Total Petroleum Hydrocarbons	--	5000	100 U	--	--	--	340 J	750 J	1100 U	100 U	--	--
Dissolved Gases (nM/L)												
Hydrogen	1333-74-0	*	6.8	--	--	--	--	--	--	1.3	--	--
Miscellaneous Parameters (mg/L)												
Acetic Acid	64-19-7	*	--	--	--	--	1 U	1 U	1 U	--	--	--
Alkalinity	T-005	*	29	--	--	--	14	16	12	7.8	--	--
Bromide	24959-67-9	*	--	--	--	--	1 U	--	--	--	--	--
Butanoic Acid	107-92-6	*	--	--	--	--	1 U	1 U	1 U	--	--	--
Chloride	16887-00-6	250000	30	--	--	--	6.3	5.7	4.3	8.6	--	--
Ethane	74-84-0	*	--	--	0.5 U	--	0.01 U	0.018	0.028	--	0.5 U	0.5 U
Ethene	74-85-1	*	--	--	0.5 U	--	0.01 U	0.057	0.045	--	0.5 U	0.5 U
Methane	74-82-8	*	--	--	0.0056	--	0.01 U	0.0048	0.018	--	0.022	0.021
Nitrate	14797-55-8	10000	0.1 U	--	--	--	--	1 U	0.01 U	0.1	--	--
Nitrite/Nitrate	--	*	0.1 U	--	--	--	0.1 U	--	--	0.1	--	--
Propionic Acid	79-09-4	*	--	--	--	--	1 U	1 U	1 U	--	--	--
Sodium	7440-23-5	160000	--	--	--	--	4.7	--	--	--	--	--
Sulfide	18496-25-8	*	1.5	--	--	--	--	1 U	1 U	1 U	--	--
Total Dissolved Solids	--	500000	110	--	--	--	85	51	57 J	50	--	--
Total Organic Carbon	7440-44-0	*	11	--	10	--	8.77	11	10	9.7	6	6
Total Suspended Solids	--	*	--	--	--	--	--	--	--	--	--	--

TABLE E-1

ABANDONED WELLS
STUDY AREA 36 - MAIN BASE

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

Well Designation	CAS Number	Screening Criteria Florida GCTL[a]	D-36-12C		OLD-36-13D				OLD-36-14D		OLD-36-15A	OLD-36-16A
Sample ID			NTC36G12C10-041700	017-OLD-36-12C-Q4-00	36G01301-120398	NTC36G13D10-041600	NTC36G13D10-041600-D	OLD-36-13BR-091503	36G01401-120498	NTC36G14D10-041600	NTC36G15A10-041800	NTC36G16A11-082400
Sample Date			04/17/00	12/05/00	12/03/98	04/16/00	04/16/00	09/15/03	12/04/98	04/16/00	04/18/00	08/24/00
Volatile Organics (µg/L)												
1,1-Dichloroethene	75-35-4	7	1 U	6 U	5 U	1 U	1 U	1 U	5 U	1 U	1 U	1 U
1,2,3-Trichlorobenzene	87-61-6	70	--	1.5 U	5 U	--	--	2 U	5 U	--	--	--
1,2,4-Trichlorobenzene	120-82-1	70	--	2 U	5 U	--	--	2 U	5 U	--	--	--
1,2,4-Trimethylbenzene	95-63-6	10	--	6.5 U	5 U	--	--	2 U	5 U	--	--	--
1,2-Dichlorobenzene	95-50-1	600	--	1.5 U	5 U	--	--	1 U	5 U	--	--	--
1,2-Dichloroethane	107-06-2	3	1 U	3 U	5 U	1 U	1 U	1 U	5 U	1 U	0.14 J	1 U
1,3,5-Trimethylbenzene	108-67-8	10	--	2.5 U	5 U	--	--	2 U	5 U	--	--	--
4-Isopropyltoluene	99-87-6	*	--	6 U	5 U	--	--	1 U	5 U	--	--	--
Acetone	67-64-1	700	10 UR	--	--	10 UR	3 J	10 U	--	10 UR	2.6 J	10 UR
Benzene	71-43-2	1	0.34 J	0.54 J	5 U	1 U	1 U	1 U	5 U	1 U	1 U	1 U
Carbon Disulfide	75-15-0	700	1 U	--	--	1 U	1 U	2 U	--	1 U	1 U	0.3 J
Chloroform	67-66-3	5.7	1 U	1.5 U	1.5 J	1 U	1 U	1 U	2.1 J	0.14 J	1 U	0.32 J
Chloromethane	74-87-3	2.7	1 U	6.5 U	10 U	1 U	1 U	1 U	10 U	1 U	1 U	1 U
cis-1,2-Dichloroethene	156-59-2	70	3.2	3.2 J	2.5 U	1 U	1 U	2.87	2.5 U	1 U	1 U	1 U
Ethylbenzene	100-41-4	30	1 U	3 U	5 U	1 U	1 U	1 U	5 U	1 U	1 U	1 U
Hexachlorobutadiene	87-68-3	0.5	--	5.5 U	5 U	--	--	0.55 U	5 U	--	--	--
Methylene Chloride	75-09-2	5	1 U	0.85 J	1.8 J	1 U	1 U	5 U	1.6 J	1 U	1 U	1 U
N-Butylbenzene	104-51-8	*	--	5.5 U	5 U	--	--	1 U	5 U	--	--	--
Naphthalene	91-20-3	20	--	2 U	5 U	--	--	5 U	5 U	--	--	--
Sec-Butylbenzene	135-98-8	*	--	6.5 U	5 U	--	--	1 U	5 U	--	--	--
Tetrachloroethene	127-18-4	3	1 U	7 U	5 U	1 U	1 U	1 U	5 U	1 U	1 U	1 U
Toluene	108-88-3	40	1 U	5.5 U	5 U	1 U	1 U	2 U	5 U	1 U	1 U	1 U
Total Xylenes	1330-20-7	20	1 U	5 U	--	1 U	1 U	1 U	--	1 U	1 U	1 U
Trans-1,2-Dichloroethene	156-60-5	100	1 U	3 U	2.5 U	1 U	1 U	1 U	2.5 U	1 U	1 U	1 U
Trichloroethene	79-01-6	3	8.1	9	5 U	1 U	1 U	2 U	5 U	1 U	1 U	1 U
Vinyl Chloride	75-01-4	1	1 U	5.5 U	10 U	1 U	1 U	1 U	10 U	1 U	1 U	1 U
Semivolatile Organics (µg/L)												
Hexachlorobutadiene	87-68-3	0.5	--	--	--	--	--	--	--	--	--	--
Naphthalene	91-20-3	20	--	--	--	--	--	--	--	--	--	--
Pesticides/PCBs (µg/L)												
beta-BHC	319-85-7	0.02	--	--	--	--	--	--	--	--	--	--
gamma-BHC (Lindane)	58-89-9	0.2	--	--	--	--	--	--	--	--	--	--
Inorganics (µg/L)												
Aluminum	7429-90-5	200	--	--	--	--	--	--	--	--	--	--
Antimony	7440-36-0	6	--	--	--	--	--	--	--	--	6 U	--
Barium	7440-39-3	2000	--	--	--	--	--	--	--	--	--	--
Calcium	7440-70-2	*	--	--	--	--	--	--	--	--	--	--
Chromium	7440-47-3	100	--	--	--	--	--	--	--	--	--	--
Cobalt	7440-48-4	420	--	--	--	--	--	--	--	--	--	--
Copper	7440-50-8	1000	--	--	--	--	--	--	--	--	--	--
Iron	7439-89-6	300	--	--	--	--	--	--	--	--	--	--
Lead	7439-92-1	15	--	--	--	--	--	--	--	--	--	--
Magnesium	7439-95-4	*	--	--	--	--	--	--	--	--	--	--
Mercury	7439-97-6	2	--	--	--	--	--	--	--	--	--	--
Nickel	7440-02-0	100	--	--	--	--	--	--	--	--	--	--
Potassium	7440-09-7	*	--	--	--	--	--	--	--	--	--	--
Sodium	7440-23-5	160000	--	--	--	--	--	--	--	--	--	--
Vanadium	7440-62-2	49	--	--	--	--	--	--	--	--	--	--
Zinc	7440-66-6	5000	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons (µg/L)												
Total Petroleum Hydrocarbons	--	5000	--	400 J	--	--	--	100 U	--	--	--	--
Dissolved Gases (nM/L)												
Hydrogen	1333-74-0	*	--	--	--	--	--	--	--	--	--	--
Miscellaneous Parameters (mg/L)												
Acetic Acid	64-19-7	*	--	1 U	--	--	--	1 U	--	--	--	--
Alkalinity	T-005	*	--	17	--	--	--	65.1	--	--	--	--
Bromide	24959-67-9	*	--	1 U	--	--	--	--	--	--	--	--
Butanoic Acid	107-92-6	*	--	1 U	--	--	--	1 U	--	--	--	--
Chloride	16887-00-6	250000	--	5.7	--	--	--	6.37	--	--	--	--
Ethane	74-84-0	*	--	0.01 U	0.83	--	--	0.026 U	0.5 U	--	--	--
Ethene	74-85-1	*	--	0.01 U	0.94	--	--	0.026 U	0.5 U	--	--	--
Methane	74-82-8	*	--	0.01 U	0.083	--	--	0.562	0.061	--	--	--
Nitrate	14797-55-8	10000	--	--	--	--	--	0.0031 U	--	--	--	--
Nitrite/Nitrate	--	*	--	0.1 U	--	--	--	--	--	--	--	--
Propionic Acid	79-09-4	*	--	1 U	--	--	--	1 U	--	--	--	--
Sodium	7440-23-5	160000	--	8.8	--	--	--	--	--	--	--	--
Sulfide	18496-25-8		--	--	--	--	--	0.1 U	--	--	--	--
Total Dissolved Solids	--	500000	--	300	--	--	--	170	--	--	--	--
Total Organic Carbon	7440-44-0	*	--	22.7	3	--	--	8.75	17	--	--	--
Total Suspended Solids	--	*	--	--	--	--	--	--	--	--	--	--

TABLE E-1

ABANDONED WELLS
STUDY AREA 36 - MAIN BASE

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

Well Designation	CAS Number	Screening Criteria Florida GCTL[a]	OLD-36-17B	OLD-36-18C	OLD-36-19A			OLD-36-20B	OLD-36-21C	OLD-36-22B	OLD-36-23C	
Sample ID			NTC36G17B11-082400	NTC36G18C11-082400	NTC36G19A11-082400	017-OLD-36-19A-Q3-01	17-OLD-36-19A-Q4-01	NTC36G20B11-082400	NTC36G21C11-082400	NTC36G22B11-082400	NTC36G23C11-082400	017-OLD-36-23C-Q4-00
Sample Date			08/24/00	08/24/00	08/24/00	08/02/01	10/26/01	08/24/00	08/24/00	08/24/00	08/24/00	12/06/00
Volatile Organics (µg/L)												
1,1-Dichloroethene	75-35-4	7	1 U	1 U	1 U	6 U	5 U	1 U	1 U	1 U	1 U	6 U
1,2,3-Trichlorobenzene	87-61-6	70	--	--	--	1.5 U	5 U	--	--	--	--	1.5 U
1,2,4-Trichlorobenzene	120-82-1	70	--	--	--	2 U	5 U	--	--	--	--	2 U
1,2,4-Trimethylbenzene	95-63-6	10	--	--	--	6.5 U	5 U	--	--	--	--	6.5 U
1,2-Dichlorobenzene	95-50-1	600	--	--	--	1.5 U	5 U	--	--	--	--	1.5 U
1,2-Dichloroethane	107-06-2	3	1 U	1 U	1 U	3 U	5 U	1 U	1 U	1 U	1 U	3 U
1,3,5-Trimethylbenzene	108-67-8	10	--	--	--	2.5 U	5 U	--	--	--	--	2.5 U
4-Isopropyltoluene	99-87-6	*	--	--	--	6 U	5 U	--	--	--	--	6 U
Acetone	67-64-1	700	10 UR	12 J	10 UR	--	--	10 UR	10 UR	10 UR	14 J	--
Benzene	71-43-2	1	1 U	1 U	1 U	1 U	5 U	1 U	1 U	1 U	0.29 J	2 U
Carbon Disulfide	75-15-0	700	0.13 J	1 U	1 U	--	--	0.11 J	0.67 J	1 U	1 U	--
Chloroform	67-66-3	5.7	0.6 J	0.52 J	1 U	1.5 U	5 U	0.087 J	1.2	1 U	0.67 J	1.5 U
Chloromethane	74-87-3	2.7	1 U	1 U	1 U	0.85 J	5 U	1 U	1 U	1 U	1 U	6.5 U
cis-1,2-Dichloroethene	156-59-2	70	1 U	1 U	1 U	6 U	5 U	1 U	1 U	1.9	0.74 J	0.81 J
Ethylbenzene	100-41-4	30	0.058 J	0.19 J	1 U	3 U	5 U	1 U	1 U	1 U	0.086 J	3 U
Hexachlorobutadiene	87-68-3	0.5	--	--	--	5.5 U	5 U	--	--	--	--	5.5 U
Methylene Chloride	75-09-2	5	0.19 J	1 U	1 U	1.5 U	5 U	1 U	0.16 J	1 U	0.39 J	1.5 U
N-Butylbenzene	104-51-8	*	--	--	--	5.5 U	5 U	--	--	--	--	5.5 U
Naphthalene	91-20-3	20	--	--	--	2 U	5 U	--	--	--	--	2 U
Sec-Butylbenzene	135-98-8	*	--	--	--	6.5 U	5 U	--	--	--	--	6.5 U
Tetrachloroethene	127-18-4	3	1 U	1 U	1 U	7 U	0.17 J	1 U	1 U	1 U	13	14
Toluene	108-88-3	40	0.15 J	0.28 J	1 U	1.2 J	5 U	1 U	0.11 J	1 U	0.28 J	5.5 U
Total Xylenes	1330-20-7	20	0.37 J	1.1	1 U	5 U	--	1 U	1 U	1 U	1.5	1.8 J
Trans-1,2-Dichloroethene	156-60-5	100	1 U	1 U	1 U	3 U	5 U	1 U	1 U	1 U	1 U	3 U
Trichloroethene	79-01-6	3	1 U	1 U	1 U	5 U	0.21 J	0.061 J	0.84 J	0.15 J	1.8	3.2 J
Vinyl Chloride	75-01-4	1	1 U	1 U	1 U	5.5 U	5 U	1 U	1 U	1 U	1 U	5.5 U
Semivolatile Organics (µg/L)												
Hexachlorobutadiene	87-68-3	0.5	--	--	--	--	--	--	--	--	--	--
Naphthalene	91-20-3	20	--	--	--	--	--	--	--	--	--	--
Pesticides/PCBs (µg/L)												
beta-BHC	319-85-7	0.02	--	--	--	--	--	--	--	--	--	--
gamma-BHC (Lindane)	58-89-9	0.2	--	--	--	--	--	--	--	--	--	--
Inorganics (µg/L)												
Aluminum	7429-90-5	200	--	--	--	--	--	--	--	--	--	--
Antimony	7440-36-0	6	--	--	--	--	--	--	--	--	--	--
Barium	7440-39-3	2000	--	--	--	--	--	--	--	--	--	--
Calcium	7440-70-2	*	--	--	--	--	--	--	--	--	--	--
Chromium	7440-47-3	100	--	--	--	--	--	--	--	--	--	--
Cobalt	7440-48-4	420	--	--	--	--	--	--	--	--	--	--
Copper	7440-50-8	1000	--	--	--	--	--	--	--	--	--	--
Iron	7439-89-6	300	--	--	--	--	--	--	--	--	--	--
Lead	7439-92-1	15	--	--	--	--	--	--	--	--	--	--
Magnesium	7439-95-4	*	--	--	--	--	--	--	--	--	--	--
Mercury	7439-97-6	2	--	--	--	--	--	--	--	--	--	--
Nickel	7440-02-0	100	--	--	--	--	--	--	--	--	--	--
Potassium	7440-09-7	*	--	--	--	--	--	--	--	--	--	--
Sodium	7440-23-5	160000	--	--	--	--	--	--	--	--	--	--
Vanadium	7440-62-2	49	--	--	--	--	--	--	--	--	--	--
Zinc	7440-66-6	5000	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons (µg/L)												
Total Petroleum Hydrocarbons	--	5000	--	--	--	270 J	100 U	--	--	--	--	280 J
Dissolved Gases (nM/L)												
Hydrogen	1333-74-0	*	--	--	--	--	0.6	--	--	--	--	--
Miscellaneous Parameters (mg/L)												
Acetic Acid	64-19-7	*	--	--	--	1 U	--	--	--	--	--	1 U
Alkalinity	T-005	*	--	--	--	14	29	--	--	--	--	25
Bromide	24959-67-9	*	--	--	--	--	--	--	--	--	--	1 U
Butanoic Acid	107-92-6	*	--	--	--	1 U	--	--	--	--	--	1 U
Chloride	16887-00-6	250000	--	--	--	11.4	8.9	--	--	--	--	3.7
Ethane	74-84-0	*	--	--	--	0.15	--	--	--	--	--	0.01 U
Ethene	74-85-1	*	--	--	--	5.6	--	--	--	--	--	0.01 U
Methane	74-82-8	*	--	--	--	0.0078	--	--	--	--	--	0.037
Nitrate	14797-55-8	10000	--	--	--	78.7	15	--	--	--	--	--
Nitrite/Nitrate	--	*	--	--	--	--	15	--	--	--	--	0.1 U
Propionic Acid	79-09-4	*	--	--	--	1 U	--	--	--	--	--	1 U
Sodium	7440-23-5	160000	--	--	--	--	--	--	--	--	--	8.8
Sulfide	18496-25-8	*	--	--	--	1 U	1 U	--	--	--	--	--
Total Dissolved Solids	--	500000	--	--	--	700 J	230	--	--	--	--	600
Total Organic Carbon	7440-44-0	*	--	--	--	3	4.1	--	--	--	--	15
Total Suspended Solids	--	*	--	--	--	--	--	--	--	--	--	--

TABLE E-1

ABANDONED WELLS
STUDY AREA 36 - MAIN BASE

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

Well Designation	CAS Number	Screening Criteria Florida GCTL[a]	OLD-36-24B			OLD-36-25C			OLD-36-26A		OLD-36-26A	
Sample ID			NTC36G24B11-082400	017-OLD-36-24B-Q3-01	17-OLD-36-24B-Q4-01	NTC36G25C11-082400	NTC36G25C11-082400-D	17-OLD-36-25C-Q4-01	017-OLD-36-26A-Q4-00	017-OLD-36-26A-Q1-01	017-OLD-36-26A-Q3-01	17-OLD-36-26A-Q4-01
Sample Date			08/24/00	08/02/01	10/26/01	08/24/00	08/24/00	10/29/01	12/01/00	03/14/01	08/01/01	10/23/01
Volatile Organics (µg/L)												
1,1-Dichloroethene	75-35-4	7	1 U	6 U	5 U	1 U	1 U	0.3 U	6 U	6 U	6 U	5 U
1,2,3-Trichlorobenzene	87-61-6	70	--	1.5 U	5 U	--	--	0.3 U	1.5 U	1.5 U	1.5 U	5 U
1,2,4-Trichlorobenzene	120-82-1	70	--	2 U	5 U	--	--	0.3 U	2 U	2 U	2 U	5 U
1,2,4-Trimethylbenzene	95-63-6	10	--	6.5 U	5 U	--	--	0.3 U	6.5 U	6.5 U	6.5 U	5 U
1,2-Dichlorobenzene	95-50-1	600	--	1.5 U	5 U	--	--	0.3 U	1.5 U	1.5 U	1.5 U	5 U
1,2-Dichloroethane	107-06-2	3	1 U	3 U	5 U	1 U	1 U	0.3 U	3 U	3 U	3 U	5 U
1,3,5-Trimethylbenzene	108-67-8	10	--	2.5 U	5 U	--	--	0.3 U	2.5 U	2.5 U	2.5 U	5 U
4-Isopropyltoluene	99-87-6	*	--	6 U	5 U	--	--	0.3 U	6 U	6 U	6 U	5 U
Acetone	67-64-1	700	10 UR	--	--	10 UR	10 UR	--	--	--	--	--
Benzene	71-43-2	1	1 U	1 U	5 U	1 U	1 U	0.3 U	2 U	1 U	1 U	5 U
Carbon Disulfide	75-15-0	700	0.13 J	--	--	1.5	1.7	--	--	--	--	--
Chloroform	67-66-3	5.7	0.34 J	1.5 U	5 U	1.6	2	0.3 U	1.5 U	1.5 U	1.5 U	5 U
Chloromethane	74-87-3	2.7	1 U	6.5 U	5 U	1 U	1 U	0.3 U	6.5 U	0.65 J	6.5 U	5 U
cis-1,2-Dichloroethene	156-59-2	70	1 U	6 U	5 U	1 U	1 U	0.3 U	6 U	6 U	6 U	0.86
Ethylbenzene	100-41-4	30	1 U	3 U	5 U	1 U	1 U	0.3 U	3 U	3 U	3 U	5 U
Hexachlorobutadiene	87-68-3	0.5	--	5.5 U	5 U	--	--	0.3 U	5.5 U	5.5 U	5.5 U	5 U
Methylene Chloride	75-09-2	5	1 U	1.5 U	5 U	1 U	1 U	0.3 U	1.5 U	0.53 J	1.5 U	5 U
N-Butylbenzene	104-51-8	*	--	5.5 U	5 U	--	--	0.3 U	5.5 U	5.5 U	5.5 U	5 U
Naphthalene	91-20-3	20	--	2 U	5 U	--	--	0.3 U	2 U	2 U	2 U	5 U
Sec-Butylbenzene	135-98-8	*	--	6.5 U	5 U	--	--	0.3 U	6.5 U	6.5 U	6.5 U	5 U
Tetrachloroethene	127-18-4	3	1 U	7 U	5 U	1 U	1 U	0.3 U	7 U	7 U	7 U	5 U
Toluene	108-88-3	40	1 U	0.86 J	5 U	1 U	1 U	0.3 U	5.5 U	5.5 U	0.66 J	5 U
Total Xylenes	1330-20-7	20	1 U	5 U	--	1 U	1 U	--	5 U	5 U	5 U	--
Trans-1,2-Dichloroethene	156-60-5	100	1 U	3 U	5 U	1 U	1 U	0.3 U	3 U	3 U	3 U	5 U
Trichloroethene	79-01-6	3	1 U	5 U	5 U	7.7	6.9	11	15	10	6.3	4.8
Vinyl Chloride	75-01-4	1	1 U	5.5 U	5 U	1 U	1 U	0.3 U	5.5 U	5.5 U	5.5 U	5 U
Semivolatile Organics (µg/L)												
Hexachlorobutadiene	87-68-3	0.5	--	--	--	--	--	--	--	--	--	--
Naphthalene	91-20-3	20	--	--	--	--	--	--	--	--	--	--
Pesticides/PCBs (µg/L)												
beta-BHC	319-85-7	0.02	--	--	--	--	--	--	--	--	--	--
gamma-BHC (Lindane)	58-89-9	0.2	--	--	--	--	--	--	--	--	--	--
Inorganics (µg/L)												
Aluminum	7429-90-5	200	--	--	--	--	--	--	--	--	--	--
Antimony	7440-36-0	6	--	--	--	--	--	--	--	--	--	--
Barium	7440-39-3	2000	--	--	--	--	--	--	--	--	--	--
Calcium	7440-70-2	*	--	--	--	--	--	--	--	--	--	--
Chromium	7440-47-3	100	--	--	--	--	--	--	--	--	--	--
Cobalt	7440-48-4	420	--	--	--	--	--	--	--	--	--	--
Copper	7440-50-8	1000	--	--	--	--	--	--	--	--	--	--
Iron	7439-89-6	300	--	--	--	--	--	--	--	--	--	--
Lead	7439-92-1	15	--	--	--	--	--	--	--	--	--	--
Magnesium	7439-95-4	*	--	--	--	--	--	--	--	--	--	--
Mercury	7439-97-6	2	--	--	--	--	--	--	--	--	--	--
Nickel	7440-02-0	100	--	--	--	--	--	--	--	--	--	--
Potassium	7440-09-7	*	--	--	--	--	--	--	--	--	--	--
Sodium	7440-23-5	160000	--	--	--	--	--	--	--	--	--	--
Vanadium	7440-62-2	49	--	--	--	--	--	--	--	--	--	--
Zinc	7440-66-6	5000	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons (µg/L)												
Total Petroleum Hydrocarbons	--	5000	--	240 J	100 U	--	--	100 U	570 J	2700	22000	190
Dissolved Gases (nM/L)												
Hydrogen	1333-74-0	*	--	--	0.75	--	--	0.86	--	--	--	10
Miscellaneous Parameters (mg/L)												
Acetic Acid	64-19-7	*	--	1 U	--	--	--	--	1 U	1 U	16	--
Alkalinity	T-005	*	--	8.6	1 U	--	--	1 U	26	18	16	3
Bromide	24959-67-9	*	--	--	--	--	--	--	0.5	--	--	--
Butanoic Acid	107-92-6	*	--	1 U	--	--	--	--	1 U	1 U	4.6	--
Chloride	16887-00-6	250000	--	3.6	7.1	--	--	5.7	6.5	9.9	4.1	9.8
Ethane	74-84-0	*	--	0.36	--	--	--	--	0.01 U	0.064	5.2	--
Ethene	74-85-1	*	--	0.41	--	--	--	--	0.01 U	0.12	23	--
Methane	74-82-8	*	--	0.049	--	--	--	--	0.01 U	0.0085	2.7	--
Nitrate	14797-55-8	10000	--	0.01 U	0.87	--	--	0.08	1.2	0.02	0.01 U	0.16
Nitrite/Nitrate	--	*	--	--	0.87	--	--	0.08	--	--	--	0.16
Propionic Acid	79-09-4	*	--	1 U	--	--	--	--	1 U	1 U	24	--
Sodium	7440-23-5	160000	--	--	--	--	--	--	8.5	--	--	--
Sulfide	18496-25-8	*	--	1.2	1 U	--	--	1 U	--	1.8	1.3	2.6
Total Dissolved Solids	--	500000	--	37 J	160	--	--	64	260	61	94 J	42
Total Organic Carbon	7440-44-0	*	--	11	4	--	--	3.5	46.6	25	76	19
Total Suspended Solids	--	*	--	--	--	--	--	--	--	--	--	--

TABLE E-1

ABANDONED WELLS
STUDY AREA 36 - MAIN BASE

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

Well Designation	CAS Number	Screening Criteria Florida GCTL[a]	OLD-36-27A				OLD-36-28B					OLD-3
Sample ID			017-OLD-36-27A-Q4-00	017-OLD-36-27A-Q1-01	017-OLD-36-27A-Q3-01	17-OLD-36-27A-Q4-01	017-OLD-36-28B-Q4-00	017-OLD-36-28B-Q1-01	017-OLD-36-28B-Q3-01	17-OLD-36-28B-Q4-01	017-OLD-36-29B-Q4-00	017-OLD-36-29B-Q1-01
Sample Date			12/01/00	03/13/01	07/31/01	10/24/01	12/01/00	03/14/01	07/30/01	10/24/01	12/04/00	03/13/01
Volatile Organics (µg/L)												
1,1-Dichloroethene	75-35-4	7	6 U	30 U	6 U	5 U	6 U	30 U	6 U	5 U	6 U	60 U
1,2,3-Trichlorobenzene	87-61-6	70	1.5 U	7.5 U	1.5 U	5 U	1.5 U	7.5 U	1.5 U	5 U	1.5 U	15 U
1,2,4-Trichlorobenzene	120-82-1	70	2 U	10 U	2 U	5 U	2 U	10 U	2 U	5 U	2 U	20 U
1,2,4-Trimethylbenzene	95-63-6	10	6.5 U	32 U	6.5 U	5 U	6.5 U	32 U	6.5 U	5 U	6.5 U	65 U
1,2-Dichlorobenzene	95-50-1	600	1.5 U	7.5 U	1.5 U	5 U	1.5 U	7.5 U	1.5 U	5 U	1.5 U	15 U
1,2-Dichloroethane	107-06-2	3	3 U	15 U	3 U	5 U	3 U	15 U	3 U	5 U	3 U	30 U
1,3,5-Trimethylbenzene	108-67-8	10	2.5 U	12 U	2.5 U	5 U	2.5 U	12 U	2.5 U	5 U	2.5 U	25 U
4-Isopropyltoluene	99-87-6	*	6 U	30 U	6 U	5 U	6 U	30 U	6 U	5 U	6 U	60 U
Acetone	67-64-1	700	--	--	--	--	--	--	--	--	--	--
Benzene	71-43-2	1	2 U	5 U	1 U	5 U	2 U	5 U	1 U	5 U	2 U	10 U
Carbon Disulfide	75-15-0	700	--	--	--	--	--	--	--	--	--	--
Chloroform	67-66-3	5.7	1.5 U	7.5 U	1.5 U	5 U	1.4 J	7.5 U	1.5 U	5 U	1.5 U	15 U
Chloromethane	74-87-3	2.7	6.5 U	32 U	6.5 U	5 U	6.5 U	32 U	6.5 U	5 U	6.5 U	65 U
cis-1,2-Dichloroethene	156-59-2	70	1.1 J	30 U	23	7.1	0.54 J	30 U	24	33	1.9 J	60 U
Ethylbenzene	100-41-4	30	3 U	15 U	3 U	5 U	3 U	15 U	3 U	5 U	3 U	30 U
Hexachlorobutadiene	87-68-3	0.5	5.5 U	28 U	5.5 U	5 U	5.5 U	28 U	5.5 U	5 U	5.5 U	55 U
Methylene Chloride	75-09-2	5	1.5 U	8.7	1.5 U	5 U	1.5 U	5.6 J	1.5 U	5 U	1.5 U	14 J
N-Butylbenzene	104-51-8	*	5.5 U	28 U	5.5 U	5 U	5.5 U	28 U	5.5 U	5 U	5.5 U	55 U
Naphthalene	91-20-3	20	2 U	10 U	2 U	5 U	2 U	10 U	2 U	5 U	2 U	20 U
Sec-Butylbenzene	135-98-8	*	6.5 U	32 U	6.5 U	5 U	6.5 U	32 U	6.5 U	5 U	6.5 U	65 U
Tetrachloroethene	127-18-4	3	7 U	35 U	0.55 J	0.4	7 U	35 U	7 U	5 U	7 U	70 U
Toluene	108-88-3	40	5.5 U	28 U	1 J	5 U	5.5 U	28 U	2 J	5 U	5.5 U	55 U
Total Xylenes	1330-20-7	20	5 U	25 U	5 U	--	5 U	25 U	5 U	--	5 U	50 U
Trans-1,2-Dichloroethene	156-60-5	100	3 U	15 U	3 U	5 U	3 U	15 U	3 U	0.53	3 U	30 U
Trichloroethene	79-01-6	3	79	97	14	1.5	85	66	30	6.8	190	150
Vinyl Chloride	75-01-4	1	5.5 U	28 U	5.5 U	5 U	5.5 U	28 U	5.5 U	5 U	5.5 U	55 U
Semivolatile Organics (µg/L)												
Hexachlorobutadiene	87-68-3	0.5	--	--	--	--	--	--	--	--	--	--
Naphthalene	91-20-3	20	--	--	--	--	--	--	--	--	--	--
Pesticides/PCBs (µg/L)												
beta-BHC	319-85-7	0.02	--	--	--	--	--	--	--	--	--	--
gamma-BHC (Lindane)	58-89-9	0.2	--	--	--	--	--	--	--	--	--	--
Inorganics (µg/L)												
Aluminum	7429-90-5	200	--	--	--	--	--	--	--	--	--	--
Antimony	7440-36-0	6	--	--	--	--	--	--	--	--	--	--
Barium	7440-39-3	2000	--	--	--	--	--	--	--	--	--	--
Calcium	7440-70-2	*	--	--	--	--	--	--	--	--	--	--
Chromium	7440-47-3	100	--	--	--	--	--	--	--	--	--	--
Cobalt	7440-48-4	420	--	--	--	--	--	--	--	--	--	--
Copper	7440-50-8	1000	--	--	--	--	--	--	--	--	--	--
Iron	7439-89-6	300	--	--	--	--	--	--	--	--	--	--
Lead	7439-92-1	15	--	--	--	--	--	--	--	--	--	--
Magnesium	7439-95-4	*	--	--	--	--	--	--	--	--	--	--
Mercury	7439-97-6	2	--	--	--	--	--	--	--	--	--	--
Nickel	7440-02-0	100	--	--	--	--	--	--	--	--	--	--
Potassium	7440-09-7	*	--	--	--	--	--	--	--	--	--	--
Sodium	7440-23-5	160000	--	--	--	--	--	--	--	--	--	--
Vanadium	7440-62-2	49	--	--	--	--	--	--	--	--	--	--
Zinc	7440-66-6	5000	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons (µg/L)												
Total Petroleum Hydrocarbons	--	5000	490 J	310 J	1100 U	100 U	400 J	350 J	1000 U	100 U	1000 U	340 J
Dissolved Gases (nM/L)												
Hydrogen	1333-74-0	*	--	--	--	2.2	--	--	--	14	--	--
Miscellaneous Parameters (mg/L)												
Acetic Acid	64-19-7	*	1 U	1 U	3.4	--	1 U	1 U	3.6	--	1 U	1 U
Alkalinity	T-005	*	160	62	140	350	300	37	49	57	27	11
Bromide	24959-67-9	*	1 U	--	--	--	1 U	--	--	--	5 U	--
Butanoic Acid	107-92-6	*	1 U	1 U	1 U	--	1 U	1 U	1 U	--	1 U	1 U
Chloride	16887-00-6	250000	6.7	7.7	13	8.9	8.7	7	8.5	48	14	9.6
Ethane	74-84-0	*	0.01 U	0.014	0.032	--	0.01 U	0.05	0.11	--	0.01 U	0.07
Ethene	74-85-1	*	0.01 U	0.057	0.095	--	0.01 U	0.11	0.21	--	0.01 U	0.07
Methane	74-82-8	*	0.01 U	0.0017	0.65	--	0.012	0.0036	1.5	--	0.01 U	0.005
Nitrate	14797-55-8	10000	0.1 U	0.01 U	1.26	2.8	0.1 U	0.01	0.01 U	0.19	--	0.01 U
Nitrite/Nitrate	--	*	--	--	--	2.8	--	--	--	0.19	0.1 U	--
Propionic Acid	79-09-4	*	1 U	1 U	8.4	--	1 U	1 U	8.2	--	1 U	1 U
Sodium	7440-23-5	160000	7.3	--	--	--	55	--	--	--	12	--
Sulfide	18496-25-8	*	--	1 U	3.2	2.2	--	1 U	2.6	3.3	--	1 U
Total Dissolved Solids	--	500000	230	91	310 J	230	920	270	180 J	340	180	68
Total Organic Carbon	7440-44-0	*	8.36	3	31	18	90.5	6	21	48	5.18	12
Total Suspended Solids	--	*	--	--	--	--	--	--	--	--	--	--

TABLE E-1

ABANDONED WELLS
STUDY AREA 36 - MAIN BASE

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

Well Designation	CAS Number	Screening Criteria Florida GCTL[a]	5-29B		OLD-36-30C			OLD-36-31C			OLD-36-31C	
Sample ID			017-OLD-36-29B-Q3-01	17-OLD-36-29B-Q4-01	017-OLD-36-30C-Q1-01	017-OLD-36-30C-Q3-01	17-OLD-36-30C-Q4-01	017-OLD-36-31C-Q4-00	017-OLD-36-31C-Q1-01	017-OLD-36-31C-Q3-01	17-OLD-36-31C-Q4-01	017-OLD-36-32C-Q4-00
Sample Date			07/30/01	10/22/01	03/14/01	07/31/01	10/23/01	12/05/00	03/14/01	07/31/01	10/23/01	12/06/00
Volatile Organics (µg/L)												
1,1-Dichloroethene	75-35-4	7	6 U	0.18 J	6 U	6 U	5 U	6 U	6 U	6 U	5 U	6 U
1,2,3-Trichlorobenzene	87-61-6	70	1.5 U	5 U	1.5 U	1.5 U	5 U	1.5 U	1.5 U	1.5 U	5 U	1.5 U
1,2,4-Trichlorobenzene	120-82-1	70	2 U	5 U	2 U	2 U	5 U	2 U	2 U	2 U	5 U	2 U
1,2,4-Trimethylbenzene	95-63-6	10	6.5 U	5 U	6.5 U	6.5 U	5 U	6.5 U	6.5 U	6.5 U	5 U	6.5 U
1,2-Dichlorobenzene	95-50-1	600	1.5 U	5 U	1.5 U	1.5 U	5 U	1.5 U	1.5 U	1.5 U	5 U	1.5 U
1,2-Dichloroethane	107-06-2	3	3 U	5 U	3 U	3 U	5 U	3 U	3 U	3 U	5 U	3 U
1,3,5-Trimethylbenzene	108-67-8	10	2.5 U	5 U	2.5 U	2.5 U	5 U	2.5 U	2.5 U	2.5 U	5 U	2.5 U
4-Isopropyltoluene	99-87-6	*	6 U	5 U	6 U	6 U	5 U	6 U	6 U	6 U	5 U	6 U
Acetone	67-64-1	700	--	--	--	--	--	--	--	--	--	--
Benzene	71-43-2	1	1 U	0.19 J	1 U	1 U	5 U	2 U	1 U	1 U	5 U	2 U
Carbon Disulfide	75-15-0	700	--	--	--	--	--	--	--	--	--	--
Chloroform	67-66-3	5.7	1.5 U	5 U	1.5 U	1.5 U	5 U	0.97 J	1.5 U	1.5 U	5 U	1.5 U
Chloromethane	74-87-3	2.7	6.5 U	5 U	6.5 U	6.5 U	5 U	6.5 U	6.5 U	0.59 J	5 U	6.5 U
cis-1,2-Dichloroethene	156-59-2	70	0.87 J	1.2	1.3 J	14	27	6 U	6 U	17	2.8	6 U
Ethylbenzene	100-41-4	30	3 U	5 U	3 U	3 U	5 U	3 U	3 U	3 U	5 U	3 U
Hexachlorobutadiene	87-68-3	0.5	5.5 U	5 U	5.5 U	5.5 U	5 U	5.5 U	5.5 U	5.5 U	5 U	5.5 U
Methylene Chloride	75-09-2	5	1.5 U	5 U	0.6 J	1.5 U	5 U	1.8	0.57 J	1.5 U	5 U	0.85 J
N-Butylbenzene	104-51-8	*	5.5 U	5 U	5.5 U	5.5 U	5 U	5.5 U	5.5 U	5.5 U	5 U	5.5 U
Naphthalene	91-20-3	20	2 U	5 U	2 U	2 U	5 U	2 U	2 U	2 U	5 U	2 U
Sec-Butylbenzene	135-98-8	*	6.5 U	5 U	6.5 U	6.5 U	5 U	6.5 U	6.5 U	6.5 U	5 U	6.5 U
Tetrachloroethene	127-18-4	3	7 U	5 U	7 U	7 U	5 U	7 U	7 U	7 U	5 U	7 U
Toluene	108-88-3	40	1.6 J	5 U	5.5 U	1.1 J	5 U	5.5 U	5.5 U	2.5 J	5 U	5.5 U
Total Xylenes	1330-20-7	20	5 U	--	5 U	5 U	--	5 U	5 U	5 U	--	5 U
Trans-1,2-Dichloroethene	156-60-5	100	3 U	5 U	3 U	3 U	0.37	3 U	3 U	3 U	5 U	3 U
Trichloroethene	79-01-6	3	130	110	57	18	12	14	13	34	13	17
Vinyl Chloride	75-01-4	1	5.5 U	5 U	5.5 U	5.5 U	5 U	5.5 U	5.5 U	5.5 U	5 U	5.5 U
Semivolatile Organics (µg/L)												
Hexachlorobutadiene	87-68-3	0.5	--	--	--	--	--	--	--	--	--	--
Naphthalene	91-20-3	20	--	--	--	--	--	--	--	--	--	--
Pesticides/PCBs (µg/L)												
beta-BHC	319-85-7	0.02	--	--	--	--	--	--	--	--	--	--
gamma-BHC (Lindane)	58-89-9	0.2	--	--	--	--	--	--	--	--	--	--
Inorganics (µg/L)												
Aluminum	7429-90-5	200	--	--	--	--	--	--	--	--	--	--
Antimony	7440-36-0	6	--	--	--	--	--	--	--	--	--	--
Barium	7440-39-3	2000	--	--	--	--	--	--	--	--	--	--
Calcium	7440-70-2	*	--	--	--	--	--	--	--	--	--	--
Chromium	7440-47-3	100	--	--	--	--	--	--	--	--	--	--
Cobalt	7440-48-4	420	--	--	--	--	--	--	--	--	--	--
Copper	7440-50-8	1000	--	--	--	--	--	--	--	--	--	--
Iron	7439-89-6	300	--	--	--	--	--	--	--	--	--	--
Lead	7439-92-1	15	--	--	--	--	--	--	--	--	--	--
Magnesium	7439-95-4	*	--	--	--	--	--	--	--	--	--	--
Mercury	7439-97-6	2	--	--	--	--	--	--	--	--	--	--
Nickel	7440-02-0	100	--	--	--	--	--	--	--	--	--	--
Potassium	7440-09-7	*	--	--	--	--	--	--	--	--	--	--
Sodium	7440-23-5	160000	--	--	--	--	--	--	--	--	--	--
Vanadium	7440-62-2	49	--	--	--	--	--	--	--	--	--	--
Zinc	7440-66-6	5000	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons (µg/L)												
Total Petroleum Hydrocarbons	--	5000	1000 U	100 U	380 J	1000 U	100 U	400	5900	3200	100 U	1000 U
Dissolved Gases (nM/L)												
Hydrogen	1333-74-0	*	--	3.4	--	--	14	--	--	--	8.7	--
Miscellaneous Parameters (mg/L)												
Acetic Acid	64-19-7	*	1 U	--	1 U	1 U	--	1 U	1 U	15	--	1 U
Alkalinity	T-005	*	12	8.5	25	20	9	18	26	1	1 U	83
Bromide	24959-67-9	*	--	--	--	--	--	1 U	--	--	--	1 U
Butanoic Acid	107-92-6	*	1 U	--	1 U	1 U	--	1 U	1 U	4.6	--	1 U
Chloride	16887-00-6	250000	7.1	30	8	7.4	11	8.9	6.9	5.4	9.9	7.9
Ethane	74-84-0	*	0.086	--	0.037	0.092	--	0.01 U	0.084	0.044	--	0.01 U
Ethene	74-85-1	*	0.12	--	0.078	0.30	--	0.01 U	0.27	0.26	--	0.01 U
Methane	74-82-8	*	0.13	--	0.0051	0.09	--	0.01 U	0.40	2.3	--	0.01 U
Nitrate	14797-55-8	10000	0.01 U	0.1 U	0.02	0.01 U	0.16	--	0.01 U	0.01 U	0.15	--
Nitrite/Nitrate	--	*	--	0.1 U	--	--	0.16	0.1 U	--	--	0.15	0.1 U
Propionic Acid	79-09-4	*	1 U	--	1 U	3.8	--	1 U	1 U	31	--	1 U
Sodium	7440-23-5	160000	--	--	--	--	--	9.2	--	--	--	16
Sulfide	18496-25-8	*	0.63 J	1 U	1 U	3.1	1.6	--	1.4	2.8	2.7	--
Total Dissolved Solids	--	500000	10 J	140	110	92 J	52	130	140	120 J	30	620
Total Organic Carbon	7440-44-0	*	6	9	1	8	12	6.41	49	31	7.1	18.5
Total Suspended Solids	--	*	--	--	--	--	--	--	--	--	--	--

TABLE E-1

ABANDONED WELLS
STUDY AREA 36 - MAIN BASE

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

Notes:

[a] Groundwater Cleanup Target Level [Development of Soil Cleanup Target Levels (SCTLs) for Chapter 62-777, F.A.C., May 26, 1999].

* Indicates that the screening value is not available.

Empty cells indicate parameter not analyzed.

"J" qualifier indicates an estimated value.

"U" qualifier indicates a non-detect value.

"UJ" qualifier indicates an estimated non-detect value.

Values in shaded cells meet or exceed the screening criteria.

APPENDIX F

GROUNDWATER ANALYTICAL DATA MAY 2002 THROUGH JUNE 2004 (REPLACEMENT WELLS)

TABLE F-1

REPLACEMENT WELLS
STUDY AREA 36 - MAIN BASE

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

Well Designation	CAS Number	Screening	OLD-36-01AR					
Sample ID		Florida	173601ARQ202	17-3601ARQ202	173601ARQ402	493601ARQ103	OLD-36-01AR-061603	OLD-36-01AR-061603-D
Sample Date		GCTL[a]	04/26/02	05/07/02	12/02/02	03/25/03	06/16/03	06/16/03
Volatile Organics (µg/L)								
1,1,2,2-Tetrachloroethane	79-34-5	0.2	1 U	0.2 U	0.2 U	0.2 UJ	0.2 U	0.2 U
1,2-Dibromo-3-Chloropropane	96-12-8	0.2	1 U	0.2 U	0.2 UJ	0.2 U	2 U	2 U
1,2-Dichloroethane	107-06-2	3	1 U	3 U	3 U	3 U	1 U	1 U
2-Butanone	78-93-3	4200	--	10 U	10 U	10 U	1 U	1 U
2-Hexanone	591-78-6	280	--	10 U	10 U	10 U	1 U	1 U
4-Methyl-2-Pentanone	108-10-1	560	--	10 U	10 U	10 U	1 U	1 U
Acetone	67-64-1	700	--	10 U	10 U	10 U	10 U	10 U
Benzene	71-43-2	1	1 U	1 U	1 U	1 U	1 U	1 U
Bromodichloromethane	75-27-4	0.6	1 U	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U
Carbon Disulfide	75-15-0	700	--	5 U	5 U	5 U	2 U	2 U
Chloroform	67-66-3	5.7	1 U	5 U	5 U	5 U	1 U	1 U
cis-1,2-Dichloroethene	156-59-2	70	2.2	1.85 J	5 U	5 U	1 U	1 U
Ethylbenzene	100-41-4	30	1 U	5 U	5 U	5 U	1 U	1 U
Methyl *tert*-Butyl Ether	1634-04-4	50	--	5 U	5 U	5 U	1 U	1 U
Tetrachloroethene	127-18-4	3	1 U	3 U	3 U	3 U	1 U	1 U
Trichloroethene	79-01-6	3	1.2	1.57 J	3 U	3 U	1 U	1 U
Vinyl Chloride	75-01-4	1	1 U	1 U	1 U	1 U	1 U	1 U
Dissolved Gases (nM/L)								
Hydrogen	1333-74-0	NA	--	--	--	--	--	--
Miscellaneous Parameters (mg/L)								
Acetic Acid	64-19-7	NA	--	--	--	--	1 U	1 U
Alkalinity		*	--	28	--	--	161	157
Butanoic Acid	107-92-6	NA	--	--	--	--	1 U	1 U
Chloride	16887-00-6	250000	--	6.36	--	--	14.5	13.2
Ethane	74-84-0	NA	--	1 U	--	--	0.026 U	0.026 U
Ethene	74-85-1	NA	--	1 U	--	--	0.026 U	0.026 U
Methane	74-82-8	*	--	1.41	--	--	0.058	0.026 U
Nitrate	14797-55-8	10000	--	1.76	--	--	2.76	2.76
Nitrite	14797-65-0	1000	--	0.027	--	--	0.005 U	0.005 U
Nitrite/Nitrate		NA	--	--	--	--	2.76	2.76
Propionic Acid	79-09-4	NA	--	--	--	--	1 U	1 U
Sulfate	14808-79-8	250000	--	--	--	--	--	--
Sulfide	18496-25-8	NA	--	0.02 U	--	--	0.1 U	0.1 U
Total Dissolved Solids		NA	--	102	--	--	284	300
Total Organic Carbon		NA	--	4.3 U	--	--	6.82	7.24
Petroleum Hydrocarbons (µg/L)								
Total Petroleum Hydrocarbons		5000	--	100 U	--	--	100 U	100 U

TABLE F-1

REPLACEMENT WELLS
STUDY AREA 36 - MAIN BASE

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

Well Designation	CAS Number	Screening	OLD-36-01AR			
Sample ID		Florida	OLD-36-01AR-091503	OLD-36-01AR-091503-D	OLD-36-01AR-120203	OLD-36-01AR-120203-D
Sample Date		GCTL[a]	09/15/03	09/15/03	12/02/03	12/02/03
Volatile Organics (µg/L)						
1,1,2,2-Tetrachloroethane	79-34-5	0.2	0.2 U	0.2 U	0.2 U	0.2 U
1,2-Dibromo-3-Chloropropane	96-12-8	0.2	2 U	2 U	2 U	2 U
1,2-Dichloroethane	107-06-2	3	1 U	1 U	1 U	1 U
2-Butanone	78-93-3	4200	1 U	1 U	1 U	1 U
2-Hexanone	591-78-6	280	1 U	1 U	1 U	1 U
4-Methyl-2-Pentanone	108-10-1	560	1 U	1 U	1 U	1 U
Acetone	67-64-1	700	10 U	10 U	10 U	10 U
Benzene	71-43-2	1	1 U	1 U	1 U	1 U
Bromodichloromethane	75-27-4	0.6	0.6 U	0.6 U	0.6 U	0.6 U
Carbon Disulfide	75-15-0	700	2 U	2 U	2 U	2 U
Chloroform	67-66-3	5.7	1 U	1 U	1 U	1 U
cis-1,2-Dichloroethene	156-59-2	70	1 U	1 U	1 U	1 U
Ethylbenzene	100-41-4	30	1 U	1 U	1 U	1 U
Methyl *tert*-Butyl Ether	1634-04-4	50	1 U	1 U	1 U	1 U
Tetrachloroethene	127-18-4	3	1 U	1 U	1 U	1 U
Trichloroethene	79-01-6	3	2 U	2 U	2 U	2 U
Vinyl Chloride	75-01-4	1	1 U	1 U	1 U	1 U
Dissolved Gases (nM/L)						
Hydrogen	1333-74-0	NA	--	--	--	--
Miscellaneous Parameters (mg/L)						
Acetic Acid	64-19-7	NA	1 U	1 U	1 U	--
Alkalinity		*	169	165	164	--
Butanoic Acid	107-92-6	NA	1 U	1 U	1 U	--
Chloride	16887-00-6	250000	6.84	7.15	5.08	--
Ethane	74-84-0	NA	0.026 U	--	0.026 U	--
Ethene	74-85-1	NA	0.026 U	--	0.026 U	--
Methane	74-82-8	*	0.026 U	--	0.357	--
Nitrate	14797-55-8	10000	1.41	1.49	1.42	--
Nitrite	14797-65-0	1000	0.0035 U	0.0035 U	0.0035 U	--
Nitrite/Nitrate		NA	--	--	1.42	--
Propionic Acid	79-09-4	NA	1 U	1 U	1 U	--
Sulfate	14808-79-8	250000	--	--	30	--
Sulfide	18496-25-8	NA	0.1 U	--	0.1 U	--
Total Dissolved Solids		NA	328	324	282	--
Total Organic Carbon		NA	13.38	--	13.65	--
Petroleum Hydrocarbons (µg/L)						
Total Petroleum Hydrocarbons		5000	100 U	100 U	100 U	100 U

TABLE F-1

REPLACEMENT WELLS
STUDY AREA 36 - MAIN BASE

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

Well Designation	CAS Number	Screening	OLD-36-01AR				OLD-36-02AR
Sample ID		Florida	OLD-36-01AR-032204	OLD-36-01AR-032204-D	OLD-36-01AR-061304	OLD-36-01AR-061304-D	17-3602ARQ202
Sample Date		GCTL[a]	03/22/04	03/22/04	06/13/04	06/13/04	05/08/02
Volatile Organics (µg/L)							
1,1,2,2-Tetrachloroethane	79-34-5	0.2	0.2 U	0.2 U	0.09 U	0.09 U	0.2 U
1,2-Dibromo-3-Chloropropane	96-12-8	0.2	1 U	1 U	1 U	1 U	0.2 U
1,2-Dichloroethane	107-06-2	3	1 U	1 U	1 U	1 U	3 U
2-Butanone	78-93-3	4200	1 U	1 U	1 U	1 U	10 U
2-Hexanone	591-78-6	280	1 U	1 U	1 U	1 U	10 U
4-Methyl-2-Pentanone	108-10-1	560	1 U	1 U	1 U	1 U	10 U
Acetone	67-64-1	700	10 U	10 U	10 U	10 U	10 U
Benzene	71-43-2	1	1 U	1 U	1 U	1 U	1 U
Bromodichloromethane	75-27-4	0.6	0.6 U	0.6 U	0.26 U	0.26 U	0.6 U
Carbon Disulfide	75-15-0	700	1 U	1 U	1 U	1 U	5 U
Chloroform	67-66-3	5.7	1 U	1 U	1 U	1 U	5 U
cis-1,2-Dichloroethene	156-59-2	70	1 U	1 U	1 U	1 U	5 U
Ethylbenzene	100-41-4	30	1 U	1 U	1 U	1 U	5 U
Methyl *tert*-Butyl Ether	1634-04-4	50	1 U	1 U	1 U	1 U	5 U
Tetrachloroethene	127-18-4	3	1 U	1 U	1 U	1 U	3 U
Trichloroethene	79-01-6	3	1 U	1 U	1 U	1 U	3 U
Vinyl Chloride	75-01-4	1	1 U	1 U	1 U	1 U	1 U
Dissolved Gases (nM/L)							
Hydrogen	1333-74-0	NA	2.6	--	2.3	--	--
Miscellaneous Parameters (mg/L)							
Acetic Acid	64-19-7	NA	1 U	--	1 U	--	--
Alkalinity		*	160	--	154	--	36.5
Butanoic Acid	107-92-6	NA	1 U	--	1 U	--	--
Chloride	16887-00-6	250000	7.06	--	17.4	--	8.29
Ethane	74-84-0	NA	0.026 U	--	0.026 U	--	1 U
Ethene	74-85-1	NA	0.026 U	--	0.026 U	--	1 U
Methane	74-82-8	*	0.407	--	0.40	--	0.00596
Nitrate	14797-55-8	10000	0.055	--	1.94	--	1.7
Nitrite	14797-65-0	1000	0.0035 U	--	0.0035 U	--	0.046
Nitrite/Nitrate		NA	--	--	--	--	--
Propionic Acid	79-09-4	NA	1 U	--	1 U	--	--
Sulfate	14808-79-8	250000	20.7	--	23.3	--	--
Sulfide	18496-25-8	NA	0.49	--	0.52	--	0.02 U
Total Dissolved Solids		NA	252	--	276	--	135
Total Organic Carbon		NA	12.56	--	12.38	--	11.4 U
Petroleum Hydrocarbons (µg/L)							
Total Petroleum Hydrocarbons		5000	200 U	210 U	220 U	211 U	100 U

TABLE F-1

REPLACEMENT WELLS
STUDY AREA 36 - MAIN BASE

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

Well Designation	CAS Number	Screening	OLD-36-02AR				
Sample ID		Florida	173602ARQ402	493602ARQ103	OLD-36-02AR-061603	OLD-36-02AR-091503	OLD-36-02AR-120203
Sample Date		GCTL[(a)]	12/03/02	03/25/03	06/16/03	09/15/03	12/02/03
Volatile Organics (µg/L)							
1,1,2,2-Tetrachloroethane	79-34-5	0.2	0.2 U	0.2 UJ	0.2 U	0.2 U	0.2 U
1,2-Dibromo-3-Chloropropane	96-12-8	0.2	0.2 UJ	0.2 U	2 U	2 U	2 U
1,2-Dichloroethane	107-06-2	3	3 U	3 U	1 U	1 U	1 U
2-Butanone	78-93-3	4200	10 U	10 U	1 U	1 U	1 U
2-Hexanone	591-78-6	280	10 U	10 U	1 U	1 U	1 U
4-Methyl-2-Pentanone	108-10-1	560	10 U	10 U	1 U	1 U	1 U
Acetone	67-64-1	700	10 U	10 U	10 U	10 U	10 U
Benzene	71-43-2	1	1 U	1 U	1 U	1 U	1 U
Bromodichloromethane	75-27-4	0.6	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U
Carbon Disulfide	75-15-0	700	5 U	5 U	2 U	2 U	2 U
Chloroform	67-66-3	5.7	5 U	5 U	1 U	1 U	1 U
cis-1,2-Dichloroethene	156-59-2	70	5 U	5 U	1 U	1 U	1 U
Ethylbenzene	100-41-4	30	5 U	5 U	1 U	1 U	1 U
Methyl *tert*-Butyl Ether	1634-04-4	50	5 U	5 U	1 U	1 U	1 U
Tetrachloroethene	127-18-4	3	3 U	3 U	1 U	1 U	1 U
Trichloroethene	79-01-6	3	3 U	3 U	1 U	2 U	2 U
Vinyl Chloride	75-01-4	1	1 U	1 U	1 U	1 U	1 U
Dissolved Gases (nM/L)							
Hydrogen	1333-74-0	NA	--	--	--	--	--
Miscellaneous Parameters (mg/L)							
Acetic Acid	64-19-7	NA	--	--	1 U	1 U	1.8
Alkalinity		*	--	--	125	117	108
Butanoic Acid	107-92-6	NA	--	--	1 U	1 U	1 U
Chloride	16887-00-6	250000	--	--	8.25	7.21	17.2
Ethane	74-84-0	NA	--	--	0.026 U	0.026 U	0.026 U
Ethene	74-85-1	NA	--	--	0.026 U	0.026 U	0.026 U
Methane	74-82-8	*	--	--	0.026 U	0.026 U	0.026 U
Nitrate	14797-55-8	10000	--	--	3.23	2.12	0.74
Nitrite	14797-65-0	1000	--	--	0.016	0.0035 U	0.052
Nitrite/Nitrate		NA	--	--	3.25	--	0.787
Propionic Acid	79-09-4	NA	--	--	1 U	1 U	1 U
Sulfate	14808-79-8	250000	--	--	--	--	37.1
Sulfide	18496-25-8	NA	--	--	0.1 U	0.1 U	0.1 U
Total Dissolved Solids		NA	--	--	276	276	224
Total Organic Carbon		NA	--	--	12.2	14.36	13.57
Petroleum Hydrocarbons (µg/L)							
Total Petroleum Hydrocarbons		5000	--	--	100 U	100 U	100 U

TABLE F-1

REPLACEMENT WELLS
STUDY AREA 36 - MAIN BASE

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

Well Designation	CAS Number	Screening	OLD-36-02AR		OLD-36-07AR	OLD-36-08BR	
Sample ID		Florida	OLD-36-02AR-032204	OLD-36-02AR-061304	OLD-36-07AR-091703	173608BRQ202	173608BRQ402
Sample Date		GCTL[a]	03/22/04	06/13/04	09/17/03	05/31/02	12/03/02
Volatile Organics (µg/L)							
1,1,2,2-Tetrachloroethane	79-34-5	0.2	0.2 U	0.09 U	0.2 U	0.2 U	0.2 U
1,2-Dibromo-3-Chloropropane	96-12-8	0.2	1 U	1 U	2 U	0.2 U	0.2 UJ
1,2-Dichloroethane	107-06-2	3	1 U	1.26	1 U	3 U	3 U
2-Butanone	78-93-3	4200	1 U	1 U	1 U	10.4	10 U
2-Hexanone	591-78-6	280	1 U	1 U	1 U	10 U	10 U
4-Methyl-2-Pentanone	108-10-1	560	1 U	1 U	1 U	10 U	10 U
Acetone	67-64-1	700	10 U	10 U	10 U	19 U	36.5
Benzene	71-43-2	1	1 U	1 U	1 U	1 U	1 U
Bromodichloromethane	75-27-4	0.6	0.6 U	0.26 U	0.6 U	0.6 U	0.6 U
Carbon Disulfide	75-15-0	700	1 U	1 U	2 U	5 U	5 U
Chloroform	67-66-3	5.7	1 U	1 U	1 U	5 U	5 U
cis-1,2-Dichloroethene	156-59-2	70	1 U	1 U	6.63	4.75 J	9.9
Ethylbenzene	100-41-4	30	1 U	1 U	1 U	5 U	5 U
Methyl *tert*-Butyl Ether	1634-04-4	50	1 U	1 U	1 U	5 U	5 U
Tetrachloroethene	127-18-4	3	1 U	1 U	1 U	3 U	3 U
Trichloroethene	79-01-6	3	1 U	12.9	3.16	54	14.1
Vinyl Chloride	75-01-4	1	1 U	1 U	1 U	1 U	1 U
Dissolved Gases (nM/L)							
Hydrogen	1333-74-0	NA	2.4	2.6	--	--	--
Miscellaneous Parameters (mg/L)							
Acetic Acid	64-19-7	NA	1 U	1 U	10	--	--
Alkalinity		*	146	178	26.4	1 U	--
Butanoic Acid	107-92-6	NA	1 U	1 U	3.6	--	--
Chloride	16887-00-6	250000	8.33	10.1	2 U	6.31	--
Ethane	74-84-0	NA	0.026 U	0.026 U	0.026 U	2.15	--
Ethene	74-85-1	NA	0.026 U	0.026 U	0.026 U	1 U	--
Methane	74-82-8	*	0.026 U	0.026 U	9.07	5.81 J	--
Nitrate	14797-55-8	10000	0.36	0.406	0.131	0.05 U	--
Nitrite	14797-65-0	1000	0.084	0.0035 U	0.0035 U	5	--
Nitrite/Nitrate		NA	--	--	--	--	--
Propionic Acid	79-09-4	NA	1 U	1 U	1	--	--
Sulfate	14808-79-8	250000	23.7	32.4	--	--	--
Sulfide	18496-25-8	NA	0.27	0.1 U	0.1 U	0.8 U	--
Total Dissolved Solids		NA	186	282	238	1310	--
Total Organic Carbon		NA	12.39	14.19	90.3	35	--
Petroleum Hydrocarbons (µg/L)							
Total Petroleum Hydrocarbons		5000	220 U	211 U	204000	1030	--

TABLE F-1

REPLACEMENT WELLS
STUDY AREA 36 - MAIN BASE

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

Well Designation	CAS Number	Screening	OLD-36-08BR				
Sample ID		Florida	493608BRQ103	OLD-36-08BR-061703	OLD-36-08BR-091603	OLD-36-08BR-120203	OLD-36-08BR-032204
Sample Date		GCTL[(a)]	03/25/03	06/17/03	09/16/03	12/02/03	03/22/04
Volatile Organics (µg/L)							
1,1,2,2-Tetrachloroethane	79-34-5	0.2	0.2 UJ	0.2 U	0.2 U	0.2 U	0.2 U
1,2-Dibromo-3-Chloropropane	96-12-8	0.2	0.2 U	2 U	2 U	2 U	1 U
1,2-Dichloroethane	107-06-2	3	3 U	1 U	1 U	1 U	1 U
2-Butanone	78-93-3	4200	10 U	10.5	1 U	1 U	1 U
2-Hexanone	591-78-6	280	40 J	1 U	1 U	1 U	1 U
4-Methyl-2-Pentanone	108-10-1	560	10 U	1 U	1 U	1 U	1 U
Acetone	67-64-1	700	10 U	14.2	10 U	10 U	10 U
Benzene	71-43-2	1	1 U	1.15	1 U	1 U	1 U
Bromodichloromethane	75-27-4	0.6	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U
Carbon Disulfide	75-15-0	700	5 U	2 U	2 U	2 U	1.03
Chloroform	67-66-3	5.7	5 U	1 U	1 U	1 U	1 U
cis-1,2-Dichloroethene	156-59-2	70	27.9	41.6	43.4	50.1	45.4
Ethylbenzene	100-41-4	30	5 U	1 U	1 U	1 U	1 U
Methyl *tert*-Butyl Ether	1634-04-4	50	5 U	1 U	1 U	1 U	1 U
Tetrachloroethene	127-18-4	3	3 U	1 U	1 U	1 U	1 U
Trichloroethene	79-01-6	3	26.8 J	20.5	7.16	2.55	1.31
Vinyl Chloride	75-01-4	1	1 U	1 U	1 U	1 U	1.07
Dissolved Gases (nM/L)							
Hydrogen	1333-74-0	NA	--	--	--	--	4.1
Miscellaneous Parameters (mg/L)							
Acetic Acid	64-19-7	NA	--	18	11	1.5	1 U
Alkalinity		*	--	52.8	62.5	54.3	66.9
Butanoic Acid	107-92-6	NA	--	5.9	1.5	1 U	1 U
Chloride	16887-00-6	250000	--	0.02 U	6.46	6.67	6.94
Ethane	74-84-0	NA	--	0.026 U	0.026 U	0.13 U	0.026 U
Ethene	74-85-1	NA	--	0.026 U	0.026 U	0.13 U	0.026 U
Methane	74-82-8	*	--	8.23	14.4	16.7	12.2
Nitrate	14797-55-8	10000	--	0.02 U	0.0031 U	0.02	0.005
Nitrite	14797-65-0	1000	--	0.005 U	0.0035 U	0.0035 U	0.0035 U
Nitrite/Nitrate		NA	--	0.018 U	--	0.018 U	--
Propionic Acid	79-09-4	NA	--	11	2.6	1 U	1 U
Sulfate	14808-79-8	250000	--	--	--	2 U	2 U
Sulfide	18496-25-8	NA	--	0.1 U	0.28	0.34	0.49
Total Dissolved Solids		NA	--	298	248	192	176
Total Organic Carbon		NA	--	88.48	32.49	17.65	13.2
Petroleum Hydrocarbons (µg/L)							
Total Petroleum Hydrocarbons		5000	--	7720	5370	1710	2090

TABLE F-1

REPLACEMENT WELLS
STUDY AREA 36 - MAIN BASE

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

Well Designation	CAS Number	Screening	OLD-36-08BR	OLD-36-09CR			
Sample ID		Florida	OLD-36-08BR-061304	173609CRQ202	173609CRQ402	493609CRQ103	OLD-36-09CR-061703
Sample Date		GCTL[a]	06/13/04	05/31/02	12/03/02	03/25/03	06/17/03
Volatile Organics (µg/L)							
1,1,2,2-Tetrachloroethane	79-34-5	0.2	0.09 U	0.817	0.2 U	0.2 UJ	0.2 U
1,2-Dibromo-3-Chloropropane	96-12-8	0.2	1 U	2.03 J	0.2 UJ	0.2 U	2 U
1,2-Dichloroethane	107-06-2	3	1 U	3 U	3 U	3 U	1 U
2-Butanone	78-93-3	4200	1 U	10 U	10 U	10 U	1 U
2-Hexanone	591-78-6	280	1 U	10 U	10 U	10 U	1 U
4-Methyl-2-Pentanone	108-10-1	560	1 U	10 U	10 U	10 U	1 U
Acetone	67-64-1	700	10 U	12.9 U	10 U	10 U	10 U
Benzene	71-43-2	1	1 U	1 U	1 U	1 U	1 U
Bromodichloromethane	75-27-4	0.6	0.26 U	1.33 J	0.6 U	0.6 U	0.6 U
Carbon Disulfide	75-15-0	700	1 U	5 U	5 U	5 U	2 U
Chloroform	67-66-3	5.7	1 U	4.34 J	5 U	5 U	1 U
cis-1,2-Dichloroethene	156-59-2	70	61	5 U	5 U	1.59 J	2.18
Ethylbenzene	100-41-4	30	1 U	5 U	5 U	5 U	1 U
Methyl *tert*-Butyl Ether	1634-04-4	50	1 U	5 U	5 U	5 U	1 U
Tetrachloroethene	127-18-4	3	1 U	3 U	3 U	3 U	1 U
Trichloroethene	79-01-6	3	1 U	25.3	4.63	6.49 J	6.96
Vinyl Chloride	75-01-4	1	1 U	1 U	1 U	1 U	1 U
Dissolved Gases (nM/L)							
Hydrogen	1333-74-0	NA	2.6	--	--	--	--
Miscellaneous Parameters (mg/L)							
Acetic Acid	64-19-7	NA	1 U	--	--	--	1 U
Alkalinity		*	56.2	12.2	--	--	1 U
Butanoic Acid	107-92-6	NA	1 U	--	--	--	1 U
Chloride	16887-00-6	250000	4.69	10.3	--	--	13.5
Ethane	74-84-0	NA	0.13 U	1 U	--	--	0.026 U
Ethene	74-85-1	NA	0.13 U	1 U	--	--	0.026 U
Methane	74-82-8	*	9.98	1.31	--	--	1.38
Nitrate	14797-55-8	10000	0.025	0.07 U	--	--	0.02 U
Nitrite	14797-65-0	1000	0.0035 U	0.2	--	--	0.012
Nitrite/Nitrate		NA	--	--	--	--	0.018 U
Propionic Acid	79-09-4	NA	1 U	--	--	--	1 U
Sulfate	14808-79-8	250000	2 U	--	--	--	--
Sulfide	18496-25-8	NA	0.1 U	0.2 U	--	--	0.1 U
Total Dissolved Solids		NA	170	176	--	--	148
Total Organic Carbon		NA	13.12	7.2 U	--	--	5.29
Petroleum Hydrocarbons (µg/L)							
Total Petroleum Hydrocarbons		5000	560	295 U	--	--	100 U

TABLE F-1

REPLACEMENT WELLS
STUDY AREA 36 - MAIN BASE

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

Well Designation	CAS Number	Screening	OLD-36-09CR				OLD-36-10BR
Sample ID		Florida	OLD-36-09CR-091603	OLD-36-09CR-120303	OLD-36-09CR-032204	OLD-36-09CR-061304	173610BRQ202
Sample Date		GCTL[a]	09/16/03	12/03/03	03/22/04	06/13/04	04/26/02
Volatile Organics (µg/L)							
1,1,2,2-Tetrachloroethane	79-34-5	0.2	0.2 U	0.2 U	0.2 U	0.09 U	1 U
1,2-Dibromo-3-Chloropropane	96-12-8	0.2	2 U	2 U	1 U	1 U	1 U
1,2-Dichloroethane	107-06-2	3	1 U	1 U	1 U	1 U	1 U
2-Butanone	78-93-3	4200	1 U	1 U	1 U	1 U	--
2-Hexanone	591-78-6	280	1 U	1 U	1 U	1 U	--
4-Methyl-2-Pentanone	108-10-1	560	1 U	1 U	1 U	1 U	--
Acetone	67-64-1	700	10 U	10 U	10 U	10 U	--
Benzene	71-43-2	1	1 U	1 U	1 U	1 U	1 U
Bromodichloromethane	75-27-4	0.6	0.6 U	0.6 U	0.6 U	0.26 U	1 U
Carbon Disulfide	75-15-0	700	2 U	2 U	1 U	1 U	--
Chloroform	67-66-3	5.7	1 U	1 U	1 U	1 U	1 U
cis-1,2-Dichloroethene	156-59-2	70	1.71	3.5	8.39	14.9	1.2
Ethylbenzene	100-41-4	30	1 U	1 U	1 U	1 U	1 U
Methyl *tert*-Butyl Ether	1634-04-4	50	1 U	1 U	1 U	1 U	--
Tetrachloroethene	127-18-4	3	1 U	1 U	1 U	1 U	1 U
Trichloroethene	79-01-6	3	6.13	16.6	27.3	43	0.44 J
Vinyl Chloride	75-01-4	1	1 U	1 U	1 U	1 U	1 U
Dissolved Gases (nM/L)							
Hydrogen	1333-74-0	NA	--	--	2.7	2.4	--
Miscellaneous Parameters (mg/L)							
Acetic Acid	64-19-7	NA	1 U	1 U	1 U	1 U	--
Alkalinity		*	1 U	1 U	1 U	1 U	--
Butanoic Acid	107-92-6	NA	1 U	1 U	1 U	1 U	--
Chloride	16887-00-6	250000	7.09	5.14	6.36	6.77	--
Ethane	74-84-0	NA	0.026 U	0.026 U	0.026 U	0.026 U	--
Ethene	74-85-1	NA	0.026 U	0.026 U	0.026 U	0.026 U	--
Methane	74-82-8	*	2.55	1.83 U	3.16	3.23	--
Nitrate	14797-55-8	10000	0.0031 U	0.0031 U	0.0031 U	0.0031 U	--
Nitrite	14797-65-0	1000	0.0035 U	0.0035 U	0.0035 U	0.0035 U	--
Nitrite/Nitrate		NA	--	--	--	--	--
Propionic Acid	79-09-4	NA	1 U	1 U	1 U	1 U	--
Sulfate	14808-79-8	250000	--	14.2	14.1	8.97	--
Sulfide	18496-25-8	NA	0.1 U	0.1 U	1.9	0.1 U	--
Total Dissolved Solids		NA	302	146	92	148	--
Total Organic Carbon		NA	8.78	4.51	5.55	5.5	--
Petroleum Hydrocarbons (µg/L)							
Total Petroleum Hydrocarbons		5000	100 U	100 U	210 U	222 U	--

TABLE F-1

REPLACEMENT WELLS
STUDY AREA 36 - MAIN BASE

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

Well Designation	CAS Number	Screening	OLD-36-10BR					
Sample ID		Florida	17-3610BRQ202	173610BRQ402	493610BRQ103	OLD-36-10BR-061603	OLD-36-10BR-120203	OLD-36-10BR-032204
Sample Date		GCTL[a]	05/07/02	12/02/02	03/25/03	06/16/03	12/02/03	03/22/04
Volatile Organics (µg/L)								
1,1,2,2-Tetrachloroethane	79-34-5	0.2	0.2 U	0.2 U	0.2 UJ	0.2 U	0.2 U	0.2 U
1,2-Dibromo-3-Chloropropane	96-12-8	0.2	0.2 U	0.2 UJ	0.2 U	2 U	2 U	1 U
1,2-Dichloroethane	107-06-2	3	3 U	3 U	3 U	1 U	1 U	1 U
2-Butanone	78-93-3	4200	10 U	10 U	10 U	1 U	1 U	1 U
2-Hexanone	591-78-6	280	10 U	10 U	10 U	1 U	1 U	1 U
4-Methyl-2-Pentanone	108-10-1	560	10 U	10 U	10 U	1 U	1 U	1 U
Acetone	67-64-1	700	20.5 U	10 U	10 U	10 U	10 U	10 U
Benzene	71-43-2	1	1 U	1 U	1 U	1 U	1 U	1 U
Bromodichloromethane	75-27-4	0.6	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U
Carbon Disulfide	75-15-0	700	5 U	5 U	5 U	2 U	2 U	1 U
Chloroform	67-66-3	5.7	5 U	5 U	5 U	1 U	1 U	1 U
cis-1,2-Dichloroethene	156-59-2	70	1.27 J	4.21 J	1.6 J	1.58	4.63	5.77
Ethylbenzene	100-41-4	30	5 U	5 U	5 U	1 U	1 U	1 U
Methyl *tert*-Butyl Ether	1634-04-4	50	5 U	5 U	5 U	1 U	1 U	1 U
Tetrachloroethene	127-18-4	3	3 U	3 U	3 U	1 U	1 U	1 U
Trichloroethene	79-01-6	3	1.06 J	3 U	1.42 J	1.8	2.34	2.11
Vinyl Chloride	75-01-4	1	1 U	1 U	1 U	1 U	1 U	1 U
Dissolved Gases (nM/L)								
Hydrogen	1333-74-0	NA	--	--	--	--	--	2.4
Miscellaneous Parameters (mg/L)								
Acetic Acid	64-19-7	NA	--	--	--	1 U	1 U	1 U
Alkalinity		*	86.4	--	--	65.5	52	55
Butanoic Acid	107-92-6	NA	--	--	--	1 U	1 U	1 U
Chloride	16887-00-6	250000	4.38	--	--	6.98	10.1	5.25
Ethane	74-84-0	NA	1 U	--	--	0.026 U	0.026 U	0.026 U
Ethene	74-85-1	NA	1 U	--	--	0.026 U	0.026 U	0.026 U
Methane	74-82-8	*	1.32	--	--	0.93	0.052	0.026 U
Nitrate	14797-55-8	10000	0.01 U	--	--	0.02 U	0.02	0.01
Nitrite	14797-65-0	1000	1.39	--	--	0.005 U	0.0035 U	0.0035 U
Nitrite/Nitrate		NA	--	--	--	0.018 U	0.018 U	--
Propionic Acid	79-09-4	NA	--	--	--	1 U	1 U	1 U
Sulfate	14808-79-8	250000	--	--	--	--	17.3	17.9
Sulfide	18496-25-8	NA	0.065	--	--	0.1 U	0.1 U	0.49
Total Dissolved Solids		NA	280	--	--	176	136	134
Total Organic Carbon		NA	48.3	--	--	7.31	7.78	7.46
Petroleum Hydrocarbons (µg/L)								
Total Petroleum Hydrocarbons		5000	100 U	--	--	100 U	100 U	200 U

TABLE F-1

REPLACEMENT WELLS
STUDY AREA 36 - MAIN BASE

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

Well Designation	CAS Number	Screening	OLD-36-10BR	OLD-36-11CR			
Sample ID		Florida	OLD-36-10BR-061304	173611CRQ202	173611CRQ402	493611CRQ103	OLD-36-11CR-061603
Sample Date		GCTL[(a)]	06/13/04	05/31/02	12/02/02	03/25/03	06/16/03
Volatile Organics (µg/L)							
1,1,2,2-Tetrachloroethane	79-34-5	0.2	0.09 U	0.2 U	0.2 U	0.2 UJ	0.2 U
1,2-Dibromo-3-Chloropropane	96-12-8	0.2	1 U	1.42 J	0.2 UJ	0.2 U	2 U
1,2-Dichloroethane	107-06-2	3	1 U	3 U	3 U	3 U	1 U
2-Butanone	78-93-3	4200	1 U	3.69 J	10 U	10 U	1 U
2-Hexanone	591-78-6	280	1 U	1.34 J	10 U	10 U	1 U
4-Methyl-2-Pentanone	108-10-1	560	1 U	1.4 J	10 U	10 U	1 U
Acetone	67-64-1	700	10 U	10 U	10 U	10 U	10 U
Benzene	71-43-2	1	1 U	1 U	1 U	1 U	1 U
Bromodichloromethane	75-27-4	0.6	0.26 U	0.6 U	0.6 U	0.6 U	0.6 U
Carbon Disulfide	75-15-0	700	1 U	5 U	5 U	5 U	2 U
Chloroform	67-66-3	5.7	1 U	5 U	5 U	5 U	1 U
cis-1,2-Dichloroethene	156-59-2	70	7.61	1.57 J	5.85	5 U	1 U
Ethylbenzene	100-41-4	30	1 U	5 U	5 U	5 U	1 U
Methyl *tert*-Butyl Ether	1634-04-4	50	1 U	5 U	5 U	5 U	1 U
Tetrachloroethene	127-18-4	3	1 U	3 U	3 U	3 U	1 U
Trichloroethene	79-01-6	3	1.48	1.43 J	3 U	3 U	1 U
Vinyl Chloride	75-01-4	1	1 U	1 U	1 U	1 U	1 U
Dissolved Gases (nM/L)							
Hydrogen	1333-74-0	NA	2.5	--	--	--	--
Miscellaneous Parameters (mg/L)							
Acetic Acid	64-19-7	NA	1 U	--	--	--	1 U
Alkalinity		*	59.8	19.8	--	--	40
Butanoic Acid	107-92-6	NA	1 U	--	--	--	1 U
Chloride	16887-00-6	250000	4.59	6.43	--	--	0.02 U
Ethane	74-84-0	NA	0.026 U	1 U	--	--	0.026 U
Ethene	74-85-1	NA	0.026 U	1 U	--	--	0.026 U
Methane	74-82-8	*	0.162	0.023	--	--	0.302
Nitrate	14797-55-8	10000	0.0031 U	0.17 U	--	--	0.02 U
Nitrite	14797-65-0	1000	0.0035 U	0.02	--	--	0.022
Nitrite/Nitrate		NA	--	--	--	--	0.018 U
Propionic Acid	79-09-4	NA	1 U	--	--	--	1 U
Sulfate	14808-79-8	250000	15.7	--	--	--	--
Sulfide	18496-25-8	NA	0.52	0.2 U	--	--	0.1 U
Total Dissolved Solids		NA	128	125	--	--	194
Total Organic Carbon		NA	10.02	4.8 U	--	--	8.1
Petroleum Hydrocarbons (µg/L)							
Total Petroleum Hydrocarbons		5000	211 U	112 U	--	--	100 U

TABLE F-1

REPLACEMENT WELLS
STUDY AREA 36 - MAIN BASE

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

Well Designation	CAS Number	Screening	OLD-36-11CR				OLD-36-18CR
Sample ID		Florida	OLD-36-11CR-091503	OLD-36-11CR-120203	OLD-36-11CR-032204	OLD-36-11CR-061304	173618CRQ202
Sample Date		GCTL[(a)]	09/15/03	12/02/03	03/22/04	06/13/04	05/31/02
Volatile Organics (µg/L)							
1,1,2,2-Tetrachloroethane	79-34-5	0.2	0.2 U	0.2 U	0.2 U	0.09 U	0.2 U
1,2-Dibromo-3-Chloropropane	96-12-8	0.2	2 U	2 U	1 U	1 U	0.2 U
1,2-Dichloroethane	107-06-2	3	1 U	1 U	1 U	1 U	3 U
2-Butanone	78-93-3	4200	1 U	1 U	1 U	1 U	10 U
2-Hexanone	591-78-6	280	1 U	1 U	1 U	1 U	10 U
4-Methyl-2-Pentanone	108-10-1	560	1 U	1 U	1 U	1 U	10 U
Acetone	67-64-1	700	10 U	10 U	10 U	10 U	10 U
Benzene	71-43-2	1	1 U	1 U	1 U	1 U	1 U
Bromodichloromethane	75-27-4	0.6	0.6 U	0.6 U	0.6 U	0.26 U	2.02 J
Carbon Disulfide	75-15-0	700	2 U	2 U	1 U	1 U	5 U
Chloroform	67-66-3	5.7	1 U	1 U	1 U	1 U	6.39
cis-1,2-Dichloroethene	156-59-2	70	1 U	1.07	1.6	1.94	5 U
Ethylbenzene	100-41-4	30	1 U	1 U	1 U	1 U	5 U
Methyl *tert*-Butyl Ether	1634-04-4	50	1 U	1 U	1 U	1 U	5 U
Tetrachloroethene	127-18-4	3	1 U	1 U	1 U	1 U	3 U
Trichloroethene	79-01-6	3	2 U	2 U	1 U	1 U	3 U
Vinyl Chloride	75-01-4	1	1 U	1 U	1 U	1 U	1 U
Dissolved Gases (nM/L)							
Hydrogen	1333-74-0	NA	--	--	2.3	2.5	--
Miscellaneous Parameters (mg/L)							
Acetic Acid	64-19-7	NA	1 U	1 U	1 U	1 U	--
Alkalinity		*	42.2	45.1	46.2	89.5	18.2
Butanoic Acid	107-92-6	NA	1 U	1 U	1 U	1 U	--
Chloride	16887-00-6	250000	8.94	6.26	6.39	5.1	7.02
Ethane	74-84-0	NA	0.026 U	0.026 U	0.026 U	0.026 U	1 U
Ethene	74-85-1	NA	0.026 U	0.026 U	0.026 U	0.026 U	1 U
Methane	74-82-8	*	0.934	0.387	0.351	1.04	0.0224
Nitrate	14797-55-8	10000	0.0031 U	0.02	0.0031 U	0.0031 U	0.01 U
Nitrite	14797-65-0	1000	0.0035 U	0.0035 U	0.0035 U	0.0035 U	0.43 J
Nitrite/Nitrate		NA	--	0.018 U	--	--	--
Propionic Acid	79-09-4	NA	1 U	1 U	1 U	1 U	--
Sulfate	14808-79-8	250000	--	24.1	23.7	22.6	--
Sulfide	18496-25-8	NA	0.1 U	0.1 U	0.1 U	0.52	0.2 U
Total Dissolved Solids		NA	150	146	126	112	649 J
Total Organic Carbon		NA	7.81	7.38	7.55	8.68	6 U
Petroleum Hydrocarbons (µg/L)							
Total Petroleum Hydrocarbons		5000	100 U	100 U	200 U	211 U	100 U

TABLE F-1

REPLACEMENT WELLS
STUDY AREA 36 - MAIN BASE

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

Well Designation	CAS Number	Screening	OLD-36-18CR				
Sample ID		Florida	173618CRQ402	493618CRQ103	OLD-36-18CR-061703	OLD-36-18CR-091603	OLD-36-18CR-120203
Sample Date		GCTL[a]	12/02/02	03/26/03	06/17/03	09/16/03	12/02/03
Volatile Organics (µg/L)							
1,1,2,2-Tetrachloroethane	79-34-5	0.2	0.2 U	0.2 UJ	0.2 U	0.2 U	0.2 U
1,2-Dibromo-3-Chloropropane	96-12-8	0.2	0.2 UJ	0.2 U	2 U	2 U	2 U
1,2-Dichloroethane	107-06-2	3	3 U	3 U	1 U	1 U	1 U
2-Butanone	78-93-3	4200	10 U	10 U	1 U	1 U	1 U
2-Hexanone	591-78-6	280	10 U	10 U	1 U	1 U	1 U
4-Methyl-2-Pentanone	108-10-1	560	10 U	10 U	1 U	1 U	1 U
Acetone	67-64-1	700	10 U	10 U	10 U	10 U	10 U
Benzene	71-43-2	1	1 U	1 U	1 U	1 U	1 U
Bromodichloromethane	75-27-4	0.6	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U
Carbon Disulfide	75-15-0	700	5 U	4.01 J	2 U	2 U	2 U
Chloroform	67-66-3	5.7	5 U	5 U	1 U	1 U	1 U
cis-1,2-Dichloroethene	156-59-2	70	5 U	5 U	1 U	1 U	1 U
Ethylbenzene	100-41-4	30	5 U	5 U	1 U	1 U	1 U
Methyl *tert*-Butyl Ether	1634-04-4	50	5 U	5 U	1 U	1 U	1 U
Tetrachloroethene	127-18-4	3	3 U	3 U	1 U	1 U	1 U
Trichloroethene	79-01-6	3	3 U	3 U	1 U	2 U	2 U
Vinyl Chloride	75-01-4	1	1 U	1 U	1 U	1 U	1 U
Dissolved Gases (nM/L)							
Hydrogen	1333-74-0	NA	--	--	--	--	--
Miscellaneous Parameters (mg/L)							
Acetic Acid	64-19-7	NA	--	--	1 U	1 U	1 U
Alkalinity		*	--	--	2.6	2.4	1 U
Butanoic Acid	107-92-6	NA	--	--	1 U	1 U	1 U
Chloride	16887-00-6	250000	--	--	0.02 U	2 U	2 U
Ethane	74-84-0	NA	--	--	0.026 U	0.026 U	0.026 U
Ethene	74-85-1	NA	--	--	0.026 U	0.026 U	0.026 U
Methane	74-82-8	*	--	--	0.186	0.141	0.026 U
Nitrate	14797-55-8	10000	--	--	0.03	0.0031 U	0.02
Nitrite	14797-65-0	1000	--	--	0.005 U	0.0035 U	0.0035 U
Nitrite/Nitrate		NA	--	--	0.029	--	0.018 U
Propionic Acid	79-09-4	NA	--	--	1 U	1 U	1 U
Sulfate	14808-79-8	250000	--	--	--	--	21.2
Sulfide	18496-25-8	NA	--	--	0.1 U	0.1 U	0.1 U
Total Dissolved Solids		NA	--	--	70	76	186
Total Organic Carbon		NA	--	--	3.95	3.03	7.25
Petroleum Hydrocarbons (µg/L)							
Total Petroleum Hydrocarbons		5000	--	--	100 U	100 U	100 U

TABLE F-1

REPLACEMENT WELLS
STUDY AREA 36 - MAIN BASE

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

Well Designation	CAS Number	Screening	OLD-36-18CR		OLD-36-19AR		
Sample ID		Florida	OLD-36-18CR-032204	OLD-36-18CR-061304	17-3619ARQ202	173619ARQ402	493619ARQ103
Sample Date		GCTL[(a)]	03/22/04	06/13/04	05/07/02	12/03/02	03/25/03
Volatile Organics (µg/L)							
1,1,2,2-Tetrachloroethane	79-34-5	0.2	0.2 U	0.09 U	0.2 U	0.2 U	0.2 UJ
1,2-Dibromo-3-Chloropropane	96-12-8	0.2	1 U	1 U	0.2 U	0.2 UJ	0.2 U
1,2-Dichloroethane	107-06-2	3	1 U	1 U	3 U	3 U	3 U
2-Butanone	78-93-3	4200	1 U	1 U	10 U	10 U	10 U
2-Hexanone	591-78-6	280	1 U	1 U	10 U	10 U	10 U
4-Methyl-2-Pentanone	108-10-1	560	1 U	1 U	10 U	10 U	10 U
Acetone	67-64-1	700	10 U	10 U	10 U	10 U	10 U
Benzene	71-43-2	1	1 U	1 U	1 U	1 U	1 U
Bromodichloromethane	75-27-4	0.6	0.6 U	0.26 U	0.6 U	0.6 U	0.6 U
Carbon Disulfide	75-15-0	700	1 U	2.07	5 U	5 U	5 U
Chloroform	67-66-3	5.7	1 U	1 U	5 U	5 U	5 U
cis-1,2-Dichloroethene	156-59-2	70	1 U	1 U	5 U	5 U	5 U
Ethylbenzene	100-41-4	30	1 U	1 U	5 U	5 U	5 U
Methyl *tert*-Butyl Ether	1634-04-4	50	1 U	1 U	5 U	5 U	5 U
Tetrachloroethene	127-18-4	3	1 U	1 U	3 U	3 U	3 U
Trichloroethene	79-01-6	3	1 U	1 U	3 U	3 U	3 U
Vinyl Chloride	75-01-4	1	1 U	1 U	1 U	1 U	1 U
Dissolved Gases (nM/L)							
Hydrogen	1333-74-0	NA	2.2	2.2	--	--	--
Miscellaneous Parameters (mg/L)							
Acetic Acid	64-19-7	NA	1 U	1 U	--	--	--
Alkalinity		*	1 U	8.1	14.8	--	--
Butanoic Acid	107-92-6	NA	1 U	1 U	--	--	--
Chloride	16887-00-6	250000	3.69	3.44	3.05	--	--
Ethane	74-84-0	NA	0.026 U	0.026 U	1 U	--	--
Ethene	74-85-1	NA	0.026 U	0.026 U	1 U	--	--
Methane	74-82-8	*	0.026 U	0.026 U	0.002 U	--	--
Nitrate	14797-55-8	10000	0.006	0.0031 U	2.52	--	--
Nitrite	14797-65-0	1000	0.0035 U	0.0035 U	0.029	--	--
Nitrite/Nitrate		NA	--	--	--	--	--
Propionic Acid	79-09-4	NA	1 U	1 U	--	--	--
Sulfate	14808-79-8	250000	22.4	19.1	--	--	--
Sulfide	18496-25-8	NA	0.1 U	0.52	0.02 U	--	--
Total Dissolved Solids		NA	422	354	67	--	--
Total Organic Carbon		NA	5.37	10.12	3.2 U	--	--
Petroleum Hydrocarbons (µg/L)							
Total Petroleum Hydrocarbons		5000	200 U	220 U	100 U	--	--

TABLE F-1

REPLACEMENT WELLS
STUDY AREA 36 - MAIN BASE

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

Well Designation	CAS Number	Screening	OLD-36-19AR				
Sample ID		Florida	OLD-36-19AR-061703	OLD-36-19AR-091703	OLD-36-19AR-120203	OLD-36-19AR-032204	OLD-36-19AR-061304
Sample Date		GCTL[(a)]	06/17/03	09/17/03	12/02/03	03/22/04	06/13/04
Volatile Organics (µg/L)							
1,1,2,2-Tetrachloroethane	79-34-5	0.2	0.2 U	0.2 U	0.2 U	0.2 U	0.09 U
1,2-Dibromo-3-Chloropropane	96-12-8	0.2	2 U	2 U	2 U	1 U	1 U
1,2-Dichloroethane	107-06-2	3	1 U	1 U	1 U	1 U	1 U
2-Butanone	78-93-3	4200	1 U	1 U	1 U	1 U	1 U
2-Hexanone	591-78-6	280	1 U	1 U	1 U	1 U	1 U
4-Methyl-2-Pentanone	108-10-1	560	1 U	1 U	1 U	1 U	1 U
Acetone	67-64-1	700	10 U	10 U	10 U	10 U	10 U
Benzene	71-43-2	1	1 U	1 U	1 U	1 U	1 U
Bromodichloromethane	75-27-4	0.6	0.6 U	0.6 U	0.6 U	0.6 U	0.26 U
Carbon Disulfide	75-15-0	700	2 U	2 U	2 U	1 U	1 U
Chloroform	67-66-3	5.7	1 U	1 U	1 U	1 U	1 U
cis-1,2-Dichloroethene	156-59-2	70	1 U	1 U	1 U	1 U	1 U
Ethylbenzene	100-41-4	30	1 U	1 U	1 U	1 U	1 U
Methyl *tert*-Butyl Ether	1634-04-4	50	1 U	1 U	1 U	1 U	1 U
Tetrachloroethene	127-18-4	3	1 U	1 U	1 U	1 U	1 U
Trichloroethene	79-01-6	3	1 U	2 U	2 U	1 U	1 U
Vinyl Chloride	75-01-4	1	1 U	1 U	1 U	1 U	1 U
Dissolved Gases (nM/L)							
Hydrogen	1333-74-0	NA	--	--	--	2	2.3
Miscellaneous Parameters (mg/L)							
Acetic Acid	64-19-7	NA	1 U	1 U	1 U	1 U	1 U
Alkalinity		*	152	112	142	133	158
Butanoic Acid	107-92-6	NA	1 U	1 U	1 U	1 U	1 U
Chloride	16887-00-6	250000	7.32	15.1	17.2 U	21.3	18.3
Ethane	74-84-0	NA	0.026 U	0.026 U	0.026 U	0.026 U	0.026 U
Ethene	74-85-1	NA	0.026 U	0.115	0.026 U	0.026 U	0.026 U
Methane	74-82-8	*	0.026 U	0.132	0.026 U	0.026 U	0.026 U
Nitrate	14797-55-8	10000	2.16	1.34	1.01	2.39	3.74
Nitrite	14797-65-0	1000	0.005 U	0.0035 U	0.0035 U	0.0035 U	0.0035 U
Nitrite/Nitrate		NA	2.16	--	1.01	--	--
Propionic Acid	79-09-4	NA	1 U	1 U	1 U	1 U	1 U
Sulfate	14808-79-8	250000	--	--	37.1	41.3	52.6
Sulfide	18496-25-8	NA	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Total Dissolved Solids		NA	256	298	272	234	314
Total Organic Carbon		NA	8.64	8.96	6.98	5.49	11.61
Petroleum Hydrocarbons (µg/L)							
Total Petroleum Hydrocarbons		5000	100 U	100 U	100 U	210 U	211 U

TABLE F-1

REPLACEMENT WELLS
STUDY AREA 36 - MAIN BASE

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

Well Designation	CAS Number	Screening	OLD-36-20BR		OLD-36-20BR		
Sample ID		Florida	17-3620BRQ202	173620BRQ402	493620BRQ103	OLD-36-20BR-061703	OLD-36-20BR-091603
Sample Date		GCTL[(a)]	05/07/02	12/03/02	03/25/03	06/17/03	09/16/03
Volatile Organics (µg/L)							
1,1,2,2-Tetrachloroethane	79-34-5	0.2	0.2 U	0.2 U	0.2 UJ	0.2 U	0.2 U
1,2-Dibromo-3-Chloropropane	96-12-8	0.2	0.2 U	0.2 UJ	0.2 U	2 U	2 U
1,2-Dichloroethane	107-06-2	3	3 U	3 U	3 U	1 U	1 U
2-Butanone	78-93-3	4200	10 U	10 U	10 U	1 U	1 U
2-Hexanone	591-78-6	280	10 U	10 U	10 U	1 U	1 U
4-Methyl-2-Pentanone	108-10-1	560	10 U	10 U	10 U	1 U	1 U
Acetone	67-64-1	700	10 U	10 U	10 U	10 U	10 U
Benzene	71-43-2	1	1 U	1 U	1 U	1 U	1 U
Bromodichloromethane	75-27-4	0.6	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U
Carbon Disulfide	75-15-0	700	5 U	5 U	5 U	2 U	2 U
Chloroform	67-66-3	5.7	5 U	5 U	5 U	1 U	1 U
cis-1,2-Dichloroethene	156-59-2	70	5 U	5 U	5 U	1 U	1 U
Ethylbenzene	100-41-4	30	5 U	5 U	5 U	1 U	1 U
Methyl *tert*-Butyl Ether	1634-04-4	50	5 U	5 U	5 U	1 U	1 U
Tetrachloroethene	127-18-4	3	3 U	3 U	3 U	1 U	1 U
Trichloroethene	79-01-6	3	3 U	3 U	3 U	1 U	2 U
Vinyl Chloride	75-01-4	1	1 U	1 U	1 U	1 U	1 U
Dissolved Gases (nM/L)							
Hydrogen	1333-74-0	NA	--	--	--	--	--
Miscellaneous Parameters (mg/L)							
Acetic Acid	64-19-7	NA	--	--	--	1 U	1 U
Alkalinity		*	17.8	--	--	62.5	105
Butanoic Acid	107-92-6	NA	--	--	--	1 U	1 U
Chloride	16887-00-6	250000	2.93	--	--	8.65	15
Ethane	74-84-0	NA	1 U	--	--	0.026 U	0.026 U
Ethene	74-85-1	NA	1 U	--	--	0.026 U	0.026 U
Methane	74-82-8	*	0.002 U	--	--	0.026 U	0.026 U
Nitrate	14797-55-8	10000	0.211 U	--	--	3.84	1.86
Nitrite	14797-65-0	1000	0.077	--	--	0.005 U	0.0035 U
Nitrite/Nitrate		NA	--	--	--	3.84	--
Propionic Acid	79-09-4	NA	--	--	--	1 U	1 U
Sulfate	14808-79-8	250000	--	--	--	--	--
Sulfide	18496-25-8	NA	0.02 U	--	--	0.1 U	0.1 U
Total Dissolved Solids		NA	93	--	--	258	232
Total Organic Carbon		NA	6.9 U	--	--	7.61	10.3
Petroleum Hydrocarbons (µg/L)							
Total Petroleum Hydrocarbons		5000	100 U	--	--	100 U	100 U

TABLE F-1

REPLACEMENT WELLS
STUDY AREA 36 - MAIN BASE

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

Well Designation	CAS Number	Screening	OLD-36-20BR			OLD-36-22BR		
Sample ID		Florida GCTL[a]	OLD-36-20BR-120203	OLD-36-20BR-032204	OLD-36-20BR-061304	17-3622BRQ202	173622BRQ402	493622BRQ103
Sample Date			12/02/03	03/22/04	06/13/04	05/08/02	12/03/02	03/25/03
Volatile Organics (µg/L)								
1,1,2,2-Tetrachloroethane	79-34-5	0.2	0.2 U	0.2 U	0.09 U	0.2 U	0.2 U	0.2 UJ
1,2-Dibromo-3-Chloropropane	96-12-8	0.2	2 U	1 U	1 U	0.2 U	0.2 UJ	0.2 U
1,2-Dichloroethane	107-06-2	3	1 U	1 U	1 U	3 U	3 U	3 U
2-Butanone	78-93-3	4200	1 U	1 U	1 U	10 U	10 U	10 U
2-Hexanone	591-78-6	280	1 U	1 U	1 U	10 U	10 U	10 U
4-Methyl-2-Pentanone	108-10-1	560	1 U	1 U	1 U	10 U	10 U	10 U
Acetone	67-64-1	700	10 U	10 U	10 U	10 U	10 U	10 U
Benzene	71-43-2	1	1 U	1 U	1 U	1 U	1 U	1 U
Bromodichloromethane	75-27-4	0.6	0.6 U	0.6 U	0.26 U	0.6 U	0.6 U	0.6 U
Carbon Disulfide	75-15-0	700	2 U	1 U	1 U	5 U	5 U	5 U
Chloroform	67-66-3	5.7	1 U	1 U	1 U	5 U	5 U	5 U
cis-1,2-Dichloroethene	156-59-2	70	1 U	1 U	1 U	4.12 J	5 U	5 U
Ethylbenzene	100-41-4	30	1 U	1 U	1 U	5 U	5 U	5 U
Methyl *tert*-Butyl Ether	1634-04-4	50	1 U	1 U	1 U	5 U	5 U	5 U
Tetrachloroethene	127-18-4	3	1 U	1 U	1 U	3.66	1.25 J	2.1 J
Trichloroethene	79-01-6	3	2 U	1 U	1 U	3.54	3 U	2.25 J
Vinyl Chloride	75-01-4	1	1 U	1 U	1 U	1 U	1 U	1 U
Dissolved Gases (nM/L)								
Hydrogen	1333-74-0	NA	--	2.2	2.4	--	--	--
Miscellaneous Parameters (mg/L)								
Acetic Acid	64-19-7	NA	1 U	1 U	1 U	--	--	--
Alkalinity		*	106	110	120	2.8	--	--
Butanoic Acid	107-92-6	NA	1 U	1 U	1 U	--	--	--
Chloride	16887-00-6	250000	19.1	21.7	18.8	5.9	--	--
Ethane	74-84-0	NA	0.026 U	0.026 U	0.026 U	1 U	--	--
Ethene	74-85-1	NA	0.026 U	0.026 U	0.026 U	1 U	--	--
Methane	74-82-8	*	0.026 U	0.026 U	0.026 U	0.197 J	--	--
Nitrate	14797-55-8	10000	0.89	2.26	1.28	0.3 U	--	--
Nitrite	14797-65-0	1000	0.066	0.911	0.034	0.1	--	--
Nitrite/Nitrate		NA	0.96	--	--	--	--	--
Propionic Acid	79-09-4	NA	1 U	1 U	1 U	--	--	--
Sulfate	14808-79-8	250000	33	40.9	41.6	--	--	--
Sulfide	18496-25-8	NA	0.1 U	0.16	0.1 U	0.079	--	--
Total Dissolved Solids		NA	236	262	252	68	--	--
Total Organic Carbon		NA	10.95	8.22	10.74	18.2	--	--
Petroleum Hydrocarbons (µg/L)								
Total Petroleum Hydrocarbons		5000	100 U	210 U	204 U	225 U	--	--

TABLE F-1

REPLACEMENT WELLS
STUDY AREA 36 - MAIN BASE

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

Well Designation	CAS Number	Screening Florida GCTL[a]	OLD-36-22BR			
Sample ID			OLD-36-22BR-061603	OLD-36-22BR-091503	OLD-36-22BR-120203	OLD-36-22BR-032204
Sample Date			06/16/03	09/15/03	12/02/03	03/22/04
Volatile Organics (µg/L)						
1,1,2,2-Tetrachloroethane	79-34-5	0.2	0.2 U	0.2 U	0.2 U	0.2 U
1,2-Dibromo-3-Chloropropane	96-12-8	0.2	2 U	2 U	2 U	1 U
1,2-Dichloroethane	107-06-2	3	1 U	1 U	1 U	1 U
2-Butanone	78-93-3	4200	1 U	1 U	1 U	1 U
2-Hexanone	591-78-6	280	1 U	1 U	1 U	1 U
4-Methyl-2-Pentanone	108-10-1	560	1 U	1 U	1 U	1 U
Acetone	67-64-1	700	10 U	10 U	10 U	10 U
Benzene	71-43-2	1	1 U	1 U	1 U	1 U
Bromodichloromethane	75-27-4	0.6	0.6 U	0.6 U	0.6 U	0.6 U
Carbon Disulfide	75-15-0	700	2 U	2 U	2 U	1 U
Chloroform	67-66-3	5.7	1 U	1 U	1 U	1 U
cis-1,2-Dichloroethene	156-59-2	70	1 U	1 U	1 U	1 U
Ethylbenzene	100-41-4	30	1 U	1 U	1 U	1 U
Methyl *tert*-Butyl Ether	1634-04-4	50	1 U	1 U	1 U	1 U
Tetrachloroethene	127-18-4	3	1 U	1 U	1 U	1 U
Trichloroethene	79-01-6	3	1 U	2 U	2 U	1 U
Vinyl Chloride	75-01-4	1	1 U	1 U	1 U	1 U
Dissolved Gases (nM/L)						
Hydrogen	1333-74-0	NA	--	--	--	2.4
Miscellaneous Parameters (mg/L)						
Acetic Acid	64-19-7	NA	1 U	1 U	1 U	1 U
Alkalinity		*	22	1 U	1 U	5.3
Butanoic Acid	107-92-6	NA	1 U	1 U	1 U	1 U
Chloride	16887-00-6	250000	7.3	5.62	5.63	8.25
Ethane	74-84-0	NA	0.026 U	0.026 U	0.026 U	0.026 U
Ethene	74-85-1	NA	0.026 U	0.026 U	0.026 U	0.026 U
Methane	74-82-8	*	0.026 U	0.026 U	0.232	0.026 U
Nitrate	14797-55-8	10000	0.07	0.199	0.02	0.013
Nitrite	14797-65-0	1000	0.005 U	0.0035 U	0.0035 U	0.0035 U
Nitrite/Nitrate		NA	0.074	--	0.018 U	--
Propionic Acid	79-09-4	NA	1 U	1 U	1 U	1 U
Sulfate	14808-79-8	250000	--	--	43.1	40.4
Sulfide	18496-25-8	NA	0.1 U	0.1 U	0.1 U	0.1 U
Total Dissolved Solids		NA	144	126	108	122
Total Organic Carbon		NA	4.97	7.73	5.11	6.57
Petroleum Hydrocarbons (µg/L)						
Total Petroleum Hydrocarbons		5000	100 U	100 U	100 U	210 U

TABLE F-1

REPLACEMENT WELLS
STUDY AREA 36 - MAIN BASE

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

Well Designation	CAS Number	Screening	OLD-36-22BR	OLD-36-23CR			
Sample ID		Florida	OLD-36-22BR-061304	17-3623CRQ202	173623CRQ402	493623CRQ103	OLD-36-23CR-061603
Sample Date		GCTL[a]	06/13/04	05/08/02	12/03/02	03/25/03	06/16/03
Volatile Organics (µg/L)							
1,1,2,2-Tetrachloroethane	79-34-5	0.2	0.09 U	0.2 U	0.2 U	0.2 UJ	0.2 U
1,2-Dibromo-3-Chloropropane	96-12-8	0.2	1 U	0.2 U	0.2 UJ	0.2 U	2 U
1,2-Dichloroethane	107-06-2	3	1 U	3.22	3 U	3 U	1 U
2-Butanone	78-93-3	4200	1 U	10 U	10 U	10 U	1 U
2-Hexanone	591-78-6	280	1 U	10 U	10 U	10 U	1 U
4-Methyl-2-Pentanone	108-10-1	560	1 U	10 U	10 U	10 U	1 U
Acetone	67-64-1	700	10 U	10 U	10 U	10 U	10 U
Benzene	71-43-2	1	1 U	168	1 U	14.4	1 U
Bromodichloromethane	75-27-4	0.6	0.26 U	0.6 U	0.6 U	0.6 U	0.6 U
Carbon Disulfide	75-15-0	700	1 U	5 U	5 U	5 U	2 U
Chloroform	67-66-3	5.7	1 U	5 U	5 U	5 U	1 U
cis-1,2-Dichloroethene	156-59-2	70	1 U	5 U	1.2 J	1.07 J	1.1
Ethylbenzene	100-41-4	30	1 U	1.82 J	5 U	5 U	1 U
Methyl *tert*-Butyl Ether	1634-04-4	50	1 U	62.9	5 U	2.89 J	1 U
Tetrachloroethene	127-18-4	3	1 U	1.34 J	10.8	10	8.56
Trichloroethene	79-01-6	3	1 U	3 U	3.78	2.59 J	3.01
Vinyl Chloride	75-01-4	1	1 U	1 U	1 U	1 U	1 U
Dissolved Gases (nM/L)							
Hydrogen	1333-74-0	NA	2.5	--	--	--	--
Miscellaneous Parameters (mg/L)							
Acetic Acid	64-19-7	NA	1 U	--	--	--	1 U
Alkalinity		*	12.6	3.8	--	--	1 U
Butanoic Acid	107-92-6	NA	1 U	--	--	--	1 U
Chloride	16887-00-6	250000	6.19	10.2	--	--	0.02 U
Ethane	74-84-0	NA	0.026 U	1 U	--	--	0.026 U
Ethene	74-85-1	NA	0.026 U	1 U	--	--	0.026 U
Methane	74-82-8	*	0.149	0.331 J	--	--	0.086
Nitrate	14797-55-8	10000	0.0031 U	0.13 U	--	--	0.02 U
Nitrite	14797-65-0	1000	0.0035 U	0.01 U	--	--	0.005 U
Nitrite/Nitrate		NA	--	--	--	--	0.018 U
Propionic Acid	79-09-4	NA	1 U	--	--	--	1 U
Sulfate	14808-79-8	250000	29.4	--	--	--	--
Sulfide	18496-25-8	NA	0.52	0.02 U	--	--	0.1 U
Total Dissolved Solids		NA	90	36 U	--	--	64
Total Organic Carbon		NA	10.39	2.5 U	--	--	5.27
Petroleum Hydrocarbons (µg/L)							
Total Petroleum Hydrocarbons		5000	220 U	268 U	--	--	100 U

TABLE F-1

REPLACEMENT WELLS
STUDY AREA 36 - MAIN BASE

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

Well Designation	CAS Number	Screening	OLD-36-23CR				OLD-36-24BR
Sample ID		Florida GCTL[(a)]	OLD-36-23BR-091503	OLD-36-23CR-120203	OLD-36-23CR-032204	OLD-36-23CR-061304	17-3624BRQ202
Sample Date			09/15/03	12/02/03	03/22/04	06/13/04	05/09/02
Volatile Organics (µg/L)							
1,1,2,2-Tetrachloroethane	79-34-5	0.2	0.2 U	0.2 U	0.2 U	0.09 U	0.2 U
1,2-Dibromo-3-Chloropropane	96-12-8	0.2	2 U	2 U	1 U	1 U	0.2 U
1,2-Dichloroethane	107-06-2	3	1 U	1 U	1 U	1 U	3 U
2-Butanone	78-93-3	4200	1 U	1 U	1 U	1 U	10 U
2-Hexanone	591-78-6	280	1 U	1 U	1 U	1 U	10 U
4-Methyl-2-Pentanone	108-10-1	560	1 U	1 U	1 U	1 U	10 U
Acetone	67-64-1	700	10 U	10 U	10 U	10 U	10 U
Benzene	71-43-2	1	1 U	1 U	1 U	1 U	1 U
Bromodichloromethane	75-27-4	0.6	0.6 U	0.6 U	0.6 U	0.26 U	0.6 U
Carbon Disulfide	75-15-0	700	2 U	2 U	1 U	1 U	5 U
Chloroform	67-66-3	5.7	1 U	1 U	1 U	1 U	5 U
cis-1,2-Dichloroethene	156-59-2	70	1 U	1 U	1 U	1 U	5 U
Ethylbenzene	100-41-4	30	1 U	1 U	1 U	1 U	5 U
Methyl *tert*-Butyl Ether	1634-04-4	50	1 U	1 U	1 U	1 U	5 U
Tetrachloroethene	127-18-4	3	9.95	8.89	8.3	7.62	3 U
Trichloroethene	79-01-6	3	2 U	2.18	1.68	1.56	3 U
Vinyl Chloride	75-01-4	1	1 U	1 U	1 U	1 U	1 U
Dissolved Gases (nM/L)							
Hydrogen	1333-74-0	NA	--	--	2.4	2.2	--
Miscellaneous Parameters (mg/L)							
Acetic Acid	64-19-7	NA	1 U	1 U	1 U	1 U	--
Alkalinity		*	1 U	1 U	108	1 U	1 U
Butanoic Acid	107-92-6	NA	1 U	1 U	1 U	1 U	--
Chloride	16887-00-6	250000	5.13	5.54	6.24	5.91	4.31
Ethane	74-84-0	NA	0.026 U	0.026 U	0.026 U	0.026 U	1 U
Ethene	74-85-1	NA	0.026 U	0.026 U	0.026 U	0.026 U	1 U
Methane	74-82-8	*	0.026 U	0.026 U	0.026 U	0.026 U	0.159 J
Nitrate	14797-55-8	10000	0.0031 U	0.02	0.013	0.0031 U	0.081 U
Nitrite	14797-65-0	1000	0.0035 U	0.0035 U	0.0035 U	0.0035 U	0.069
Nitrite/Nitrate		NA	--	0.018 U	--	--	--
Propionic Acid	79-09-4	NA	1 U	1 U	1 U	1 U	--
Sulfate	14808-79-8	250000	--	28.8	32	27.3	--
Sulfide	18496-25-8	NA	0.1 U	0.11	0.1 U	0.1 U	0.142
Total Dissolved Solids		NA	98	88	248	70	109
Total Organic Carbon		NA	4.81	4.88	4.07	5.78	10.4 U
Petroleum Hydrocarbons (µg/L)							
Total Petroleum Hydrocarbons		5000	100 U	100 U	210 U	211 U	545 U

TABLE F-1

REPLACEMENT WELLS
STUDY AREA 36 - MAIN BASE

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

Well Designation	CAS Number	Screening	OLD-36-24BR				
Sample ID		Florida	173624BRQ402	493624BRQ103	OLD-36-24BR-061703	OLD-36-24BR-091603	OLD-36-24BR-120303
Sample Date		GCTL[(a)]	12/03/02	03/26/03	06/17/03	09/16/03	12/03/03
Volatile Organics (µg/L)							
1,1,2,2-Tetrachloroethane	79-34-5	0.2	0.2 U	0.2 UJ	0.2 U	0.2 U	0.2 U
1,2-Dibromo-3-Chloropropane	96-12-8	0.2	0.2 UJ	0.2 U	2 U	2 U	2 U
1,2-Dichloroethane	107-06-2	3	3 U	3 U	1 U	1 U	1 U
2-Butanone	78-93-3	4200	10 U	10 U	1 U	1 U	1 U
2-Hexanone	591-78-6	280	10 U	10 U	1 U	1 U	1 U
4-Methyl-2-Pentanone	108-10-1	560	10 U	10 U	1 U	1 U	1 U
Acetone	67-64-1	700	10 U	10 U	10 U	10 U	10 U
Benzene	71-43-2	1	1 U	1 U	1 U	1 U	1 U
Bromodichloromethane	75-27-4	0.6	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U
Carbon Disulfide	75-15-0	700	5 U	5 U	2 U	2 U	2 U
Chloroform	67-66-3	5.7	5 U	5 U	1 U	1 U	1 U
cis-1,2-Dichloroethene	156-59-2	70	5 U	5 U	1 U	1 U	1 U
Ethylbenzene	100-41-4	30	5 U	5 U	1 U	1 U	1 U
Methyl *tert*-Butyl Ether	1634-04-4	50	5 U	5 U	1 U	1 U	1 U
Tetrachloroethene	127-18-4	3	3 U	3 U	1 U	1 U	1 U
Trichloroethene	79-01-6	3	3 U	3 U	1 U	2 U	2 U
Vinyl Chloride	75-01-4	1	1 U	1 U	1 U	1 U	1 U
Dissolved Gases (nM/L)							
Hydrogen	1333-74-0	NA	--	--	--	--	--
Miscellaneous Parameters (mg/L)							
Acetic Acid	64-19-7	NA	--	--	1 U	1 U	1 U
Alkalinity		*	--	--	1 U	1 U	1 U
Butanoic Acid	107-92-6	NA	--	--	1 U	1 U	1 U
Chloride	16887-00-6	250000	--	--	0.02 U	2 U	5.61
Ethane	74-84-0	NA	--	--	0.026 U	0.026 U	0.026 U
Ethene	74-85-1	NA	--	--	0.026 U	0.026 U	0.026 U
Methane	74-82-8	*	--	--	0.026 U	0.026 U	0.026 U
Nitrate	14797-55-8	10000	--	--	0.02 U	0.0031 U	0.034
Nitrite	14797-65-0	1000	--	--	0.005 U	0.0035 U	0.0035 U
Nitrite/Nitrate		NA	--	--	0.018 U	--	--
Propionic Acid	79-09-4	NA	--	--	1 U	1 U	1 U
Sulfate	14808-79-8	250000	--	--	--	--	134
Sulfide	18496-25-8	NA	--	--	0.1 U	0.1 U	0.1 U
Total Dissolved Solids		NA	--	--	132	200	298
Total Organic Carbon		NA	--	--	6.59	6.84	4.82
Petroleum Hydrocarbons (µg/L)							
Total Petroleum Hydrocarbons		5000	--	--	100 U	100 U	100 U

TABLE F-1

REPLACEMENT WELLS
STUDY AREA 36 - MAIN BASE

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

Well Designation	CAS Number	Screening	OLD-36-24BR		OLD-36-25CR		
Sample ID		Florida	OLD-36-24BR-032204	OLD-36-24BR-061304	17-3625CRQ202	173625CRQ402	493625CRQ103
Sample Date		GCTL[(a)]	03/22/04	06/13/04	05/09/02	12/03/02	03/26/03
Volatile Organics (µg/L)							
1,1,2,2-Tetrachloroethane	79-34-5	0.2	0.2 U	0.09 U	0.2 U	0.2 U	0.2 UJ
1,2-Dibromo-3-Chloropropane	96-12-8	0.2	1 U	1 U	0.2 U	0.2 UJ	0.2 U
1,2-Dichloroethane	107-06-2	3	1 U	1 U	3 U	3 U	3 U
2-Butanone	78-93-3	4200	1 U	1 U	10 U	10 U	10 U
2-Hexanone	591-78-6	280	1 U	1 U	10 U	10 U	10 U
4-Methyl-2-Pentanone	108-10-1	560	1 U	1 U	10 U	10 U	10 U
Acetone	67-64-1	700	10 U	10 U	10 U	10 U	10 U
Benzene	71-43-2	1	1 U	1 U	1 U	1 U	1 U
Bromodichloromethane	75-27-4	0.6	0.6 U	0.26 U	0.6 U	0.6 U	0.6 U
Carbon Disulfide	75-15-0	700	1 U	1 U	5 U	5 U	5 U
Chloroform	67-66-3	5.7	1 U	1 U	5 U	5 U	5 U
cis-1,2-Dichloroethene	156-59-2	70	1 U	1 U	5 U	5 U	5 U
Ethylbenzene	100-41-4	30	1 U	1 U	5 U	5 U	5 U
Methyl *tert*-Butyl Ether	1634-04-4	50	1 U	1 U	5 U	5 U	5 U
Tetrachloroethene	127-18-4	3	1 U	1 U	3 U	3 U	3 U
Trichloroethene	79-01-6	3	1 U	1 U	3 U	3 U	3 U
Vinyl Chloride	75-01-4	1	1 U	1 U	1 U	1 U	1 U
Dissolved Gases (nM/L)							
Hydrogen	1333-74-0	NA	2.5	2.3	--	--	--
Miscellaneous Parameters (mg/L)							
Acetic Acid	64-19-7	NA	1 U	1 U	--	--	--
Alkalinity		*	15	17.3	1 U	--	--
Butanoic Acid	107-92-6	NA	1 U	1 U	--	--	--
Chloride	16887-00-6	250000	8.9	3.01	3.23	--	--
Ethane	74-84-0	NA	0.026 U	0.026 U	1 U	--	--
Ethene	74-85-1	NA	0.026 U	0.026 U	1 U	--	--
Methane	74-82-8	*	0.026 U	0.026 U	0.00926 U	--	--
Nitrate	14797-55-8	10000	0.027	0.04	0.13 U	--	--
Nitrite	14797-65-0	1000	0.0035 U	0.0035 U	0.01 U	--	--
Nitrite/Nitrate		NA	--	--	--	--	--
Propionic Acid	79-09-4	NA	1 U	1 U	--	--	--
Sulfate	14808-79-8	250000	125	79.2	--	--	--
Sulfide	18496-25-8	NA	0.38	0.1 U	0.02 U	--	--
Total Dissolved Solids		NA	254	172	110	--	--
Total Organic Carbon		NA	4.73	8.74	2.9 U	--	--
Petroleum Hydrocarbons (µg/L)							
Total Petroleum Hydrocarbons		5000	240 U	225 U	198 U	--	--

TABLE F-1

REPLACEMENT WELLS
STUDY AREA 36 - MAIN BASE

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

Well Designation	CAS Number	Screening	OLD-36-25CR			OLD-36-33AR	
Sample ID		Florida GCTL[a]	OLD-36-25CR-061703	OLD-36-25CR-091603	OLD-36-25CR-120203	17-3633ARQ202	173633ARQ402
Sample Date			06/17/03	09/16/03	12/02/03	05/08/02	12/03/02
Volatile Organics (µg/L)							
1,1,2,2-Tetrachloroethane	79-34-5	0.2	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,2-Dibromo-3-Chloropropane	96-12-8	0.2	2 U	2 U	2 U	0.2 U	0.2 UJ
1,2-Dichloroethane	107-06-2	3	1 U	1 U	1 U	3 U	3 U
2-Butanone	78-93-3	4200	1 U	1 U	1 U	10 U	10 U
2-Hexanone	591-78-6	280	1 U	1 U	1 U	10 U	10 U
4-Methyl-2-Pentanone	108-10-1	560	1 U	1 U	1 U	10 U	10 U
Acetone	67-64-1	700	10 U	10 U	10 U	10 U	10 U
Benzene	71-43-2	1	1 U	1 U	1 U	1 U	1 U
Bromodichloromethane	75-27-4	0.6	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U
Carbon Disulfide	75-15-0	700	2 U	2 U	2 U	5 U	5 U
Chloroform	67-66-3	5.7	1 U	1 U	1 U	5 U	5 U
cis-1,2-Dichloroethene	156-59-2	70	1 U	1 U	1 U	5 U	5 U
Ethylbenzene	100-41-4	30	1 U	1 U	1 U	5 U	5 U
Methyl *tert*-Butyl Ether	1634-04-4	50	1 U	1 U	1 U	5 U	5 U
Tetrachloroethene	127-18-4	3	1 U	1 U	1 U	3 U	3 U
Trichloroethene	79-01-6	3	1 U	2 U	2 U	3 U	3 U
Vinyl Chloride	75-01-4	1	1 U	1 U	1 U	1 U	1 U
Dissolved Gases (nM/L)							
Hydrogen	1333-74-0	NA	--	--	--	--	--
Miscellaneous Parameters (mg/L)							
Acetic Acid	64-19-7	NA	1 U	1 U	1 U	--	--
Alkalinity		*	1 U	1 U	1 U	1 U	--
Butanoic Acid	107-92-6	NA	1 U	1 U	1 U	--	--
Chloride	16887-00-6	250000	0.02 U	2 U	2 U	5.16	--
Ethane	74-84-0	NA	0.026 U	0.026 U	0.026 U	1 U	--
Ethene	74-85-1	NA	0.026 U	0.026 U	0.026 U	1 U	--
Methane	74-82-8	*	0.026 U	0.026 U	0.026 U	0.0544	--
Nitrate	14797-55-8	10000	0.02 U	0.0031 U	0.0031 U	0.13 U	--
Nitrite	14797-65-0	1000	0.005 U	0.0035 U	0.0035 U	0.01 U	--
Nitrite/Nitrate		NA	0.018 U	--	--	--	--
Propionic Acid	79-09-4	NA	1 U	1 U	1 U	--	--
Sulfate	14808-79-8	250000	--	--	67	--	--
Sulfide	18496-25-8	NA	0.1 U	0.1 U	0.1 U	0.02 U	--
Total Dissolved Solids		NA	140	160	132	92	--
Total Organic Carbon		NA	2.99	3.24	2.83	6.7 U	--
Petroleum Hydrocarbons (µg/L)							
Total Petroleum Hydrocarbons		5000	100 U	100 U	100 U	100 U	--

TABLE F-1

REPLACEMENT WELLS
STUDY AREA 36 - MAIN BASE

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

Well Designation	CAS Number	Screening	OLD-36-33AR				
Sample ID		Florida	493633ARQ103	OLD-36-33AR-061703	OLD-36-33AR-091603	OLD-36-33AR-120203	OLD-36-33AR-032204
Sample Date		GCTL[a]	03/26/03	06/17/03	09/16/03	12/03/03	03/22/04
Volatile Organics (µg/L)							
1,1,2,2-Tetrachloroethane	79-34-5	0.2	0.2 UJ	0.2 U	0.2 U	0.2 U	0.2 U
1,2-Dibromo-3-Chloropropane	96-12-8	0.2	0.2 U	2 U	2 U	2 U	1 U
1,2-Dichloroethane	107-06-2	3	3 U	1 U	1 U	1 U	1 U
2-Butanone	78-93-3	4200	10 U	1 U	1 U	1 U	1 U
2-Hexanone	591-78-6	280	10 U	1 U	1 U	1 U	1 U
4-Methyl-2-Pentanone	108-10-1	560	10 U	1 U	1 U	1 U	1 U
Acetone	67-64-1	700	10 U	10 U	10 U	10 U	10 U
Benzene	71-43-2	1	1 U	1 U	1 U	1 U	1 U
Bromodichloromethane	75-27-4	0.6	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U
Carbon Disulfide	75-15-0	700	5 U	2 U	2 U	2 U	1 U
Chloroform	67-66-3	5.7	5 U	1 U	1 U	1 U	1 U
cis-1,2-Dichloroethene	156-59-2	70	5 U	1 U	1 U	1 U	1 U
Ethylbenzene	100-41-4	30	5 U	1 U	1 U	1 U	1 U
Methyl *tert*-Butyl Ether	1634-04-4	50	5 U	1 U	1 U	1 U	1 U
Tetrachloroethene	127-18-4	3	3 U	1 U	1 U	1 U	1 U
Trichloroethene	79-01-6	3	3 U	1 U	2 U	2 U	1 U
Vinyl Chloride	75-01-4	1	1 U	1 U	1 U	1 U	1 U
Dissolved Gases (nM/L)							
Hydrogen	1333-74-0	NA	--	--	--	--	2.6
Miscellaneous Parameters (mg/L)							
Acetic Acid	64-19-7	NA	--	1 U	1 U	1 U	1 U
Alkalinity		*	--	69.5	106	151	71.5
Butanoic Acid	107-92-6	NA	--	1 U	1 U	1 U	1 U
Chloride	16887-00-6	250000	--	0.02 U	2 U	2 U	2.5
Ethane	74-84-0	NA	--	0.026 U	0.026 U	0.026 U	0.026 U
Ethene	74-85-1	NA	--	0.026 U	0.026 U	0.026 U	0.026 U
Methane	74-82-8	*	--	0.026 U	0.026 U	0.026 U	0.026 U
Nitrate	14797-55-8	10000	--	1.81	4.17	1.82	2.2
Nitrite	14797-65-0	1000	--	0.005 U	0.0035 U	0.105	0.941
Nitrite/Nitrate		NA	--	1.81	--	--	--
Propionic Acid	79-09-4	NA	--	1 U	1 U	1 U	1 U
Sulfate	14808-79-8	250000	--	--	--	108	62
Sulfide	18496-25-8	NA	--	0.1 U	0.1 U	0.1 U	0.38
Total Dissolved Solids		NA	--	236	496	388	292
Total Organic Carbon		NA	--	6.38	8.23	8.29	8.9
Petroleum Hydrocarbons (µg/L)							
Total Petroleum Hydrocarbons		5000	--	280	100 U	100 U	220 U

TABLE F-1

REPLACEMENT WELLS
STUDY AREA 36 - MAIN BASE

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

Well Designation	CAS Number	Screening	OLD-36-33AR	OLD-36-35CR			
Sample ID		Florida	OLD-36-33AR-061304	17-3635CRQ202	173635CRQ402	493635CRQ103	OLD-36-35CR-061703
Sample Date		GCTL[a]	06/13/04	05/09/02	12/04/02	03/26/03	06/17/03
Volatile Organics (µg/L)							
1,1,2,2-Tetrachloroethane	79-34-5	0.2	0.09 U	0.2 U	0.2 U	0.2 UJ	0.2 U
1,2-Dibromo-3-Chloropropane	96-12-8	0.2	1 U	0.2 U	0.2 UJ	0.2 U	2 U
1,2-Dichloroethane	107-06-2	3	1 U	3 U	3 U	3 U	1 U
2-Butanone	78-93-3	4200	1 U	10 U	10 U	10 U	1 U
2-Hexanone	591-78-6	280	1 U	10 U	10 U	10 U	1 U
4-Methyl-2-Pentanone	108-10-1	560	1 U	10 U	10 U	10 U	1 U
Acetone	67-64-1	700	10 U	10 U	10 U	10 U	10 U
Benzene	71-43-2	1	1 U	1 U	1 U	1 U	1 U
Bromodichloromethane	75-27-4	0.6	0.26 U	0.6 U	0.6 U	0.6 U	0.6 U
Carbon Disulfide	75-15-0	700	1 U	5 U	5 U	5 U	2 U
Chloroform	67-66-3	5.7	1 U	5 U	5 U	5 U	1 U
cis-1,2-Dichloroethene	156-59-2	70	1 U	5 U	5 U	5 U	1 U
Ethylbenzene	100-41-4	30	1 U	5 U	5 U	5 U	1 U
Methyl *tert*-Butyl Ether	1634-04-4	50	1 U	5 U	5 U	5 U	1 U
Tetrachloroethene	127-18-4	3	1 U	3 U	3 U	3 U	1 U
Trichloroethene	79-01-6	3	1 U	3 U	3 U	3 U	1 U
Vinyl Chloride	75-01-4	1	1 U	1 U	1 U	1 U	1 U
Dissolved Gases (nM/L)							
Hydrogen	1333-74-0	NA	2.5	--	--	--	--
Miscellaneous Parameters (mg/L)							
Acetic Acid	64-19-7	NA	1 U	--	--	--	1 U
Alkalinity		*	16.8	194	--	--	4.4
Butanoic Acid	107-92-6	NA	1 U	--	--	--	1 U
Chloride	16887-00-6	250000	13.9	20.9	--	--	6.75
Ethane	74-84-0	NA	0.026 U	1 U	--	--	0.026 U
Ethene	74-85-1	NA	0.026 U	1 U	--	--	0.026 U
Methane	74-82-8	*	0.026 U	1.1	--	--	0.285
Nitrate	14797-55-8	10000	1.14	0.22 U	--	--	0.02 U
Nitrite	14797-65-0	1000	0.028	0.01 U	--	--	0.005 U
Nitrite/Nitrate		NA	--	--	--	--	0.018 U
Propionic Acid	79-09-4	NA	1 U	--	--	--	1 U
Sulfate	14808-79-8	250000	87.2	--	--	--	--
Sulfide	18496-25-8	NA	0.1 U	0.02 U	--	--	0.1 U
Total Dissolved Solids		NA	368	310	--	--	106
Total Organic Carbon		NA	9.48	48.5	--	--	12.12
Petroleum Hydrocarbons (µg/L)							
Total Petroleum Hydrocarbons		5000	220 U	1270	--	--	100 U

TABLE F-1

REPLACEMENT WELLS
STUDY AREA 36 - MAIN BASE

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

Well Designation	CAS Number	Screening	OLD-36-35CR		OLD-36-36CR		
Sample ID		Florida	OLD-36-35CR-091603	OLD-36-35CR-120303	17-3636CRQ202	173636CRQ402	493636CRQ103
Sample Date		GCTL[(a)]	09/16/03	12/03/03	05/09/02	12/03/02	03/26/03
Volatile Organics (µg/L)							
1,1,2,2-Tetrachloroethane	79-34-5	0.2	0.2 U	0.2 U	0.2 U	0.2 U	0.2 UJ
1,2-Dibromo-3-Chloropropane	96-12-8	0.2	2 U	2 U	0.2 U	0.2 UJ	0.2 U
1,2-Dichloroethane	107-06-2	3	1 U	1 U	3 U	3 U	3 U
2-Butanone	78-93-3	4200	1 U	1 U	10 U	10 U	10 U
2-Hexanone	591-78-6	280	1 U	1 U	10 U	10 U	10 U
4-Methyl-2-Pentanone	108-10-1	560	1 U	1 U	10 U	10 U	10 U
Acetone	67-64-1	700	10 U	10 U	10 U	10 U	10 U
Benzene	71-43-2	1	1 U	1 U	1 U	1 U	1 U
Bromodichloromethane	75-27-4	0.6	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U
Carbon Disulfide	75-15-0	700	2 U	2 U	5 U	5 U	5 U
Chloroform	67-66-3	5.7	1 U	1 U	1.01 J	5 U	5 U
cis-1,2-Dichloroethene	156-59-2	70	1 U	1 U	5 U	5 U	5 U
Ethylbenzene	100-41-4	30	1 U	1 U	5 U	5 U	5 U
Methyl *tert*-Butyl Ether	1634-04-4	50	1 U	1 U	5 U	5 U	5 U
Tetrachloroethene	127-18-4	3	1 U	1 U	3 U	3 U	3 U
Trichloroethene	79-01-6	3	2 U	2 U	1.66 J	3 U	3 U
Vinyl Chloride	75-01-4	1	1 U	1 U	1 U	1 U	1 U
Dissolved Gases (nM/L)							
Hydrogen	1333-74-0	NA	--	--	--	--	--
Miscellaneous Parameters (mg/L)							
Acetic Acid	64-19-7	NA	1 U	1 U	--	--	--
Alkalinity		*	6.6	2.3	1 U	--	--
Butanoic Acid	107-92-6	NA	1 U	1 U	--	--	--
Chloride	16887-00-6	250000	6.6	6.94	4.61	--	--
Ethane	74-84-0	NA	0.026 U	0.026 U	1 U	--	--
Ethene	74-85-1	NA	0.026 U	0.026 U	1 U	--	--
Methane	74-82-8	*	0.197	0.163	0.204 J	--	--
Nitrate	14797-55-8	10000	0.0031 U	0.0031 U	0.01 U	--	--
Nitrite	14797-65-0	1000	0.0035 U	0.0035 U	0.33	--	--
Nitrite/Nitrate		NA	--	--	--	--	--
Propionic Acid	79-09-4	NA	1 U	1 U	--	--	--
Sulfate	14808-79-8	250000	--	10.9	--	--	--
Sulfide	18496-25-8	NA	0.1 U	0.1 U	0.135	--	--
Total Dissolved Solids		NA	164	102	270	--	--
Total Organic Carbon		NA	13.83	14.93	15.8	--	--
Petroleum Hydrocarbons (µg/L)							
Total Petroleum Hydrocarbons		5000	100 U	100 U	437 UJ	--	--

TABLE F-1

REPLACEMENT WELLS
STUDY AREA 36 - MAIN BASE

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

Well Designation	CAS Number	Screening	OLD-36-36CR				
Sample ID		Florida GCTL[a]	OLD-36-36CR-061703	OLD-36-36CR-091603	OLD-36-36CR-120303	OLD-36-36CR-032204	OLD-36-36CR-061304
Sample Date			06/17/03	09/16/03	12/03/03	03/22/04	06/13/04
Volatile Organics (µg/L)							
1,1,2,2-Tetrachloroethane	79-34-5	0.2	0.2 U	0.2 U	0.2 U	0.2 U	0.09 U
1,2-Dibromo-3-Chloropropane	96-12-8	0.2	2 U	2 U	2 U	1 U	1 U
1,2-Dichloroethane	107-06-2	3	1 U	1 U	1 U	1 U	1 U
2-Butanone	78-93-3	4200	1 U	1 U	1 U	1 U	1 U
2-Hexanone	591-78-6	280	1 U	1 U	1 U	1 U	1 U
4-Methyl-2-Pentanone	108-10-1	560	1 U	1 U	1 U	1 U	1 U
Acetone	67-64-1	700	10 U	10 U	10 U	10 U	10 U
Benzene	71-43-2	1	1 U	1 U	1 U	1 U	1 U
Bromodichloromethane	75-27-4	0.6	0.6 U	0.6 U	0.6 U	0.6 U	0.26 U
Carbon Disulfide	75-15-0	700	2 U	2 U	2 U	1 U	1 U
Chloroform	67-66-3	5.7	1 U	1 U	1 U	1 U	1 U
cis-1,2-Dichloroethene	156-59-2	70	1 U	1 U	1 U	1 U	1 U
Ethylbenzene	100-41-4	30	1 U	1 U	1 U	1 U	1 U
Methyl *tert*-Butyl Ether	1634-04-4	50	1 U	1 U	1 U	1 U	1 U
Tetrachloroethene	127-18-4	3	1 U	1 U	1 U	1 U	1 U
Trichloroethene	79-01-6	3	1 U	2 U	2 U	1 U	1 U
Vinyl Chloride	75-01-4	1	1 U	1 U	1 U	1 U	1 U
Dissolved Gases (nM/L)							
Hydrogen	1333-74-0	NA	--	--	--	2.8	2.1
Miscellaneous Parameters (mg/L)							
Acetic Acid	64-19-7	NA	1 U	1 U	1 U	1 U	1 U
Alkalinity		*	1.8	39.6	91.1	43.6	87.8
Butanoic Acid	107-92-6	NA	1 U	1 U	1 U	1 U	1 U
Chloride	16887-00-6	250000	0.02 U	2 U	2 U	4.99	4.52
Ethane	74-84-0	NA	0.026 U	0.026 U	0.026 U	0.026 U	0.026 U
Ethene	74-85-1	NA	0.026 U	0.026 U	0.026 U	0.026 U	0.026 U
Methane	74-82-8	*	0.026 U	0.026 U	0.026 U	0.026 U	0.026 U
Nitrate	14797-55-8	10000	0.02 U	0.0031 U	0.0031 U	0.063	0.0031 U
Nitrite	14797-65-0	1000	0.005 U	0.0035 U	0.0035 U	0.0035 U	0.0035 U
Nitrite/Nitrate		NA	0.018 U	--	--	--	--
Propionic Acid	79-09-4	NA	1 U	1 U	1 U	1 U	1 U
Sulfate	14808-79-8	250000	--	--	54.8	73.2	58.1
Sulfide	18496-25-8	NA	0.1 U	0.1 U	0.1 U	0.27	0.1 U
Total Dissolved Solids		NA	136	164	230	82	212
Total Organic Carbon		NA	7.43	4.61	5.53	4.76	6.71
Petroleum Hydrocarbons (µg/L)							
Total Petroleum Hydrocarbons		5000	100 U	100 U	100 U	220 U	204 U

TABLE F-1

REPLACEMENT WELLS
STUDY AREA 36 - MAIN BASE

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

Notes:

[a] Groundwater Cleanup Target Level [Development of Soil Cleanup Target Levels (SCTLs) for Chapter 62-777, F.A.C., May 26, 1999].

* Indicates that the screening value is not available.

Empty cells indicate non-detects.

"J" qualifier indicates an estimated value.

NA - No analysis performed.

Only chemicals detected in at least one sample are shown.

"U" qualifier indicates a non-detect.

Values in shaded cells are equal to or exceed the screening criteria.

APPENDIX G

CONCENTRATIONS TREND PLOTS

FIGURE G-1
OLD-36-08BR PCE and DAUGHTER PRODUCTS
DECEMBER 2002 THROUGH JUNE 2004

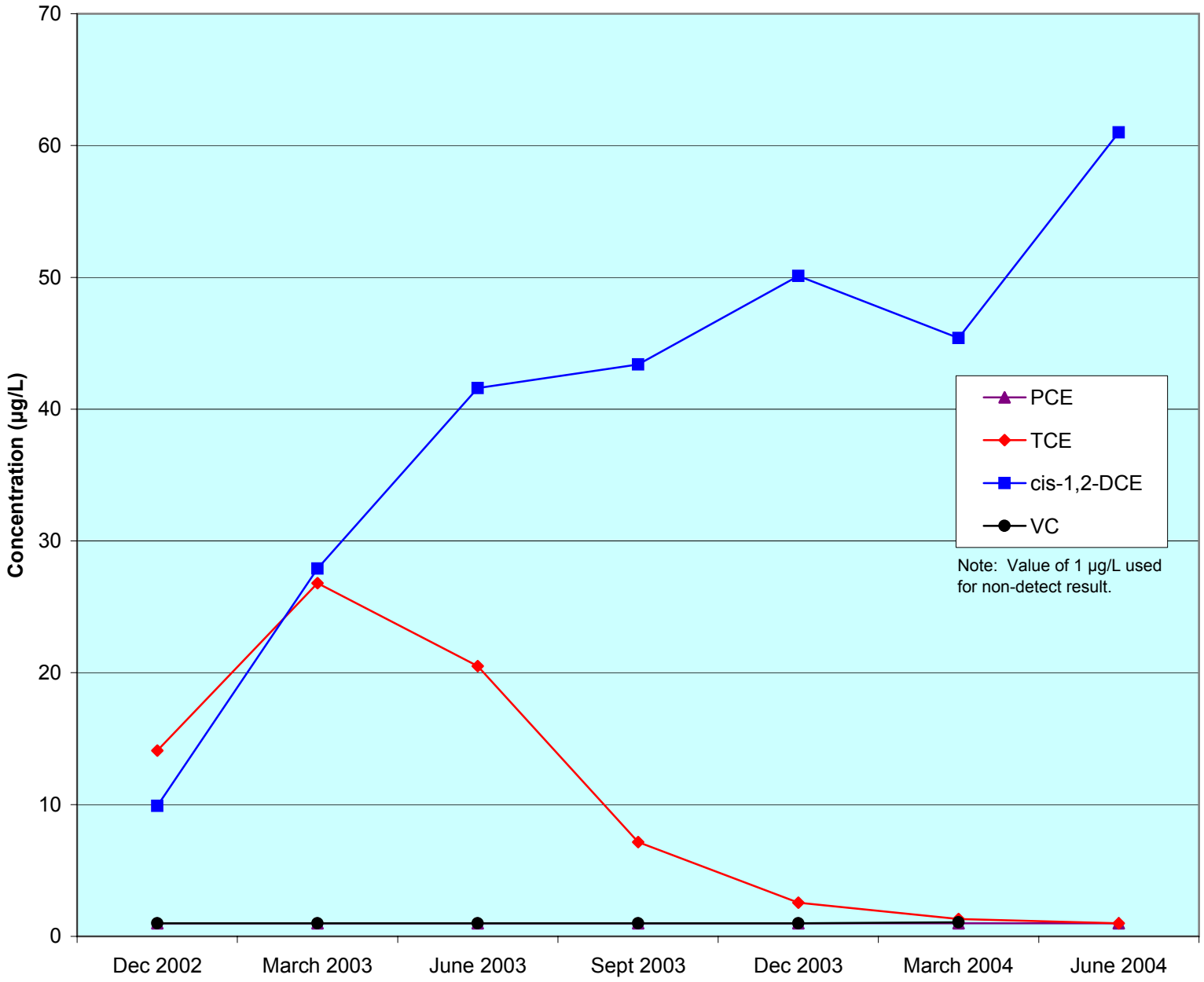


FIGURE G-2
OLD-36-10BR PCE and DAUGHTER PRODUCTS
DECEMBER 2002 THROUGH JUNE 2004

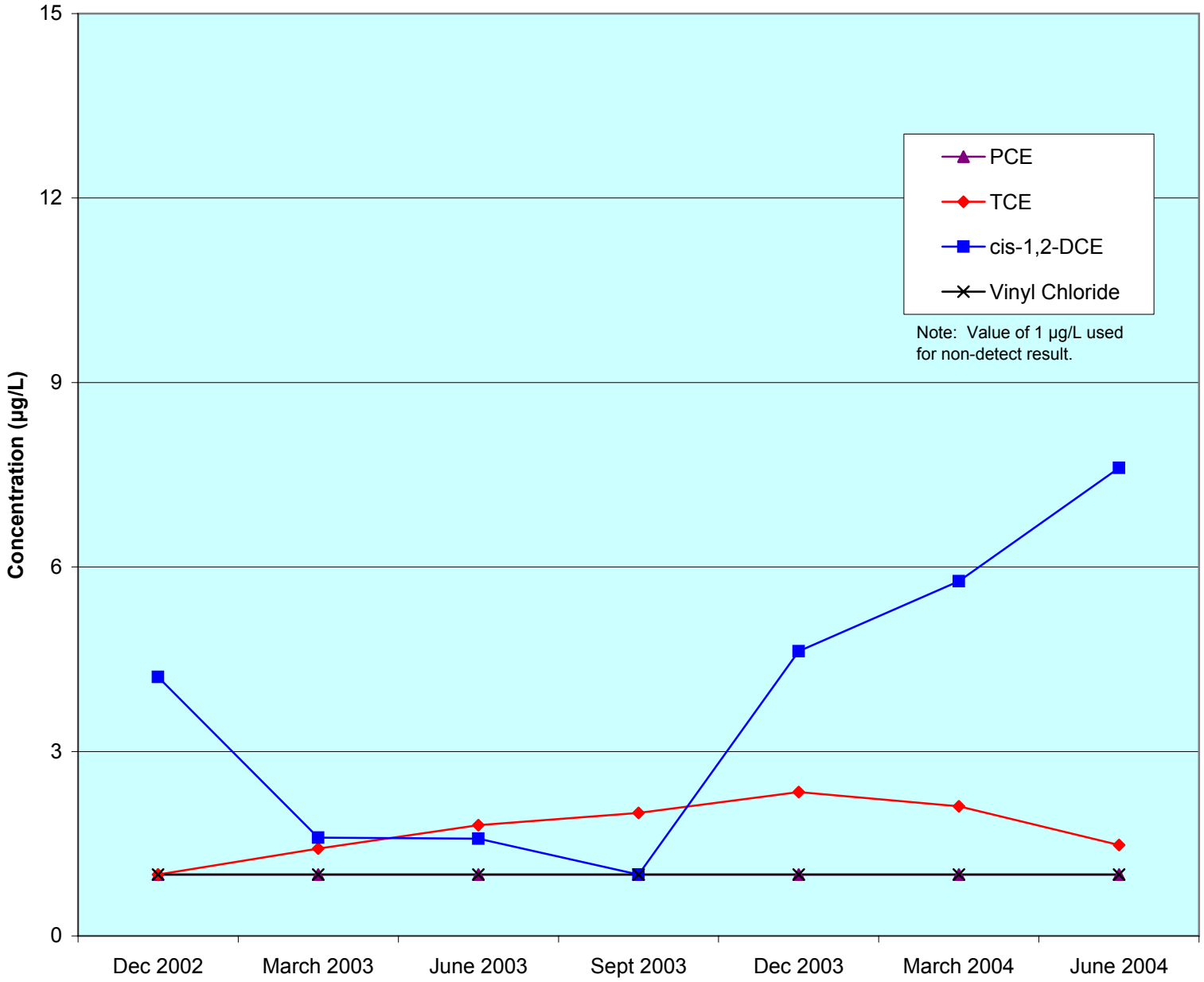


FIGURE G-3
PCE, TCE, cis-1,2-DCE and VC
ALONG ZONE B FLOW PATH
JUNE 2004

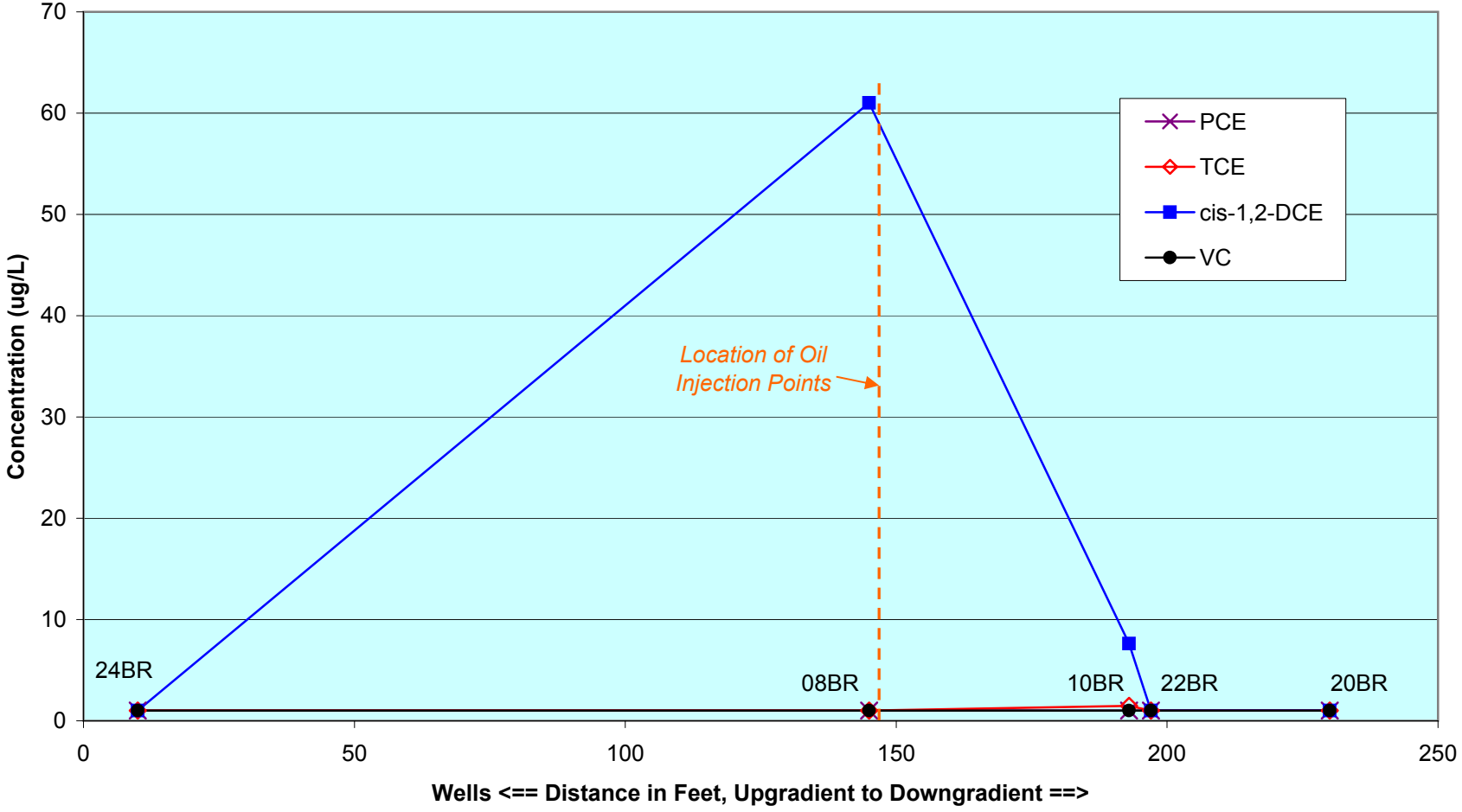


FIGURE G-4
NITRATE/NITRITE, SULFATE, FERROUS IRON, SULFIDE, and METHANE ALONG ZONE B FLOW PATH
JUNE 2004

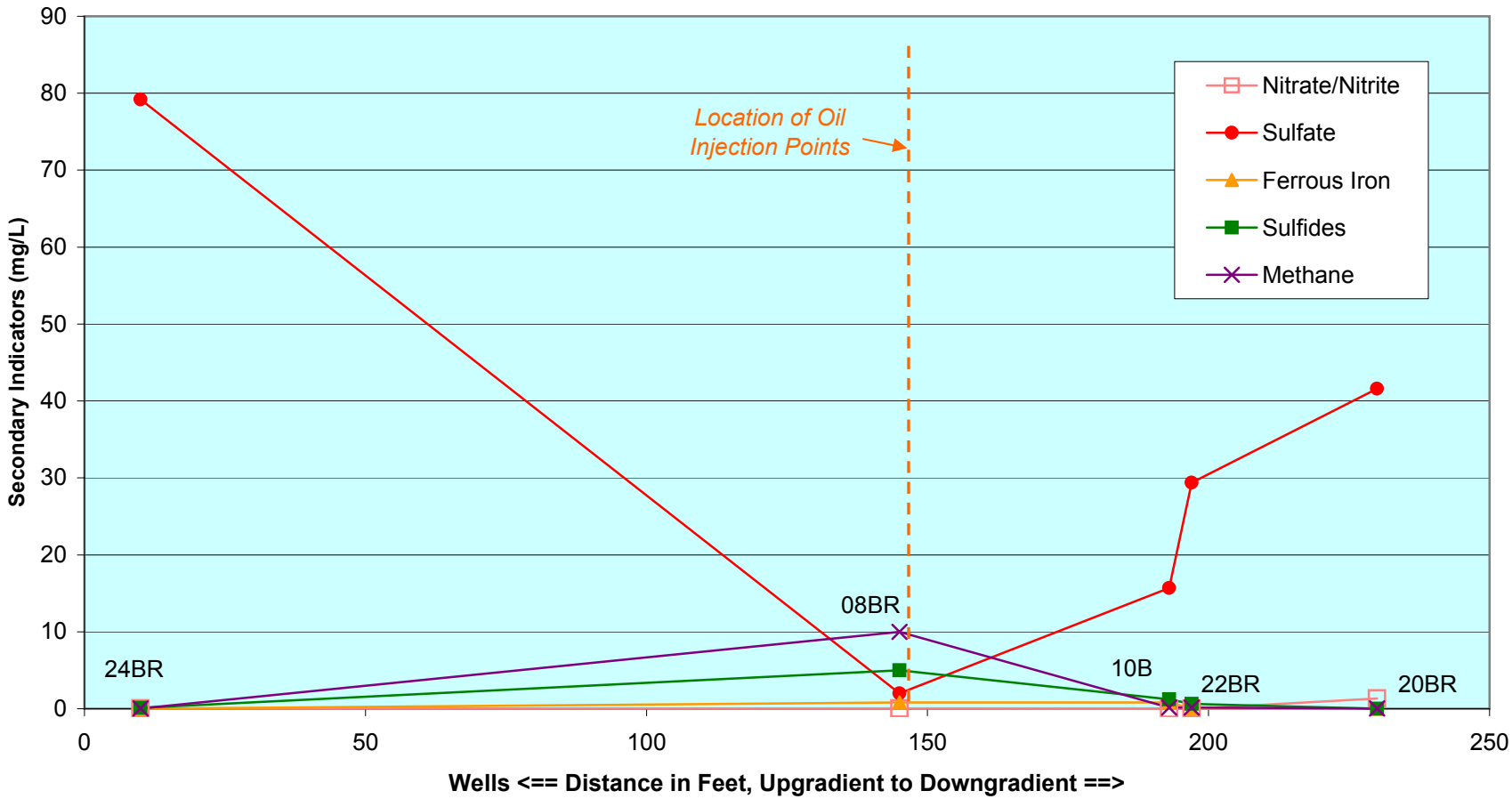


FIGURE G-5
ORP, CARBON DIOXIDE, and ALKALINITY
ALONG ZONE B FLOW PATH
JUNE 2004

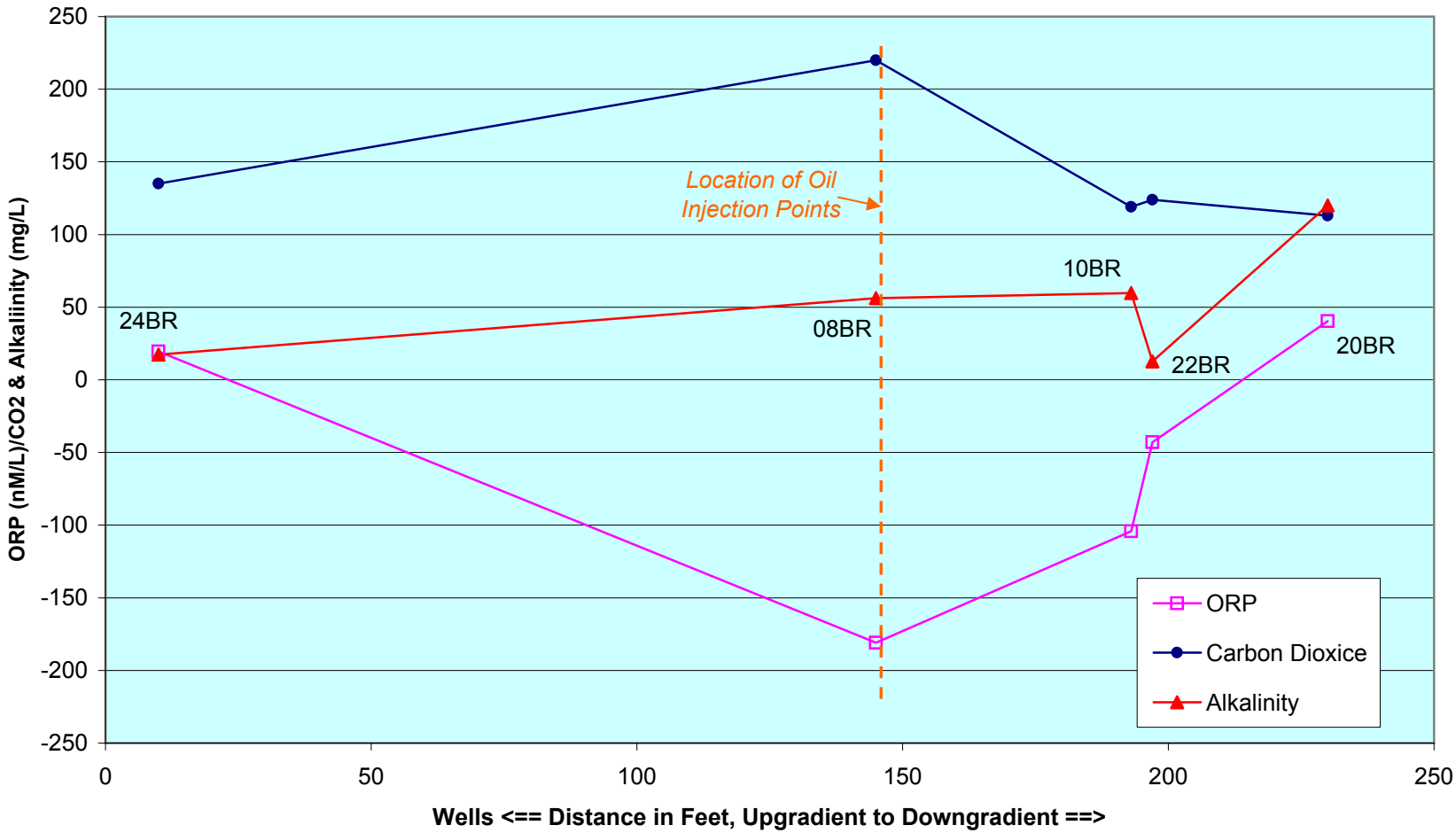


FIGURE G-6
HYDROGEN and CHLORIDE
ALONG ZONE B FLOW PATH
JUNE 2004

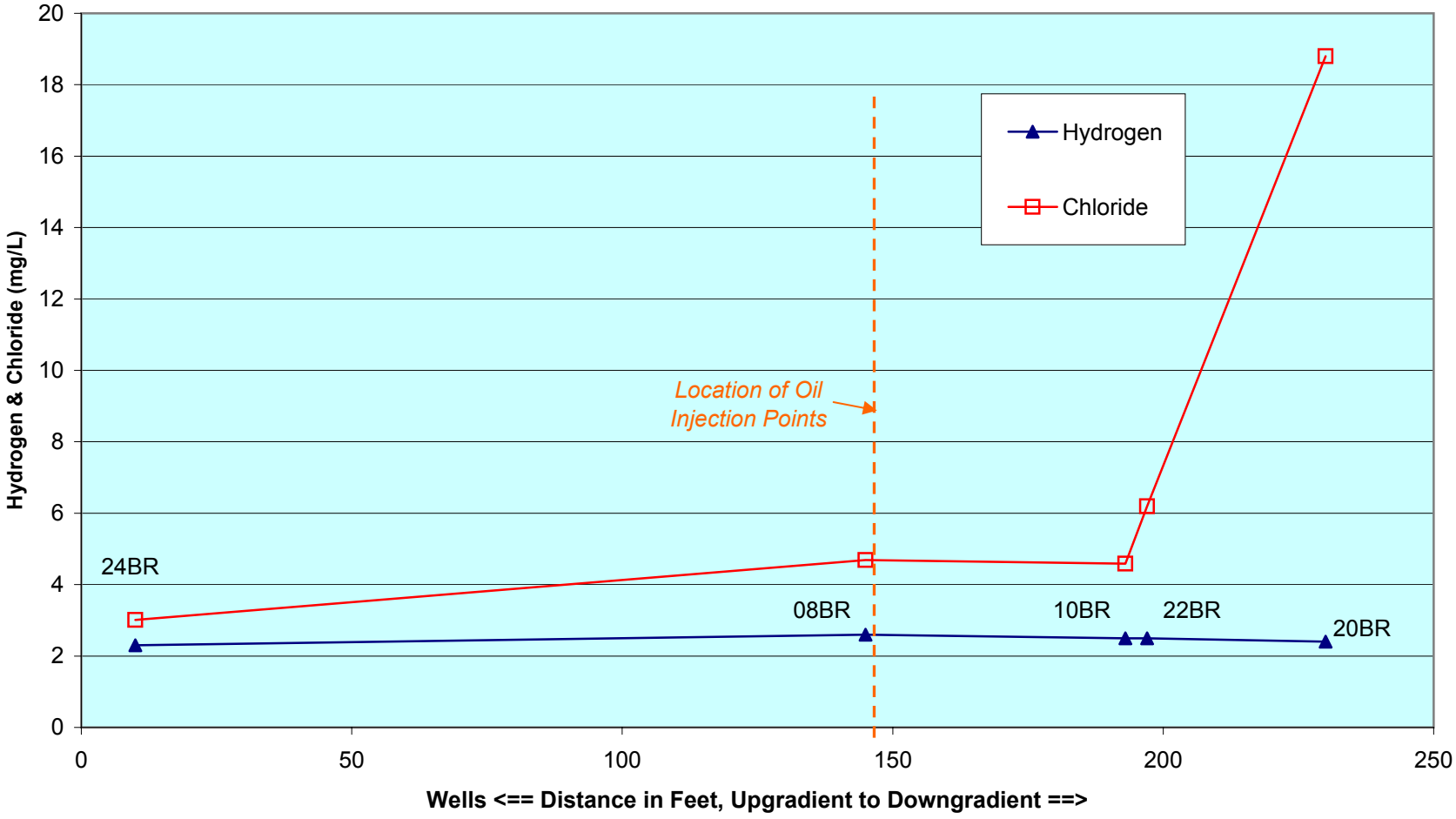


FIGURE G-7
OLD-36-23CR PCE and DAUGHTER PRODUCTS
DECEMBER 2002 THROUGH JUNE 2004

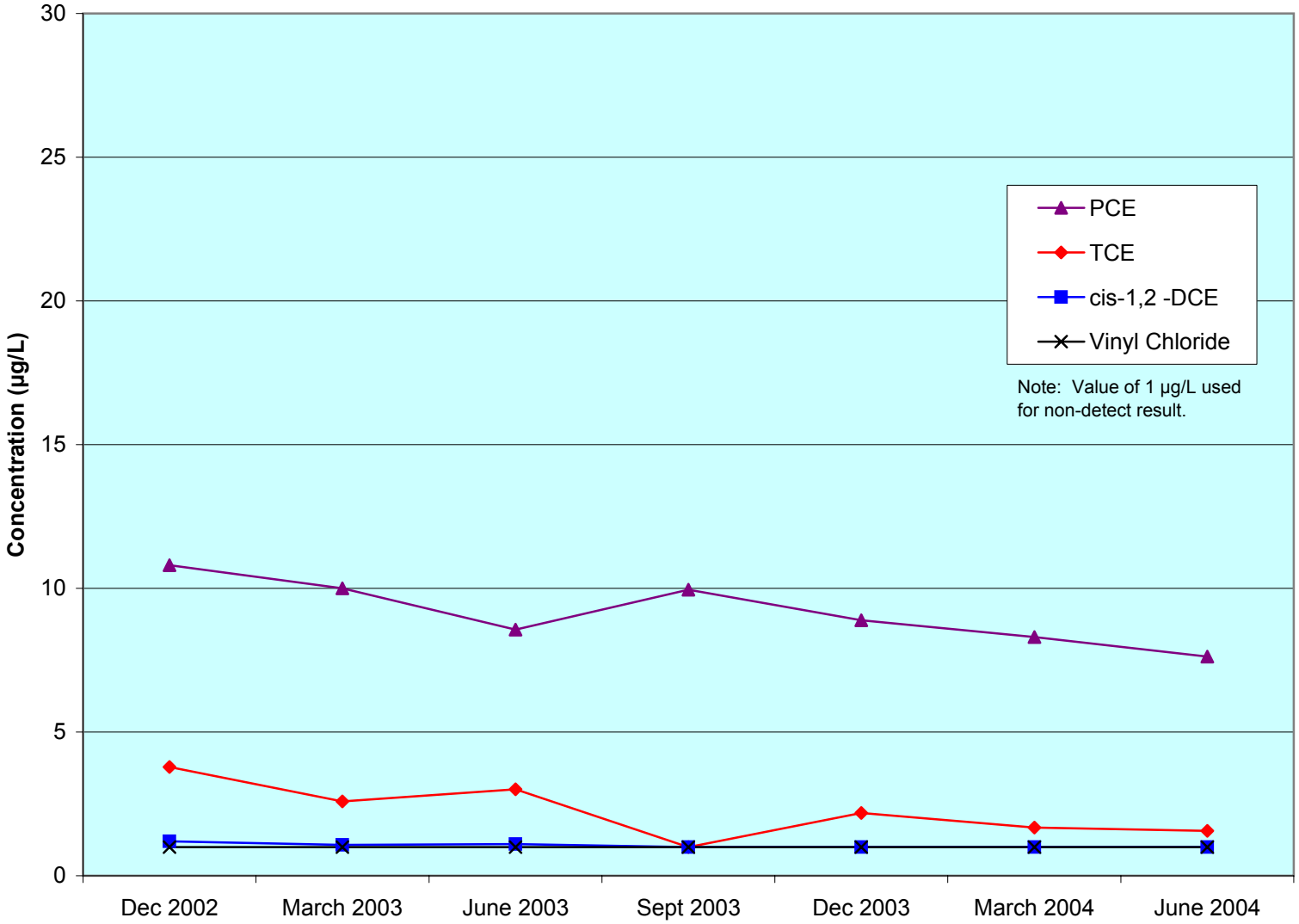


FIGURE G-8
OLD-36-09CR PCE and DAUGHTER PRODUCTS
DECEMBER 2002 THROUGH JUNE 2004

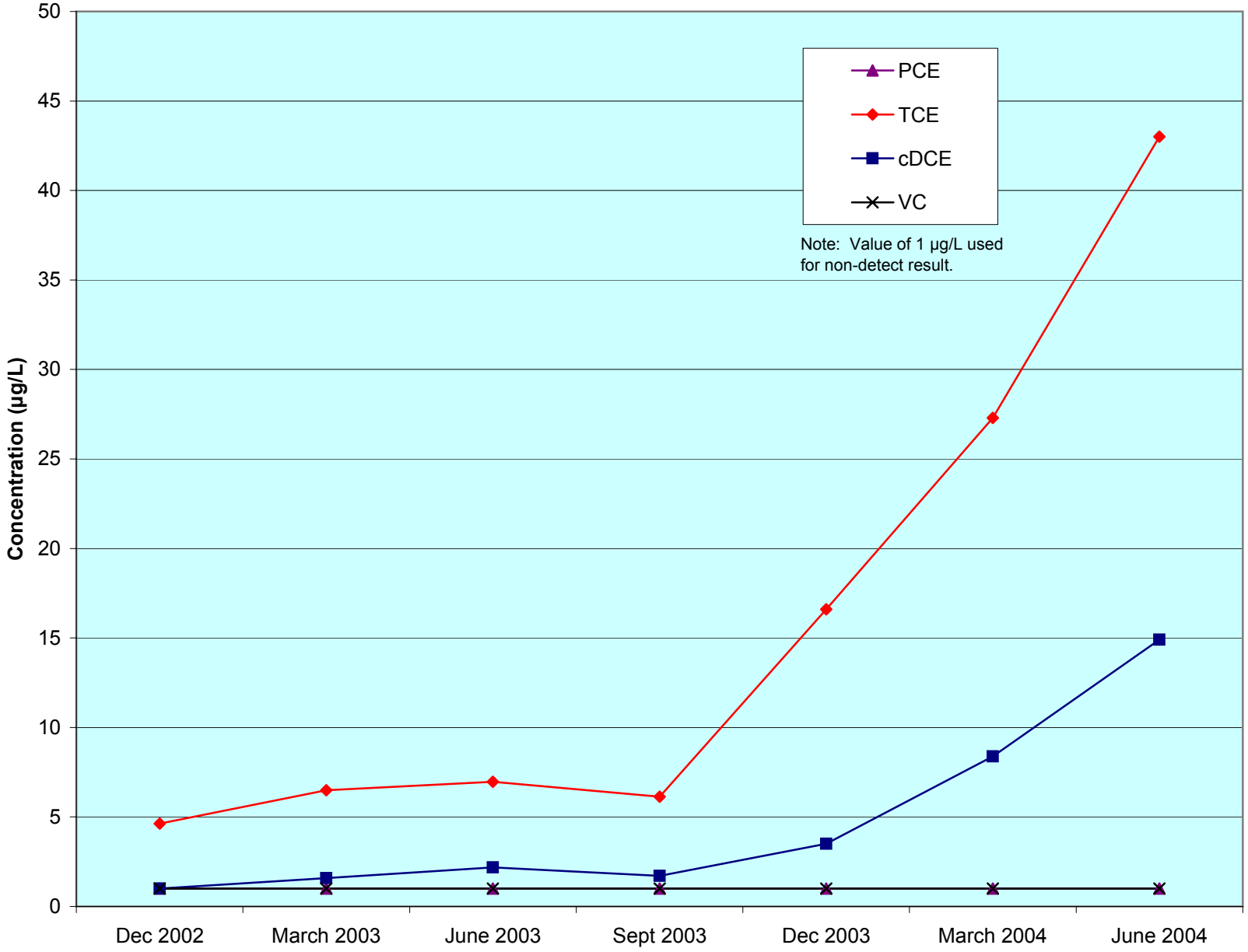


FIGURE G-9
PCE, TCE, cis-1,2-DCE, VC
ALONG ZONE C FLOW PATH
JUNE 2004

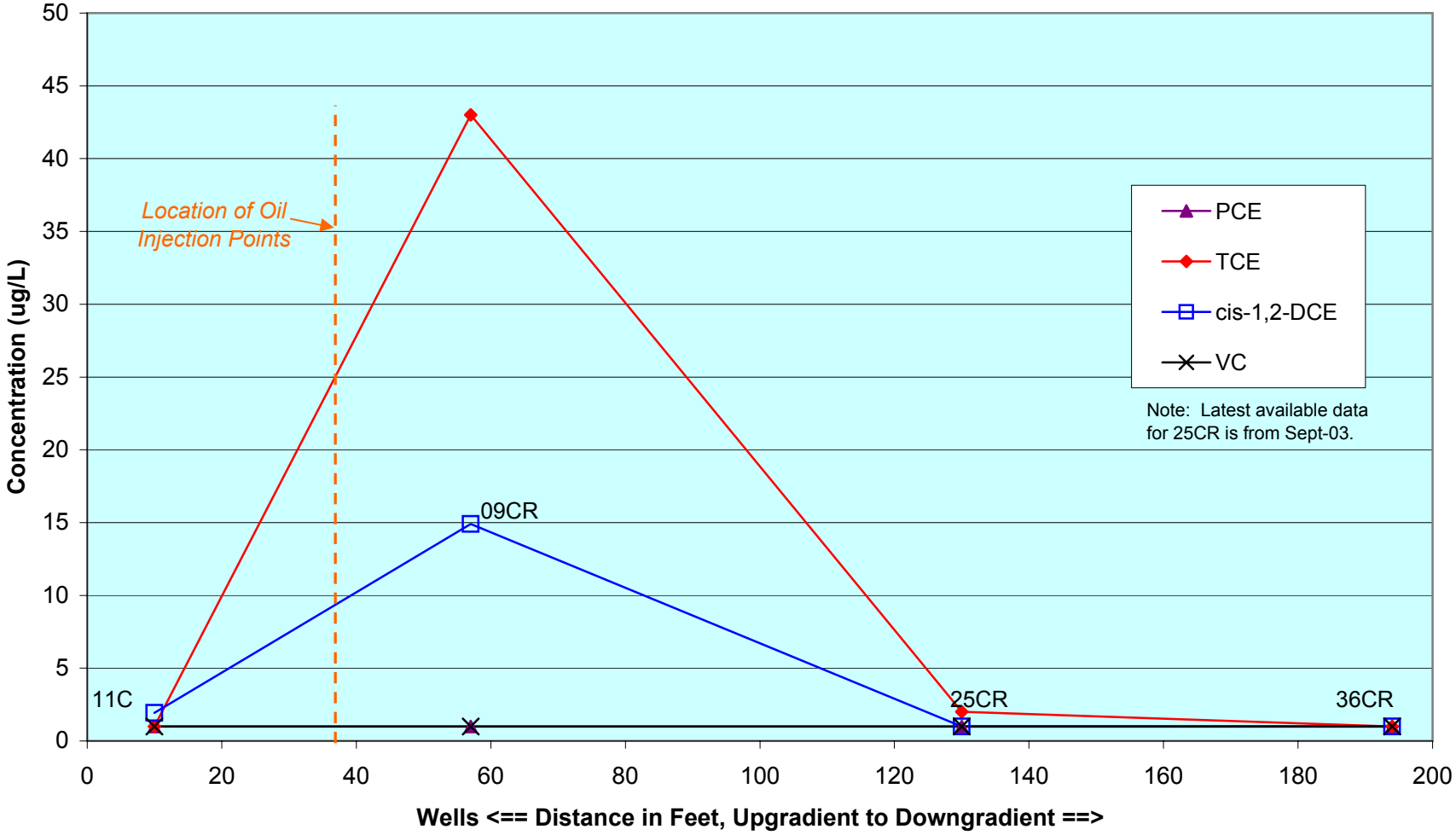


FIGURE G-10
NITRATE/NITRITE, SULFATE, FERROUS IRON, SULFIDE, and METHANE ALONG ZONE C FLOW PATH
JUNE 2004

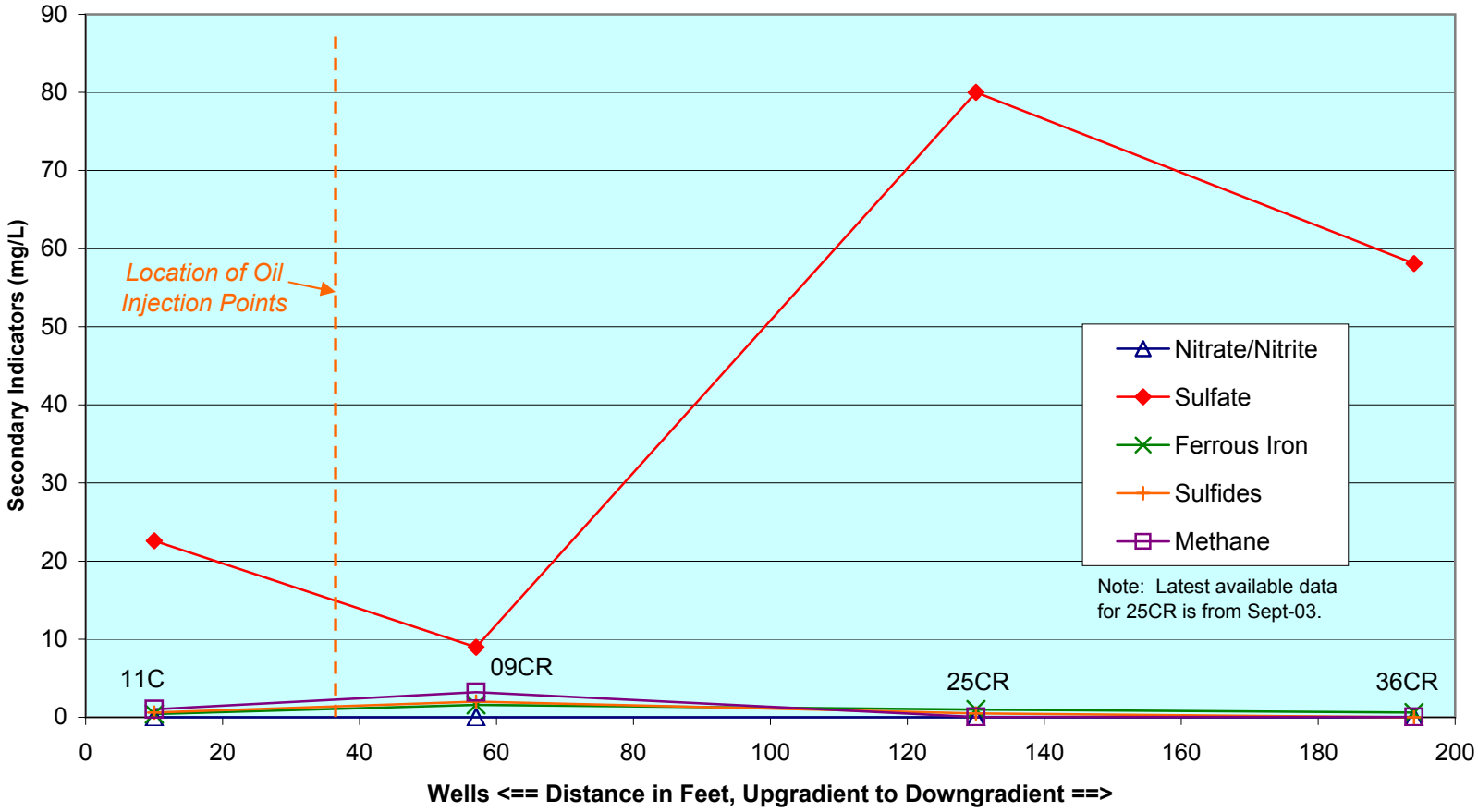


FIGURE G-11
ORP, CARBON DIOXIDE, and ALKALINITY
ALONG ZONE C FLOW PATH
JUNE 2004

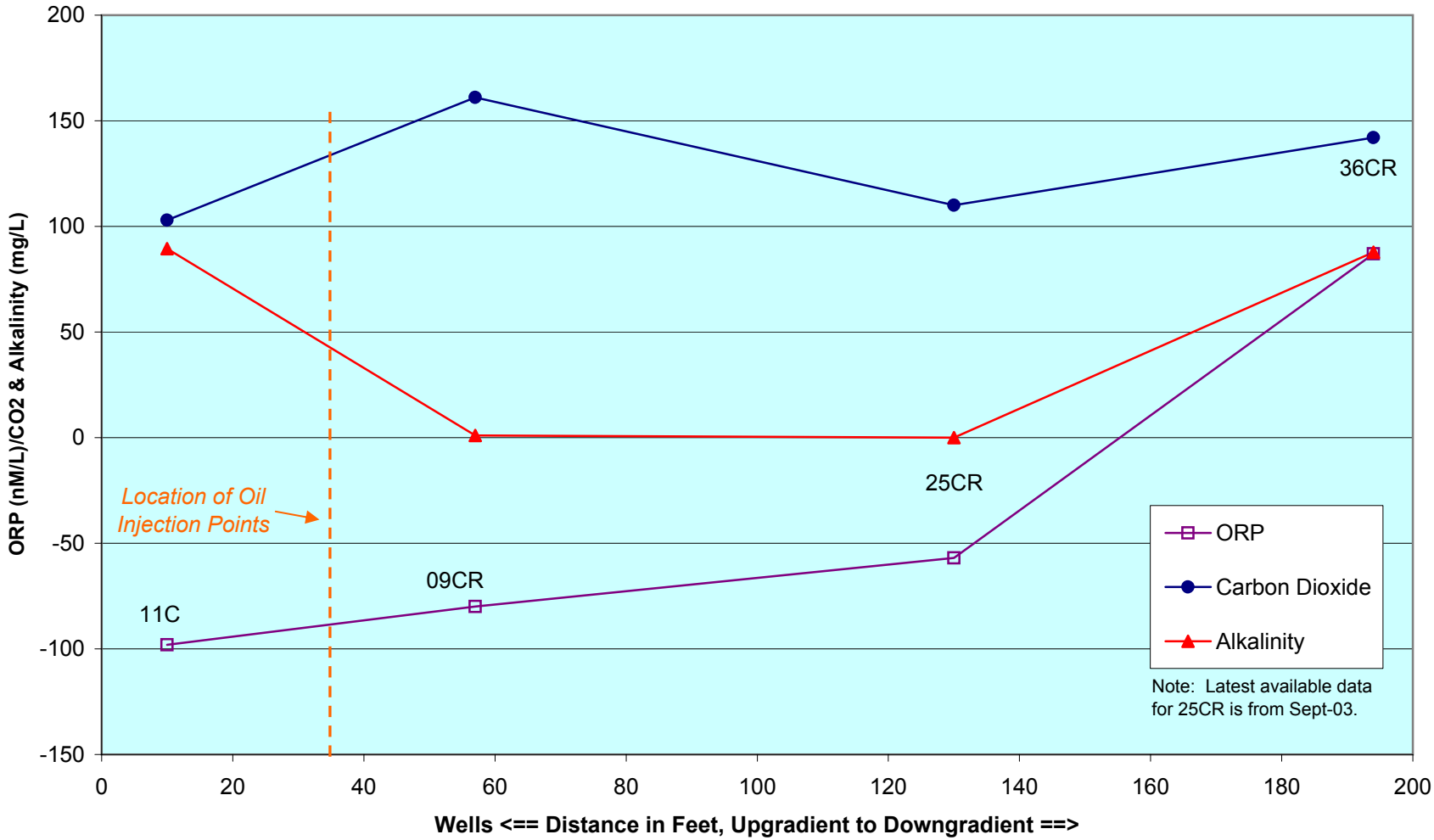
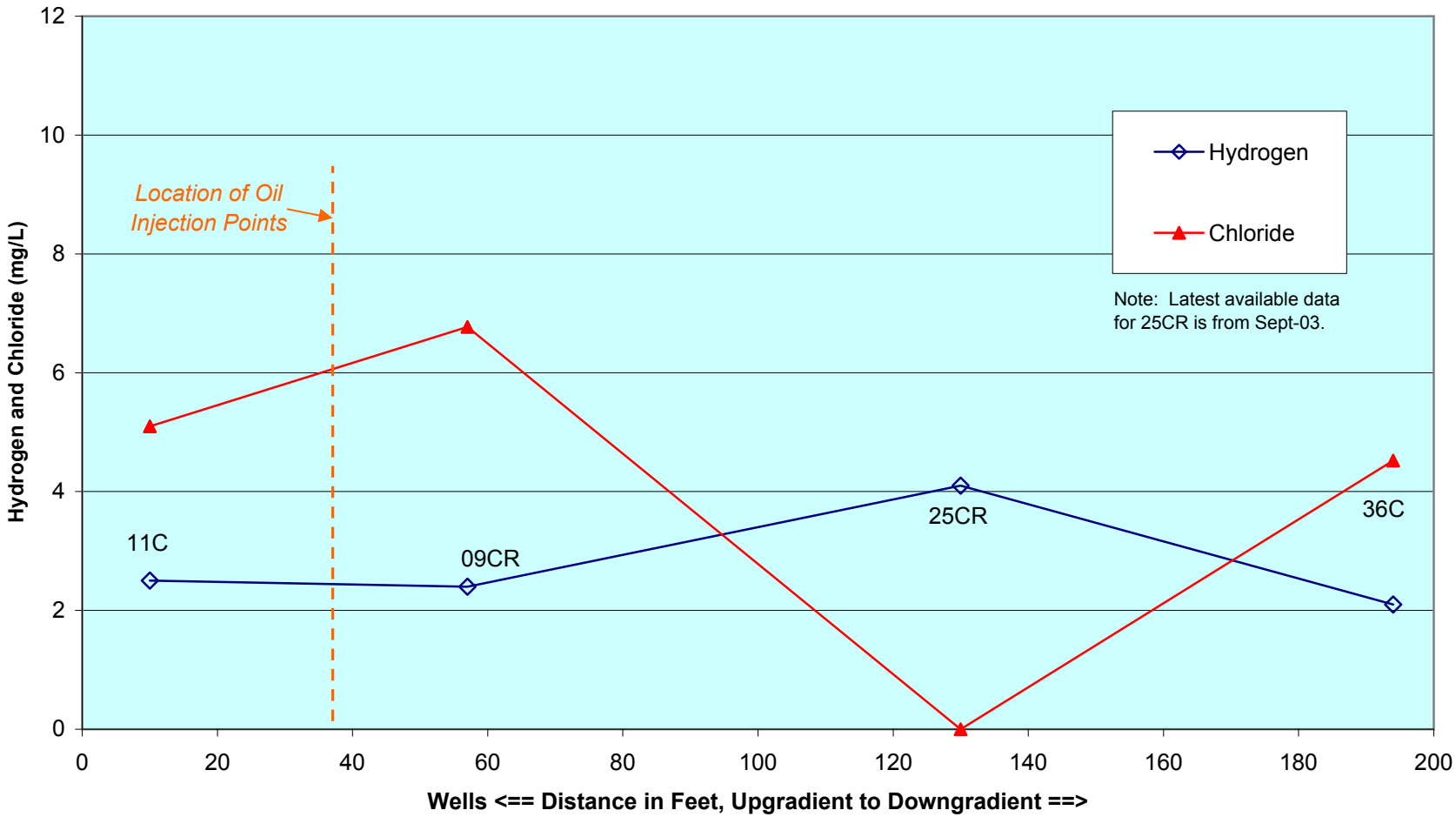



FIGURE G-12
HYDROGEN and CHLORIDE
ALONG ZONE C FLOW PATH
JUNE 2004