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AREA C PRELIMINARY RISK EVALUATION NTC ORLANDO FL
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ABB ENVIRONMENTAL

**AREA C PRELIMINARY
RISK EVALUATION**

**NAVAL TRAINING CENTER
ORLANDO, FLORIDA**

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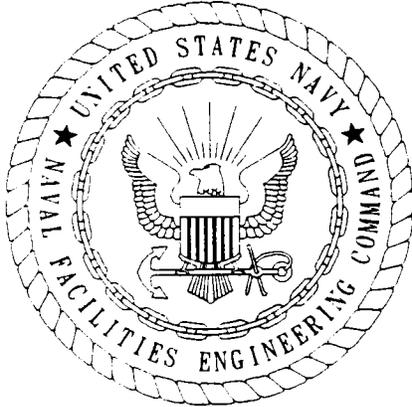
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April 1996



CERTIFICATION OF TECHNICAL
DATA CONFORMITY (MAY 1987)

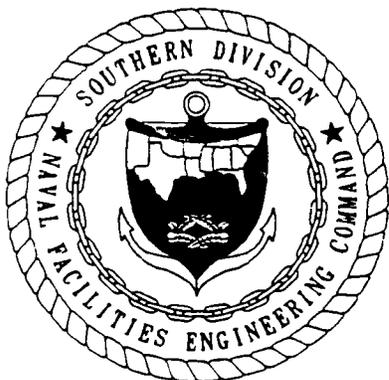
The Contractor, ABB Environmental Services, Inc., hereby certifies that, to the best of its knowledge and belief, the technical data delivered herewith under Contract No. N62467-89-D-0317/107 are complete and accurate and comply with all requirements of this contract.

DATE: April 30, 1996

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(DFAR 252.227-7036)



FOREWORD

To meet its mission objectives, the U.S. Navy performs a variety of operations, some requiring the use, handling, storage, or disposal of hazardous materials. Through accidental spills and leaks and conventional methods of past disposal, hazardous materials may have entered the environment in ways unacceptable by today's standards. With growing knowledge of the long-term effects of hazardous materials on the environment, the Department of Defense initiated various programs to investigate and remediate conditions related to suspected past releases of hazardous materials at its facilities.

One of these programs is the Base Realignment and Closure (BRAC) cleanup program. This program complies with the BRAC Act of 1988 (Public Law (P.L.) 100-526, 102 Statute 2623) and the Defense Base Closure and Realignment Act of 1990 (P.L. 101-510, 104 Statute 1808), which require the DOD to observe pertinent environmental legal provisions of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA); the 1992 Community Environmental Response Facilitation Act; Executive Order 12580; and the statutory provisions of the Defense Environmental Restoration Program, the National Environmental Policy Act (NEPA), and any other applicable statutes that protect natural and cultural resources.

CERCLA requirements, in conjunction with corrective action requirements under Subtitle C of the Resource Conservation and Recovery Act (RCRA), govern most environmental restoration activities. Requirements under Subtitles C, D, and I, of RCRA, as well as the Toxic Substances Control Act, the Clean Water Act, the Clean Air Act, the Safe Drinking Water Act, and other statutes, govern most environmental missions or operational-related and closure-related compliance activities. These compliance laws may also be applicable or relevant and appropriate requirements for selecting and implementing remedial actions under CERCLA. NEPA requirements govern the Environmental Impact Analysis and Environmental Impact Statement preparation for the disposal and reuse of BRAC installations.

The BRAC program centers on a single goal: expediting and improving environmental response actions to facilitate the disposal and reuse of a BRAC installation, while protecting human health and the environment.

The Southern Division, Naval Facilities Engineering Command (SOUTHNAVFACENGCOM); the U.S. Environmental Protection Agency; and the Florida Department of Environmental Protection collectively coordinate the cleanup activities through the BRAC cleanup team. This team approach is intended to foster partnering, accelerate the environmental cleanup process and expedite timely, cost-effective, and environmentally responsible disposal and reuse decisions.

Questions regarding the BRAC program at Naval Training Center, Orlando should be addressed to the SOUTHNAVFACENGCOM BRAC Environmental Coordinator, Mr. Wayne Hansel, Code 18B7, at (407) 646-5294 or SOUTHNAVFACENGCOM Engineer-in-Charge (EIC), Ms. Barbara Nwokike, Code 1873, at (803) 820-5566.

EXECUTIVE SUMMARY

ABB Environmental Services, Inc. (ABB-ES), under contract to the Southern Division, Naval Facilities Engineering Command, in accordance with Base Realignment and Closure (BRAC) 1993, has prepared this Preliminary Risk Evaluation (PRE) to characterize the potential risks to human health and the environment from environmental contamination associated with Area C at Naval Training Center (NTC), Orlando, Florida. The PREs are screening-level evaluations of potential risks that environmental contaminants associated with Area C may pose to human and ecological receptors. The PREs were performed to determine whether or not environmental contamination at Area C will require any future action, including but not limited to, additional site evaluations, a baseline risk assessment, remedial measures, or no further action.

The human health and ecological PREs were conducted in accordance with methodology provided in the U.S. Environmental Protection Agency (USEPA) Region IV Memorandum "Amended Guidance on Preliminary Risk Evaluations (PREs) for the Purpose of Reaching a Finding of Suitability to Lease (FOSL)" (USEPA, 1994a), and minutes of meetings with the USEPA and Florida Department of Environmental Protection (FDEP) concerning PREs (ABB-ES, 1995c). This methodology is designed to result in a conservative evaluation that does not overlook or dismiss potentially substantial risks. The PRE is most useful in determining risks that are not significant, rather than determining the specific nature and magnitude of risks associated with the site.

In accordance with this methodology, the public health PRE was conducted by comparing maximum detected analyte concentrations in groundwater, surface water, sediment, surface soil, subsurface soil, and estimated indoor air concentrations of volatile organic compounds (VOCs), to regulatory criteria and readily available risk screening values based on potential exposures to residential populations. These evaluations were expressed as risk estimates and were compared to the USEPA target cancer risk range of 1×10^{-6} to 1×10^{-4} and the noncancer hazard index (HI) value of 1.

The results of the public health risk assessment indicate that, based on available information, potential residential exposures to groundwater used as source of drinking water may pose cancer and noncancer risks above USEPA acceptable risk levels, and maximum groundwater concentrations of chlorinated VOCs, arsenic, and beryllium exceed State and Federal regulatory criteria. In addition, under current land-use conditions, a potential may exist for VOC vapor migration from groundwater and subsurface soil to ambient air in aboveground residential structures. Potential cancer risks for residential inhalation exposures to estimated indoor VOC concentrations are within USEPA acceptable risk limits, but are above 1×10^{-6} . Cancer and noncancer risk estimates for potential residential direct-contact exposures to surface soil and subsurface soil, and potential residential swimming exposures to surface water and sediment in Lake Druid, are within USEPA acceptable risk limits. However, cancer risk estimates for surface water are above 1×10^{-6} , and maximum concentrations of arsenic, tetrachloroethylene, and beryllium in soils exceed State regulatory criteria.

The ecological PRE was conducted by comparing maximum detected analyte concentrations in surface water and sediment to State and Federal standards and maximum surface soil concentrations to soil screening values developed by ABB-ES.

Through these comparisons, analytes which were detected at maximum concentrations above the screening values were identified. The results of the ecological PRE suggest that it is unlikely that the populations of aquatic receptors occurring in Lake Druid, and terrestrial plant, invertebrate, and vertebrate receptors potentially exposed to Area C surface soils would be adversely affected by contamination associated with Area C.

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GLOSSARY

ABB-ES	ABB Environmental Services, Inc.
AWQC	Federal Ambient Water Quality Criteria
bls	below land surface
BRAC	Base Realignment and Closure
CF	conversion factor
cm	centimeter
DCE	dichloroethene
DRMO	Defense Reutilization Materials Office
EBS	Environmental Baseline Survey
ELCR	excess lifetime cancer risk
FDEP	Florida Department of Environmental Protection
FOSL	Finding of Suitability to Lease
GC	gas chromatograph
HI	hazard index
HQ	hazard quotient
ℓ/day	liters per day
MADEP	Massachusetts Department of Environmental Protection
MCL	maximum contaminant level
MEK	methyl-ethyl ketone
m ³	cubic meter
μg/kg	micrograms per kilogram
μg/ℓ	microgram per liter
mg/day	milligrams per day
mg/kg	milligram per kilogram
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NTC	Naval Training Center
OPT	Orlando Partnering Team
PCE	Tetrachloroethene
PCL	Protective Contaminant Levels

GLOSSARY (Continued)

PRE	preliminary risk evaluation
RBC	risk-based concentrations
SCG	soil cleanup goal
SQC	sediment quality criteria
SQGs	sediment quality guidelines
SWSV	surface water screening values
TCE	trichloroethene
TPH	total petroleum hydrocarbon
UCL	upper confidence limit
USEPA	U.S. Environmental Protection Agency
VOC	volatile organic compound

1.0 INTRODUCTION

This document presents Public Health and Ecological Preliminary Risk Evaluations (PREs) for Area C at the Naval Training Center (NTC) in Orlando, Florida. Soil and groundwater contamination (primarily chlorinated solvents) was discovered during site screening activities at the former laundry (Study Area 13) and the adjacent Study Areas 12 and 14 (ABB Environmental Services, Inc. [ABB-ES], 1995a).

1.1 BACKGROUND AND CONDITIONS. The following is a brief summary of Study Areas 12, 13, and 14. More detailed descriptions can be found in the Final Site Screening Plan, Groups I Through V Study Areas and Miscellaneous Sites (ABB-ES, 1995b).

1.1.1 Study Area 12 Study Area 12 includes the Defense Reutilization Materials Office (DRMO) warehouses and salvage yard (Building 1063), and the truck scales (Building 1069). These buildings are located on Port Hueneme Avenue, in the northcentral portion of Area C, south of the laundry (Study Area 13). The warehouse building was originally constructed in the early 1940s. Site use has reportedly remained consistent (i.e., salvage, scrap, and disposal yard) throughout its history. Based on review of aerial photographs, the original structure occupied approximately one-half the footprint of the current structure. The current warehouse is constructed of sheet-metal walls and roof (i.e., a Butler building) on concrete slab. This structure was added to, or replaced, the original warehouse in 1962. The asphalt paved salvage yard, located west of the warehouse, is occupied by rows of salvage scrap materials, concrete storage bins, and a drum storage area. There is also a transformer carcass storage area in the southwest corner of the study area. Salvage scrap items are also stored in this area, including desks, wheels, vehicles, transformers, and fencing. It is not known how long this area has been paved.

Historical records indicate this area was used to store small quantities (1 to 5 gallons) of hazardous waste between 1959 and 1985. These wastes were stored in the southwest corner of the salvage lot and included the following: paints, insecticides, asbestos, solvents including trichloroethene (TCE) and methyl-ethyl ketone, ammonium hydroxide, sodium sulfide, and mercury.

1.1.2 Study Area 13 Study Area 13 includes the NTC laundry facility (Building 1100) and the former location of a boiler house (Building 1101). Study Area 13 is located in the northwest corner of Area C at Port Hueneme Avenue and Davisville Street. Building 1101 was located east of Building 1100 and was demolished sometime after 1962.

Building 1100 was constructed in 1943, and is a single-story, wood-framed structure that had always been used as an industrial laundry and drycleaning facility, which served the entire military base. The surrounding property is paved asphalt, except for small areas east and west of the building that are landscaped and grass covered. The paved areas around the perimeter of the building include roads and parking lots. Prior to construction of the facility in 1943, the land was undeveloped. The laundry was closed in 1995.

Reportedly, hazardous wastes generated and materials used in the drycleaning process had been poorly managed. At the time of the environmental baseline survey

(ABB-ES, 1994), there were many containers in the building, ranging in volume from ½ to 55 gallons that were open and not labeled. The facility had received a Notice of Violation and a citation from the Florida Department of Environmental Protection (FDEP) for unlabeled and unmanifested waste.

Wastewater from the laundry machines discharged to the sanitary sewer through badly deteriorated drainage trenches in the floor. The floor trenches discharge to a single pipe that is connected to a settling-and-surge tank. Due to the volume of water discharged in this area, a 30,000-gallon surge tank was installed in the mid-1960s. Sludge was removed from this tank annually and disposed of through the DRMO. Waste filters from the drycleaning machines were also generated at the facility. Tetrachloroethene (PCE) was separated from the water and filters by heating the assemblies in a pressure cooker. The filters were disposed of through the DRMO, and the solvent was recycled. In the past, the filters were allegedly disposed of in the North Grinder Landfill (ABB-ES, 1994).

Documented discharges of water contaminated with chlorinated solvents have occurred on the property. Discharges of water from the washing machines to Lake Druid have also been documented.

1.1.3 Study Area 14 Study Area 14 includes Building 1102 and the surrounding paved and grassed areas. The facility is located off Marvin Shields Avenue in the northwest portion of Area C, west of the laundry (Study Area 13). The facilities are used for indoor and outdoor storage of salvageable equipment and materials, in support of DRMO operations. The facility includes a rectangular, one-story, corrugated-steel building constructed on a concrete slab with a gabled roof. The surrounding salvage yard is currently asphalt paved. The building was originally constructed in 1969. Prior to that time, the area between the base laundry (to the northwest) and the current structure was used as a scrap and salvage yard. Equipment and materials currently stored at this location include office furniture, mattresses, refrigerators, and drycleaning equipment.

There is documentation of a release of three gallons of PCE from scrap drycleaning equipment in 1989. Remediation included the removal and disposal of approximately 20 drums of contaminated soil and asphalt. However, the exact location of the release was not indicated (ABB-ES, 1994).

1.2 INVESTIGATION SUMMARY. The site-screening investigation conducted at Area C included a soil-gas survey, surface and subsurface soil sampling, and the installation of 16 monitoring wells to evaluate groundwater. Twelve wells were installed to evaluate the shallow surficial aquifer (approximately 15 to 20 feet below land surface [bls]). Four wells in the immediate vicinity of the laundry were screened at the base of the surficial aquifer, approximately 60 feet bls. Saturated soil samples were collected approximately every 6 feet from the interval between the shallow and deep wells and analyzed on a field gas chromatograph (GC). Combined with the groundwater samples collected from the monitoring wells, these data contributed to the evaluation of the surficial aquifer.

The results of the site screening investigation are provided in detail in the Draft Site Screening Report for Groups I and II (ABB-ES, 1995a). Volatile organic detections are summarized on Figure 1-1. PCE and TCE were detected above the Florida Maximum Contaminant Level (MCL) of 3 micrograms per liter ($\mu\text{g}/\ell$) in several shallow monitoring wells. The highest concentrations of each compound

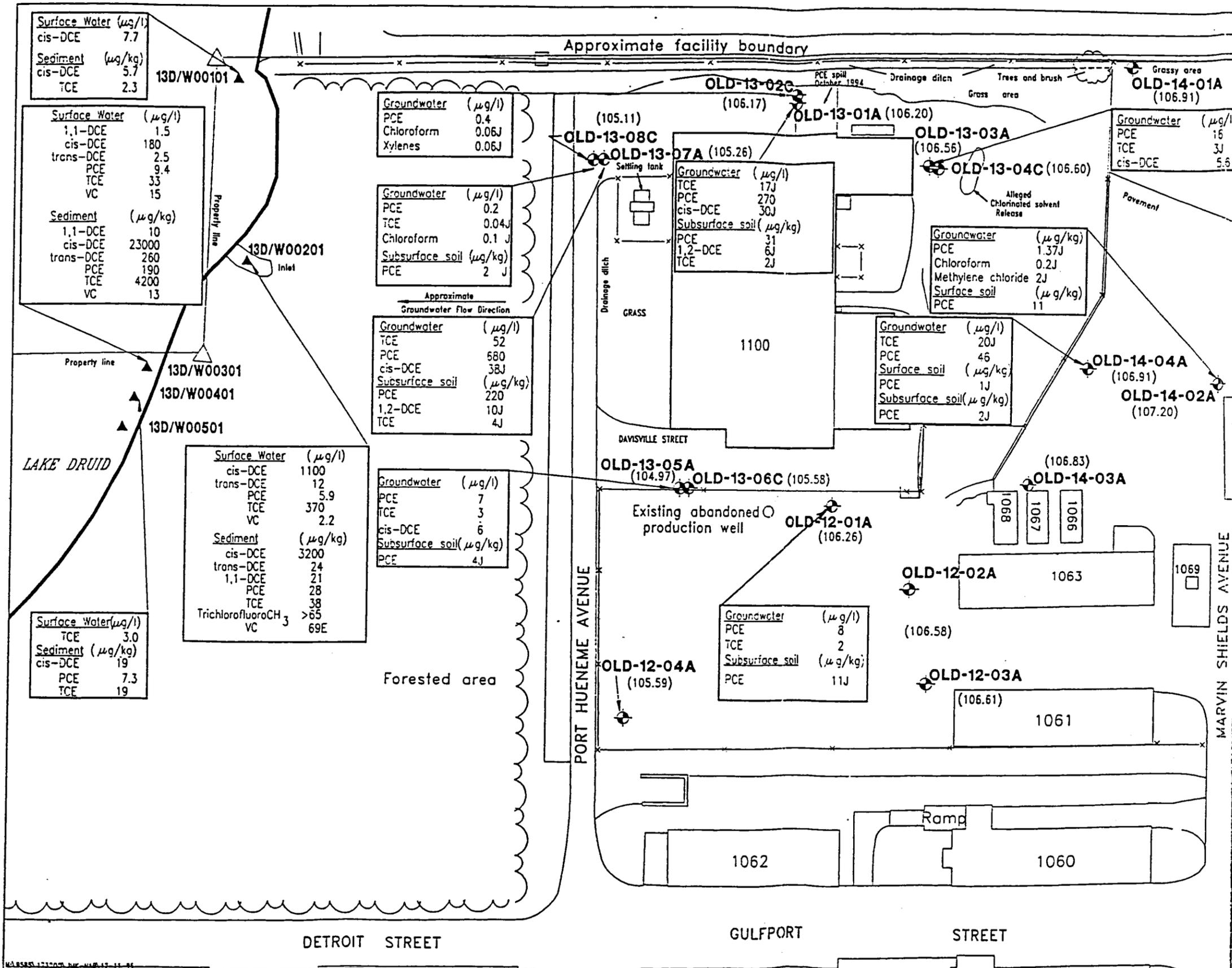
were detected in shallow monitoring well OLD-13-07A, located west of the laundry. PCE and TCE were also detected in the deep well OLD-13-08C, but at concentrations below the MCL. Field GC data for soils collected in this vicinity detected PCE and TCE in soil approximately 18 feet bls at concentrations of 3,700 micrograms per kilogram ($\mu\text{g}/\text{kg}$) and 1,300 $\mu\text{g}/\text{kg}$, respectively.

Lake Druid was not included in the original site screening investigation. After reviewing the site-screening data, the Orlando Partnering Team (OPT) requested that surface water and sediment samples be collected from the lake.

On November 29, 1995, surface water and sediment samples were collected along the shoreline of Lake Druid. These samples were analyzed by an offsite laboratory by U.S. Environmental Protection Agency (USEPA) Method 8010. These results are also summarized on Figure 1-1. PCE, TCE, cis-1,2-dichloroethene (cis-DCE), 1,1-DCE, and vinyl chloride were detected at these locations. At some locations, TCE and cis-DCE were detected in surface water at concentrations greater than had been detected in groundwater collected from the monitoring wells. Vinyl chloride and 1,1-DCE had not been detected in groundwater.

On December 11, 1995, additional surface water and sediment samples were collected in Lake Druid approximately 50 west of the locations shown on Figure 1-1. The water depth was approximately 4 feet. Cis-DCE was detected in surface water collected from each deeper location. TCE was also detected in surface water opposite sample location 13D/W00201. TCE and PCE were detected in sediment from this deeper location, and from the location 50 feet west of sample 13W/D00301. Chlorinated solvent concentrations from the locations farther out in the lake were generally much lower than at the shoreline, sometimes by two orders of magnitude.

The PRE for Area C was conducted using the data outlined above.



LEGEND

OLD-14-01A Monitoring well and designation
 (106.91) Water level elevation on 9/13/95

A Suffix designates shallow (15 to 20 feet) below land surface (bis) well

C Suffix designates deep (60 feet) bis well

PCE perchloroethylene
 TCE trichloroethene
 DCE dichloroethene
 VC vinyl chloride
 J estimated value
 $\mu\text{g/l}$ micrograms per liter
 $\mu\text{g/kg}$ micrograms per kilogram

FIGURE 1-1
VOLATILE ORGANIC DETECTIONS
AREA 'C'

AREA 'C' PRELIMINARY
RISK EVALUATION (PRE)

NAVAL TRAINING CENTER
ORLANDO, FLORIDA



2.0 PRELIMINARY RISK EVALUATION

The PREs are screening-level evaluations of potential risks that environmental analytes may pose to human and ecological receptors. The results of the PREs are used in conjunction with other information gathered during site screening to focus future site activities.

The specific objectives of the PRE are to:

- review the existing analytical data collected for surface soil, subsurface soil, surface water, sediment, and groundwater;
- characterize the current and potential future land uses and ecological status of each site to identify potential human and ecological receptors and contaminant exposure pathways;
- compare the analytical data to available human health and ecological screening guidelines and criteria to identify chemicals that may be associated with risks of concern;
- identify data gaps and make recommendations for future actions.

Specifically, the PREs at NTC, Orlando, Area C were conducted to aid in determining whether or not additional remedial investigations are needed at this site.

This chapter provides a brief summary of the methodology used to conduct the Public Health and Ecological PREs (Section 2.1), results of the Public Health and Ecological PREs (Section 2.2), and conclusions of the PREs (Section 2.3).

2.1 PRELIMINARY RISK EVALUATION METHODOLOGY. The human health and ecological PREs are generally consistent with methodology provided in the USEPA Region IV memorandum "Amended Guidance on Preliminary Risk Evaluations (PREs) for the Purpose of Reaching a Finding of Suitability to Lease (FOSL)" (USEPA, 1994a), and minutes of meetings with USEPA and FDEP concerning PREs (ABB-ES, 1995c).

In summary, the PREs provide an evaluation of the primary exposure pathways that might be expected to contribute substantially to potential human and ecological risks associated with exposures to analytes in various media at the site. The PREs are conducted by comparing maximum detected analyte concentrations with background concentrations and readily available risk screening values. This methodology is designed to result in a conservative evaluation that does not overlook or dismiss potentially substantial risks. The PRE is most useful in determining risks that are not significant, rather than determining the nature and magnitude of risks associated with the site.

The technical approaches used for the public health and ecological PREs are described below in Subsections 2.1.1 and 2.1.2, respectively.

2.1.1 Public Health PRE The public health PRE is conducted by comparing maximum detected analyte concentrations in groundwater, surface water, sediment, surface soil (soil collected 0-2 feet bls), and subsurface soil (soil collected 2 to 10

feet bls), in addition to estimated indoor air concentrations of volatile organic compounds (VOCs), with readily available screening values including the following:

- risk-based concentrations (RBCs) published by USEPA Region III (USEPA, 1995a) (all media except surface water)
- Federal MCLs (USEPA, 1995b) (groundwater only)
- FDEP guidance concentrations (FDEP, 1994) (groundwater only)
- FDEP soil cleanup goals for military sites (FDEP, 1995) (soils only).
- surface water screening values (SWSVs) developed by ABB-ES (Appendix B)

Comparisons to RBCs and SWSVs are expressed through a risk ratio. For analytes with maximum concentrations above the background concentration, risk-ratios are calculated by dividing the maximum detected analyte concentration by the RBC or SWSV. Separate risk ratios are calculated for carcinogenic and noncarcinogenic effects. Summary risk ratios for carcinogenic and noncarcinogenic effects are then calculated by summing the cancer risk ratios for all carcinogenic analytes, and the noncancer risk ratios for noncarcinogenic analytes, respectively.

For groundwater, maximum detected groundwater concentrations are also compared directly to MCLs and FDEP criteria. Any analytes with maximum concentrations that exceed these values are identified. In addition, because the potential may exist for VOCs in groundwater and subsurface soil to volatilize and accumulate in structures located on the ground surface above, potential exposures to indoor air were estimated using a VOC migration model (Farmer Model) (Appendix C). The estimated indoor air concentrations were then compared with RBCs for ambient air. Risk ratios are not-calculated for the comparison to regulatory criteria.

USEPA Region III RBCs are based on toxicity constants and standard exposure scenarios and correspond to fixed levels of risk. For noncarcinogenic chemicals, the RBC is based on a hazard quotient (HQ) of 1. For carcinogenic chemicals the RBC is based on a lifetime cancer risk of 1×10^{-6} . The standard exposure scenarios (residential and industrial) for which RBCs have been developed include the inhalation of ambient air and the ingestion of tapwater, fish tissue, and soil. For groundwater at Area C, RBCs for tapwater are used for risk screening of potential direct contact exposures. Indirect exposures to groundwater VOCs, which may volatilize to aboveground structures, are evaluated with RBCs for ambient air. For surface soils, subsurface soils, and sediments, RBCs for residential soil are used. RBCs for tapwater exposures are calculated assuming that children (age 1-6 years) and adults ingest 1 liter or 2 liters per day (L/day) of groundwater that has been used as drinking water, respectively, 350 days per year for a combined total of 30 years. RBCs for ambient air use the same exposure parameters for tapwater exposure, substituting inhalation rates of 12 cubic meters (m^3) (child) and 20 m^3 per day (adult) for water ingestion rates. RBCs for residential soil exposures are calculated assuming that children (age 1-6 years) and adults ingest 200 or 100 milligrams per day of soil, respectively, 350 days per year for a combined total of 30 years. Dermal and inhalation exposures are not considered in the calculation of RBCs.

For noncarcinogenic analytes, a risk-ratio above 1 indicates that the maximum detected analyte concentration exceeds the RBC and, therefore, exceeds a HQ of

1. A noncancer summary risk ratio above 1 indicates that additive exposures to the maximum detected concentrations of all noncarcinogenic analytes exceed a hazard index (HI) of 1. An HI less than 1 indicates that noncarcinogenic toxic effects are unlikely. HIs greater than 1 indicate non-carcinogenic risk associated with potential exposures may be of concern. As the HI increases, so does the likelihood that adverse effects might be associated with exposure. However, HI values greater than 1 should be interpreted with caution, since the toxicities of all analytes are not necessarily additive. The acceptable risk level for noncarcinogenic effects is generally an HI of 1 or less (USEPA, 1989), although values greater than 1 may also be acceptable.

For carcinogenic analytes, a risk ratio above 1 indicates that the maximum detected analyte concentration exceeds the RBC and, therefore, potential exposures may be associated with excess lifetime cancer risk greater than 1×10^{-6} . A cancer summary risk ratio above 1 indicates that additive exposures to the maximum detected concentrations of all carcinogenic analytes may be associated with an excess lifetime cancer risk (ELCR) greater than 1×10^{-6} . The USEPA guidelines, established in the National Oil and Hazardous Substances Contingency Plan (NCP), indicate that the allowable total lifetime cancer risk due to exposure to the analytes at a site, by each complete exposure pathway, is within a range of 1 in 1 million (1×10^{-6}) to 1 in 10,000 (1×10^{-4}) (USEPA, 1990). These criteria are generally based on exposure to a conservative estimate of the average concentrations of analytes.

Because Lake Druid surface water is not used as a source of drinking water, comparisons of surface water data with screening values developed for potential drinking water exposures are not appropriate. Therefore, surface water screening values based on potential swimming exposures were developed by ABB-ES to evaluate surface water data. Health-based SWSVs were developed using risk assessment methodology consistent with USEPA guidance. SWSVs were developed for a child (age 1-6) and adult resident that are assumed to be exposed to surface water through incidental ingestion and dermal contact for 2.6 hours per day, 45 days per year, for 30 years. Using the ratio method described below, SWSVs were calculated for the surface water concentrations associated with 1×10^{-6} excess lifetime cancer risk with an HI of 1. The risk assessment spreadsheets, including documentation of exposure parameters and presentation of SWSV calculations, are provided in Appendix B.

$$\frac{\text{Surface water Risk}}{\text{Surface water Concentration}} = \frac{\text{Target Risk}}{\text{SWSV}} \quad (1)$$

where: Surface water risk is the ELCR or HI calculated in the risk spreadsheets (Appendix B), and
Target Risk is ELCR = 1×10^{-6} or HI = 1

For each analyte, the lower of the calculated screening concentrations for cancer or noncancer risk was selected as the final SWSV.

2.1.2 Ecological PRE The ecological PRE is conducted by comparing the maximum concentrations of analytes detected in surface water, sediment, and surface soil (soil collected 0-2 feet bls) with readily available screening values. Since ecological receptors are typically not exposed to subsurface soils (soils

collected deeper than 2 feet), this medium is not evaluated in the ecological PRE. Likewise, ecological receptors do not have direct contact exposures to groundwater and, therefore, this medium is not evaluated.

The ecological PRE for surface water is conducted by comparing maximum detected concentrations of analytes in surface water with surface water screening values based on water quality criteria for the protection of aquatic organisms. The ecological PRE for sediment is conducted by comparing maximum detected concentrations of analytes in sediment with sediment screening values based on sediment quality criteria for the protection of aquatic organisms. The ecological PRE for surface soil is conducted by comparing the maximum detected concentrations of analytes in surface soil with surface soil screening values developed to protect terrestrial vertebrate receptors, plants, and invertebrates. For all media, analytes that are detected at maximum concentrations above the background concentrations and above the screening values are identified.

Surface water screening values include the following:

- Federal Ambient Water Quality Criteria (USEPA, 1986),
- USEPA Region IV Chronic Freshwater Quality Screening Values (USEPA, 1994b), and
- Florida Class III Fresh Water Standards (Florida Administrative Code, Chapter 62-302, 1995).

Sediment screening values include the following:

- Sediment Quality Criteria (SQC) for the protection of Benthic Organisms (USEPA, 1988)
- USEPA Region IV Sediment Screening Values for Hazardous Waste Sites (USEPA, 1994c)
- Florida Sediment Quality Guidelines (SQG) (MacDonald, 1994)
- Ontario Ministry of Environment SQG; lowest effect levels (Persaud et al., 1992).

The lesser of the surface water and sediment screening values provided by each of these sources are used as the aquatic screening values to evaluate surface water and sediment data at Area C.

USEPA Region IV does not specify a methodology for assessing surface soil exposures to ecological receptors (USEPA, 1994a), and no State or Federal standards or guidelines exist for surface soil exposure. Therefore, this exposure pathway is evaluated through comparison of maximum analyte concentrations in surface soil with Protective Contaminant Levels (PCLs) for terrestrial vertebrate receptors (calculated by ABB-ES), phytotoxicity benchmark values for plants (Hill and Suter, 1994; Hulzebos et al., 1993), and invertebrate toxicity benchmark values for terrestrial invertebrates (Neuhauser, 1985; and others). This method of evaluation has been reviewed by the U.S. Army, Massachusetts Department of Environmental Protection, regulators in USEPA Regions I and IV, and the FDEP.

The PCL value is calculated using a food-web model, which assumes that terrestrial vertebrate receptors could be exposed to analytes in surface soil through incidental surface soil ingestion and food-chain uptake (e.g., ingestion of plants and invertebrates exposed to the soil). PCLs are calculated for receptors that could potentially occur at Area C, including the short-tailed shrew, the white-footed mouse, and the American Robin. The lowest PCL value for these three receptors is selected as the screening value to evaluate surface soil data. This value is expected to be protective of the population of terrestrial vertebrate receptors that could potentially be exposed to the surface soil at Area C.

2.2 PRELIMINARY RISK EVALUATION RESULTS. The results of the human health PRE are presented in Appendix A, Tables A-1 through A-5, and discussed in Subsection 2.2.1. The results of the ecological PRE are presented in Appendix A, Tables A-5 through A-8, and discussed in Subsection 2.2.2.

2.2.1 Human Health Preliminary Risk Evaluation This PRE identifies potential risks that may be associated with current and potential future exposures to groundwater associated with Area C, surface soil, and subsurface soil collected at Area C, and surface water and sediment collected at Lake Druid. Sample locations for these media are presented on Figure 1-1.

Although not part of Area C, a small area of Lake Druid adjacent to Area C was sampled (Figure 1-1). Data collected during the site investigation suggest that groundwater associated with Area C may be discharging to Lake Druid, located approximately 300 feet downgradient of the site. Analytical data for surface water and sediment samples collected in the vicinity of the potential groundwater discharge area substantiate site-screening results. Therefore, surface water and sediment samples collected in this portion of Lake Druid are included in the PRE.

Under current land use, there are no direct contact exposures to surface soil and subsurface soil, since samples were collected from beneath a paved area and there are no excavation activities presently occurring which could result in potential exposures. Groundwater associated with Area C is not used as a source of residential or industrial water and, therefore, there are no direct contact exposures. However, because the depth to groundwater is relatively shallow (i.e., approximately 6 feet), there may be potential for volatile contaminants in the groundwater to volatilize into aboveground structures; exposures to contaminated air could potentially occur. As discussed above, surface water is not used as a source of drinking water. Swimming is unlikely in the area of Lake Druid that was sampled because the area abuts U.S. Navy property, is not readily accessible to residents living on the lake, and does not present an attractive place for swimming (e.g., the area appeared "stagnant" and filled with aquatic vegetation). However, to provide a conservative evaluation of risks associated with potential exposures to surface water and sediment, swimming exposures were evaluated.

Under future land use, it is assumed that groundwater associated with this site could be used as a source of residential drinking water; exposures could occur through ingestion, dermal contact, and inhalation of volatiles. If the pavement was removed, surface soils could be made accessible for direct contact exposures (i.e., incidental ingestion, dermal contact, and inhalation of dust and vapors). If construction activities were to take place, subsurface soils could be re-located to the surface; direct contact exposures could occur through incidental ingestion, dermal uptake, and inhalation of vapors and dust.

Groundwater. Appendix A, Table A-1 presents the results of the human health PRE for groundwater. The summary cancer risk ratio is 1,300. This indicates that additive potential exposures to the maximum detected concentrations of carcinogenic analytes in groundwater might be associated with an excess lifetime cancer risk as high as 1×10^{-3} (1 in 1,000). The analytes contributing the largest percentage to the cancer risk ratio include tetrachloroethylene and arsenic. Risk ratios for these analytes are 620 and 610, respectively, which correspond to estimated cancer risks of 6×10^{-4} for each analyte. The maximum detected concentrations of trichloroethene and beryllium also exceed RBCs by factors of more than 10, corresponding to estimated cancer risks between 1×10^{-5} and 1×10^{-4} . Maximum detected concentrations of tetrachloroethylene, trichloroethene, and bis(2-ethylhexyl)phthalate also exceed Federal MCLs and FDEP guidance concentrations.

The summary noncancer risk ratio for groundwater is 5.6 (Appendix A, Table A-1). The individual risk ratios contributed by arsenic (2.5) and antimony (1.2) account for approximately one-half of the summary noncancer risk ratio. The maximum detected concentration of antimony exceeds the MCL and the FDEP guidance concentration. The maximum detected concentrations of aluminum and iron exceed secondary MCLs, which are promulgated for aesthetic or economic reasons (not health-based), and FDEP guidance concentrations. The maximum detected concentration of sodium exceeds the Federal health advisory and the FDEP guidance concentration.

The PRE for potential exposures to estimated indoor air VOC concentrations is presented in Appendix C. Of the three VOCs detected in well OLD-13-01A (which is the well adjacent to the abutting residential property), estimated indoor air concentrations of two VOCs (tetrachloroethylene and trichloroethene) exceed RBCs for ambient air. The summary cancer risk ratio is 66, with ratios for tetrachloroethylene and trichloroethene of 58 and 8.3, respectively. These ratios correspond to estimated cancer risks of 6×10^{-5} and 8×10^{-6} , respectively. The summary noncancer risk ratio is less than 1.

Surface Water. Appendix A, Table A-2 presents the public health PRE for surface water. The summary cancer risk ratio is 28. This indicates that additive potential exposures to the maximum detected concentrations of carcinogenic analytes in surface water might be associated with an excess lifetime cancer risk as high as 3×10^{-5} (3 in 10,000). The analyte contributing the largest percentage to the cancer risk ratio is vinyl chloride. The risk ratio for this analyte is 19, which corresponds to estimated cancer risks of 2×10^{-5} .

The summary noncancer risk ratio for surface water is 0.3 (Appendix A, Table A-2). The majority of this risk is contributed by cis-1,2-dichloroethene, which was detected at a maximum concentration of 1,100 $\mu\text{g}/\ell$.

Sediment. Appendix A, Table A-3 presents the public health PRE for sediment. The summary cancer risk ratio is 0.31. This indicates that additive potential exposures to the maximum detected concentrations of carcinogenic analytes in sediment might be associated with an excess lifetime cancer risk as high as 3×10^{-7} . The analyte contributing the largest percentage to the cancer risk ratio is vinyl chloride, with a cancer risk ratio of 0.2 (corresponding to an estimated cancer risk of 2×10^{-7}).

The summary noncancer risk ratio for sediment is 0.03 (Appendix A, Table A-3). The majority of this risk is contributed by cis-1,2-dichloroethene, which was detected at a maximum concentration of 23,000 mg/kg.

Surface Soil. Appendix A, Table A-4 presents the public health PRE for surface soil. The summary cancer risk ratio is 1.4. This indicates that additive potential exposures to the maximum detected concentrations of carcinogenic analytes in surface soil may be associated with excess lifetime cancer risk as high as 1×10^{-6} . No analytes are associated with individual cancer risk ratios above 1. Only arsenic was detected at a maximum concentration above the Florida Soil Cleanup Goals (SCGs). However, the maximum detected concentration is below the background concentration.

The summary noncancer risk ratio for surface soil is 0.38 (Appendix A, Table A-2). The maximum detected concentration of arsenic exceeds the SCG, but is below the background concentration.

Subsurface Soil. Appendix A, Table A-5 presents the results of the human health PRE for subsurface soil. The summary cancer risk ratio is 11. This indicates that additive potential exposures to the maximum detected concentrations of carcinogenic analytes in subsurface soil may be associated with excess lifetime cancer risk as high as 1×10^{-5} . The analytes contributing the largest percentage to the cancer risk ratio include arsenic, beryllium, and Aroclor-1260. Risk ratios for these analytes are 6, 3.3, and 1.3, respectively, which correspond to estimated cancer risks between 1×10^{-6} and 1×10^{-5} for each analyte. The maximum detected concentration of tetrachloroethylene exceeds the leaching SCG.

The summary noncancer risk ratio for subsurface soil is 2.3 (Appendix A, Table A-3). The individual risk ratio contributed by total petroleum hydrocarbons (TPH) (1.6) accounts for the majority of the summary noncancer risk ratio. The screening value for TPH is not an RBC, but rather a risk-based screening value developed by ABB-ES for potential exposures to gasoline in soil. Since volatile compounds typically associated with gasoline, which are more toxic than heavier petroleum compounds, were not detected in the subsurface soil at this site, this screening value is conservative for this site.

There are several sources of uncertainty associated with the human health PRE that should be kept in mind when interpreting the results. Among those that may influence the results most substantially are described below.

- No evaluation of potential groundwater direct-contact inhalation exposures: Tapwater RBCs account for ingestion intakes only, and do not address additional exposures that may occur to VOCs through inhalation and dermal contact during bathing or dishwashing activities. Although ingestion exposures often represent a greater percentage of the total exposure, not evaluating potential inhalation exposures from groundwater results in underestimation of potential risk for volatile compounds.
- Estimated indoor-air concentrations: Indoor-air concentrations were estimated to provide a preliminary evaluation of the potential exposures that might occur if VOCs in groundwater and subsurface soil migrated as vapor and accumulated in overlying structures, specifically the residences adjacent to Area C. For this reason, groundwater VOC concentrations detected in well OLD-13-01A were used to estimate

potential indoor air concentrations. This well was selected to represent groundwater concentrations because it is located closest to the residences and, lacking more sufficient data, provides the best estimate of potential concentrations associated with this exposure pathway. However, it is unknown whether or not VOC contamination is present under the residential area. This, in addition to several other variables such as potential VOC concentration in groundwater, depth to groundwater, soil moisture and porosity, and building construction details, lends considerable uncertainty to this evaluation.

- Potential exposures to surface water and sediment in Lake Druid: Exposures to Lake Druid surface water were evaluated for potential swimming activities by a resident living on the lake. Evaluation of this exposure scenario represents a conservative approach because it is based on activities that would result in a reasonable maximum exposure to surface water. Potential exposures to surface water from fishing and boating activities would be considerably lower, as VOCs do not substantially accumulate in fish tissue, and inhalation exposures to VOCs in surface water and sediment would be lower than surface water ingestion and dermal contact exposures. However, risks for these potential exposures would be additive to risks for swimming exposures.
- Evaluation of the maximum detected analyte concentration: Developing summary risk estimates using maximum detected analyte concentrations provides a conservative evaluation, as it is unlikely that a receptor would be simultaneously exposed to all sample locations associated with maximum detected concentrations. Evaluation of the average concentration or 95th percent upper confidence limit (UCL) on the arithmetic mean concentration results in lower and more realistic risk estimates.
- No evaluation of potential noncancer risks from exposures to carcinogenic analytes: With the exception of arsenic, published RBCs are based on either a noncancer or cancer endpoint, depending upon which basis results in a lower (more protective) RBC; chemicals with RBCs based on a cancer endpoint are not included in the noncancer risk evaluation. Because all chemicals have an inherent noncancer (systemic) toxicity, excluding carcinogenic chemicals from the noncancer risk evaluation results in an underestimation of potential noncancer risk.
- Relative contribution of background to the risk estimate: For some inorganic analytes such as arsenic and beryllium, background concentrations exceed RBCs. The background groundwater arsenic concentration, for example, contributes approximately 18 percent of the estimated risk. This suggests that estimated risks for these analytes are not entirely attributable to site-related contamination.

2.2.2 Ecological Preliminary Risk Evaluation This PRE identifies potential risks that may be associated with exposures to surface soils collected at Area C and surface water and sediment collected at Lake Druid. Sample locations for these media are presented on Figure 1-1.

Data collected during the site investigation suggest that groundwater associated with Area C may be discharging to Lake Druid, located approximately 300 feet downgradient of the site. Analytical data for surface water and sediment samples

collected in the vicinity of a potential discharge area substantiate site-screening results (Figure 1-1). Therefore, although the portion of Lake Druid adjacent to Area C is not considered part of Area C, it is included in this PRE to determine if contamination potentially associated with Area C poses a risk to aquatic receptors.

Surface soils were collected from an area that is presently covered by pavement. Therefore, terrestrial vertebrate, plant, and invertebrate receptors are not currently exposed to surface soils at Area C. The surface soil risk evaluation provides an estimate of potential risks that may be present if the pavement in this area was to be removed in the future, allowing for direct contact with the soils.

Surface Water. Appendix A, Table A-6 presents the results of the ecological PRE for surface water. Of the six chlorinated VOCs detected in surface water, only the maximum detected concentration of trichloroethene exceeds the surface water screening value. Maximum concentrations of four other VOCs do not exceed screening values, and a screening value is not available for vinyl chloride.

Sediment. Appendix A, Table A-7 presents the results of the ecological PRE for sediment. No screening values are available for any of the six chlorinated VOCs detected in sediment. Therefore, data reported for sediment cannot be directly evaluated. A method of indirectly evaluating potential sediment impacts is discussed below.

The presumed source of the VOCs in surface water and sediment is groundwater, which discharges through the sediments and into the surface water of the lake. As groundwater discharges, some amount of each contaminant may sorb to sediment particulates, while the rest remains free in the pores between sediment particulates (i.e., the sediment porewater). The fraction of contaminant within the sediment porewater is generally considered to be more bioavailable than the fraction that is sorbed to sediments (USEPA, 1988). If it is assumed that all of the contaminants in groundwater are contained within the porewater (i.e., that none are sorbed to the sediment particulates), then groundwater concentrations may be representative of sediment porewater concentrations. Comparing these estimated sediment porewater concentrations to screening criteria provides an estimate of potential risks to aquatic organisms in sediments at the point of groundwater discharge.

A comparison of maximum groundwater concentrations (presented previously in Appendix A, Table A-1) with surface water screening values (presented in Appendix A, Table A-6) indicates that of the three VOCs detected in both groundwater and sediment (cis-1,2-dichloroethene, tetrachloroethylene, and trichloroethene), only the maximum detected groundwater concentration of tetrachloroethylene (680 $\mu\text{g/L}$) exceeds the surface water screening value (84 $\mu\text{g/L}$). However, this evaluation does not consider potential exposures to porewater concentrations of 1,1-dichloroethene, trans-1,2-dichloroethene, and vinyl chloride. These VOCs, which may result from chlorinated ethene degradation, were detected in sediment but not in groundwater and, therefore, the potential porewater concentrations are unknown.

Surface Soil. Appendix A, Table A-8 presents the results of the ecological PRE for surface soil. No organic analytes were detected at maximum concentrations above terrestrial PCL, plant, or invertebrate screening values. No inorganic analytes were detected at maximum concentrations above PCL values. Plant

screening values are exceeded by the maximum detected concentrations of aluminum, chromium, and zinc. The maximum concentration of copper exceeds the invertebrate screening value.

The screening values for aluminum, copper, and zinc are exceeded by factors of less than two, whereas the chromium screening value is exceeded by a factor of four. However, plant screening values for aluminum and chromium are based on background soil concentrations because the published literature-based screening values are below the soil background concentrations for Area C. Plants that may occur in the vicinity of this site would not be adversely affected by background concentrations of these inorganic analytes. Although the concentrations at which phytotoxicity may occur are unknown, it is unlikely that plants would be adversely affected by exposures to concentrations slightly above background. Likewise, it is unlikely that plant and invertebrate exposures to zinc and copper concentrations, respectively, that are slightly above the screening values would adversely affect plants and invertebrates.

2.3 PRELIMINARY RISK EVALUATION CONCLUSIONS. Conclusions of the public health and ecological PREs are presented below.

- Under current land-use conditions, a potential may exist for VOC vapor migration from groundwater and subsurface soil to ambient air in above-ground residential structures. Potential cancer risks based on estimated indoor air concentrations for a theoretical structure located on the Area C boundary adjacent to the residential area are within the USEPA acceptable cancer risk limits, but are greater than 1×10^{-6} . However, additional data are required to determine the nature and extent of potential groundwater and subsurface soil contamination in the vicinity of the residential property.
- Potential human receptor exposures to tetrachloroethylene, trichloroethene, arsenic, and beryllium in groundwater used as a residential source of water may pose cancer and noncancer risks above USEPA acceptable risk levels.
- Maximum detected concentrations of tetrachloroethylene, trichloroethene, and arsenic in groundwater, arsenic in surface soil, and tetrachloroethylene, arsenic, and beryllium in subsurface soil exceed Federal and State regulatory criteria.
- Based on available sampling and analytical data, potential exposures to VOC contamination in surface water and sediment from recreational swimming do not pose cancer and noncancer risks above USEPA acceptable risk levels. Cancer risks associated with potential surface water exposures are greater than 1×10^{-6} . However, these risk estimates do not consider additive exposures from other surface water and sediment exposure pathways that could potentially exist.
- It is unlikely that the populations of terrestrial vertebrate, plant, and soil invertebrate receptors would be adversely impacted by potential future exposures to surface soils at Area C.

- It is unlikely that the populations of aquatic receptors occurring in Lake Druid would be adversely impacted by potential exposures to VOCs in surface water and sediment in the area of suspected discharge. However, potential risks associated with sediment exposures could only be qualitatively evaluated, and this represents an uncertainty.
- The human health and ecological PREs for surface water and sediment are limited. Surface water and sediment sampling in Lake Druid was confined to an area of suspected groundwater discharge, and samples were analyzed for chlorinated VOCs only. Risks were evaluated for the data available and, therefore, are representative of potential exposures to a limited number of analytes in a defined area of the lake. The potential presence of contamination in other areas of Lake Druid has not been well characterized. Although supplemental samples collected at locations approximately 50 feet further into the lake from the original sampling points contained substantially lower concentrations of chlorinated VOCs (i.e., less than 50 parts per billion), the characteristics of groundwater discharge into Lake Druid have not been fully established. Risks associated with other areas of potential groundwater discharge and other chemicals have not been evaluated.
- There are no human or ecological receptor direct contact exposures to groundwater and subsurface soil at Area C under current land-use conditions.

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APPENDIX A

PRELIMINARY RISK EVALUATION TABLES

TABLE A-1
Human Health Preliminary Risk Evaluation of Groundwater ¹

Area "C"
Naval Training Center
Orlando, Florida

ANALYTE	Frequency of Detection ²	Maximum Detected Concentration	Background Concentration ³	Maximum Exceeds Background?	USEPA Region III RBC ⁴	Risk Ratio ⁵	Federal MCL ⁶	Maximum Exceeds Federal MCL?	FDEP Guidance Concentration ⁷	Maximum Exceeds Guid. Conc.?
CARCINOGENIC EFFECTS										
VOLATILES (µg/L)										
Chloroform	3 / 18	0.2	ND	YES	0.15	1.3	100	NO	• 6	NO
Methylene chloride	1 / 18	2	ND	YES	4.1	0.49	5	NO	• 5	NO
Tetrachloroethylene	11 / 18	680	ND	YES	1.1	618	5	YES	• 3	YES
Trichloroethene	9 / 18	52	ND	YES	1.6	33	5	YES	• 3	YES
SEMIVOLATILES (µg/L)										
Bis(2-Ethylhexyl) phthalate	3 / 18	33	ND	YES	4.8	6.9	6	YES	• 6	YES
INORGANICS (µg/L)										
Arsenic	8 / 18	27.6	5	YES	0.045	613	50	NO	• 50	NO
Beryllium	7 / 18	1.1	ND	YES	0.016	69	4	NO	• 4	NO
SUMMARY CANCER RISK RATIO:						1300				
NON-CARCINOGENIC EFFECTS										
VOLATILES (µg/L)										
1,2-Dichloroethene (cis)	5 / 18	38	ND	YES	61	0.62	70	NO	• 70	NO
Xylene (total)	1 / 18	0.06	ND	YES	12,000	0.0000050	10,000	NO	• 10000	NO
SEMIVOLATILES (µg/L)										
Dimethylphthalate	1 / 18	1	ND	YES	370,000	0.0000027	NA	NA	• 70000	NO
Phenol	1 / 18	1	ND	YES	22,000	0.000045	NA	NA	• 10	NO
INORGANICS (µg/L)										
Aluminum	15 / 18	17300	4067	YES	37,000	0.47	200	YES	• 200	YES
Antimony	4 / 18	17.8	4.1	YES	15	1.17	6	YES	• 6	YES
Arsenic	8 / 18	27.6	5	YES	11	2.51	50	NO	• 50	NO
Barium	18 / 18	145	31.4	YES	2,600	0.056	2,000	NO	• 2000	NO
Cadmium	1 / 18	3.2	5.6	NO	18	NE	5	NO	• 5	NO
Calcium	18 / 18	125000	36830	YES	1,055,398	0.12	NA	NA	• NA	NA
Chromium	2 / 18	20.8	7.8	YES	180	0.12	100	NO	• 100	NO
Copper	1 / 18	47.9	5.4	YES	1,500	0.032	1,300	NO	• 1000	NO
Iron	18 / 18	2010	1227	YES	11,000	0.18	300	YES	• 300	YES
Lead	1 / 18	2.1	4	NO	15	NE	15	NO	• 15	NO
Magnesium	18 / 18	5030	4560	YES	118,807	0.042	NA	NA	• NA	NA
Manganese	18 / 18	32.8	17	YES	180	0.18	50	NO	• 50	NO
Mercury	3 / 18	0.14	0.12	YES	11	0.013	2	NO	• 2	NO
Potassium	18 / 18	3730	5400	NO	297,016	NE	NA	NA	• NA	NA
Selenium	3 / 18	5.5	9.7	NO	180	NE	50	NO	• 50	NO
Silver	2 / 18	3.6	ND	YES	180	0.020	100	NO	• 100	NO
Sodium	18 / 18	41600	18222	YES	396,022	0.11	20,000	YES	• 160000	NO
Vanadium	12 / 18	16.9	20.6	NO	260	NE	NA	NA	• 49	NO
Zinc	10 / 18	24.4	4	YES	11,000	0.002	5,000	NO	• 5000	NO
WATER QUALITY PARAMETERS (mg/L)										
Total Suspended Solids	2 / 6	108	ND	YES	NA	NA	NA	NA	• NA	NA
SUMMARY NON-CANCER RISK RATIO:						5.6				

TABLE A-1
Human Health Preliminary Risk Evaluation of Groundwater ¹

Area "C"
Naval Training Center
Orlando, Florida

ANALYTE	Frequency of Detection ²	Maximum Detected Concentration	Background Concentration ³	Maximum Exceeds Background?	USEPA Region III RBC ⁴	Risk Ratio ⁵	Federal MCL ⁶	Maximum Exceeds Federal MCL ⁷	FDEP Guidance Concentration ⁷	Maximum Exceeds Guid. Conc. ⁷
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NOTES:

¹ Based on analytical data for the following sample identifiers: 12G00101 TO 12G00401, 13G00101 TO 13G00801 (duplicate at 13G00101), 14G00101 TO 14G00401, 1400G302 (duplicate at 14G00401)

² Frequency of Detection is equal to the number of samples in which the analyte is detected in relation to the total number of samples.

³ The background screening value is twice the average of detected concentrations for inorganic analytes. For organic analytes, values are the mean of detected concentrations, presented for comparison purposes only.

⁴ Values are from USEPA Region III RBC table, October 20, 1995 (USEPA, 1995).

RBCs are for tap water and are based on a hazard quotient of 1 or an excess lifetime cancer risk of 1 in 1 million.

Arsenic is evaluated as a carcinogen and a non-carcinogen.

Value for chromium based on chromium VI.

Values for essential nutrients (calcium, magnesium, potassium, and sodium) are based on Recommended Daily Allowances (RDAs), and are derived by ABB-ES.

RBC is not available for lead; value is the treatment technique action limit for lead in drinking water distribution systems identified in the Drinking Water Standards and Health Advisories (USEPA, 1995).

Value for mercury based on inorganic mercury.

⁵ The risk ratio is equal to the maximum detected analyte concentration divided by the USEPA Region III RBC. Risk ratios are calculated for analytes with a maximum detected concentration greater than the background concentration.

A summary cancer risk ratio of 1 roughly corresponds to excess lifetime cancer risk of 1×10^{-6} ; a summary non-cancer risk ratio of 1 roughly corresponds to a hazard index of 1. These ratios tend to overestimate risks, since they are based on maximum detected concentrations.

⁶ Federal MCL published in Drinking Water Regulations and Health Advisories, May 1995 (USEPA, 1995).

Current MCLs listed for bromodichloromethane and chloroform. 1994 Proposed rule for disinfectants and disinfection byproducts: total for all trihalomethanes combined cannot exceed 80 ppm.

Value for aluminum is a secondary MCL and represents the upper limit of the range (50 - 200 $\mu\text{g/L}$).

Value for copper is the treatment technique action level; the secondary MCL is 1000 $\mu\text{g/L}$.

Value for iron is a secondary MCL.

Value for lead is the action level triggering treatment techniques.

Value for manganese is a secondary MCL.

Value for silver is a secondary MCL and a lifetime health advisory.

Value for sodium is a health advisory guideline value.

Value for zinc is a lifetime health advisory; the secondary MCL is 5000 $\mu\text{g/L}$.

⁷ Florida Department of Environmental Protection Groundwater Standards, June 1994.

⁸ FDEP Primary Standard

⁹ FDEP Guidance Concentration

NA = Not Available/Not Applicable

ND = Not Detected

NE = Not Evaluated

TABLE A-2
Human Health Preliminary Risk Evaluation of Surface Water ¹

Area "C"
 Naval Training Center
 Orlando, Florida

ANALYTE	Frequency of Detection ²	Maximum Detected Concentration	Background Concentration ³	Maximum Exceeds Background?	SWSV ⁴	Risk Ratio ⁵
CARCINOGENIC EFFECTS						
VOLATILES (µg/L)						
1,1-Dichloroethene	1 / 5	1.9	ND	YES	1.3	1.5
Tetrachloroethylene	2 / 5	9.4	ND	YES	4.7	2
Trichloroethene	3 / 5	370	ND	YES	64.9	5.70
Vinyl chloride	2 / 5	15	ND	YES	0.8	19
SUMMARY CANCER RISK RATIO:						28
NON-CARCINOGENIC EFFECTS						
VOLATILES (µg/L)						
1,2-Dichloroethene (cis)	3 / 5	1100	ND	YES	3667	0.30
1,2-Dichloroethene (trans)	2 / 5	12	ND	YES	3750	0.0032
SUMMARY NON-CANCER RISK RATIO:						0.30

NOTES:

¹ Based on analytical data from the following sampling locations: 13W/D00101 to 13W/D00501.

² Frequency of Detection is equal to the number of samples in which the analyte is detected in relation to the total number of samples.

³ The background screening value is twice the average of detected concentrations for inorganic analytes. For organic analytes, values are the mean of detected concentrations, presented for comparison purposes only.

⁴ Values have been calculated by ABB-ES in accordance with USEPA Region IV risk assessment guidance, and are based on child and adult resident ingestion and dermal contact exposures to surface water during swimming. Screening values are based on a target cancer risk of 1×10^{-6} or a target HI of 1, and were calculated using the following equality: $[(\text{Maximum surface water concentration}) / (\text{Total resident cancer risk (or child HI for non-cancer risk)})] = [(\text{Screening value}) / (\text{Target risk})]$. Screening values are presented in Table A-4.

⁵ The risk ratio is equal to the maximum detected analyte concentration divided by the screening value. Risk ratios are calculated for analytes with a maximum detected concentration greater than the background concentration.

A summary cancer risk ratio of 1 roughly corresponds to excess lifetime cancer risk of 1×10^{-6} ; a summary non-cancer risk ratio of 1 roughly corresponds to a hazard index of 1. These ratios tend to overestimate risks, since they are based on maximum detected concentrations.

NA = Not Available/Not Applicable

ND = Not Detected

TABLE A-3
Human Health Preliminary Risk Evaluation of Sediment ¹

Area "C"
 Naval Training Center
 Orlando, Florida

ANALYTE	Frequency of Detection ²	Maximum Detected Concentration	Background Concentration ³	Maximum Exceeds Background?	USEPA Region III RBC ⁴	Risk Ratio ⁵
CARCINOGENIC EFFECTS						
VOLATILES (mg/Kg)						
1,1 - Dichloroethene	2 / 5	0.021	ND	YES	1.1	0.019
Tetrachloroethylene	3 / 5	0.19	ND	YES	12	0.0158
Trichloroethene	4 / 5	4.2	ND	YES	58	0.07
Vinyl chloride	2 / 5	0.069	ND	YES	0.34	0.20
SUMMARY CANCER RISK RATIO:						0.31
NON - CARCINOGENIC EFFECTS						
VOLATILES (mg/Kg)						
1,2 - Dichloroethene (cis)	4 / 5	23	ND	YES	780	0.029
1,2 - Dichloroethene (trans)	2 / 5	0.26	ND	YES	1600	0.00016
SUMMARY NON - CANCER RISK RATIO:						0.030

- NOTES:**
- ¹ Based on analytical data from the following sampling locations: 13W/D00101 to 13W/D00501.
 - ² Frequency of Detection is equal to the number of samples in which the analyte is detected in relation to the total number of samples.
 - ³ The background screening value is twice the average of detected concentrations for inorganic analytes. For organic analytes, values are the mean of detected concentrations, presented for comparison purposes only.
 - ⁴ Values are from USEPA Region III RBC table, October 20, 1995 (USEPA, 1995).
 RBCs are for residential soil and are based on a hazard quotient of 1 or an excess lifetime cancer risk of 1 in 1 million.
 - ⁵ The risk ratio is equal to the maximum detected analyte concentration divided by the USEPA Region III RBC. Risk ratios are calculated for analytes with a maximum detected concentration greater than the background concentration.
 A summary cancer risk ratio of 1 roughly corresponds to excess lifetime cancer risk of 1×10^{-6} ; a summary non-cancer risk ratio of 1 roughly corresponds to a hazard index of 1. These ratios tend to overestimate risks, since they are based on maximum detected concentrations.
- NA = Not Available/Not Applicable
 ND = Not Detected
 NE = Not Evaluated

TABLE A-4
Human Health Preliminary Risk Evaluation of Surface Soil ¹

Area "C"
 Naval Training Center
 Orlando, Florida

ANALYTE	Frequency of Detection ²	Maximum Detected Concentration	Background Concentration ³	Maximum Exceeds Background?	USEPA Region III RBC ⁴	Risk Ratio ⁵	FDEP SCG ⁶	Maximum Exceeds SCG ?
CARCINOGENIC EFFECTS								
VOLATILE ORGANIC COMPOUNDS (mg/kg)								
Tetrachloroethylene	3 / 10	0.011	ND	YES	12	0.00092	7 0.03	NO
SEMIVOLATILE ORGANIC COMPOUNDS (mg/kg)								
Benzo (a) anthracene	1 / 10	0.11	ND	YES	0.88	0.13	1.4	NO
Benzo (b) fluoranthene	1 / 10	0.22	ND	YES	0.88	0.25	1.4	NO
Benzo (k) fluoranthene	1 / 10	0.18	ND	YES	8.8	0.020	14	NO
Chrysene	1 / 10	0.2	ND	YES	88	0.0023	140	NO
Indeno (1,2,3-cd) pyrene	1 / 10	0.14	ND	YES	0.88	0.16	1.4	NO
PESTICIDES/PCBs (mg/kg)								
4,4'-DDE	2 / 10	0.0058	ND	YES	1.9	0.0031	3	NO
4,4'-DDT	3 / 10	0.017	ND	YES	1.9	0.0089	3.1	NO
Chlordane-alpha	1 / 10	0.0018	ND	YES	0.49	0.0037	0.8	NO
Chlordane-gamma	1 / 10	0.0016	ND	YES	0.49	0.0033	0.8	NO
INORGANICS (mg/kg)								
Arsenic	4 / 10	0.84	1	NO	0.43	NE	0.7	YES
Beryllium	2 / 10	0.13	0.09	YES	0.15	0.87	0.2	NO
SUMMARY CANCER RISK RATIO:							1.4	
NON-CARCINOGENIC EFFECTS								
VOLATILE ORGANIC COMPOUNDS (mg/kg)								
Acetone	2 / 10	0.042	ND	YES	7,800	0.0000054	260	NO
SEMIVOLATILE ORGANIC COMPOUNDS (mg/kg)								
Benzo (g,h,i) perylene	1 / 10	0.18	ND	YES	2,300	0.000078	14	NO
Pyrene	1 / 10	0.23	ND	YES	2,300	0.00010	2200	NO
INORGANICS (mg/kg)								
Aluminum	10 / 10	2180	2088	YES	78,000	0.028	75000	NO
Arsenic	4 / 10	0.84	1	NO	23	NE	0.7	YES
Barium	10 / 10	5.8	8.7	NO	5,500	NE	5200	NO
Cadmium	1 / 10	1.7	0.98	YES	39	0.044	37	NO

Continued on next page.

TABLE A-4
Human Health Preliminary Risk Evaluation of Surface Soil ¹

Area "C"
Naval Training Center
Orlando, Florida

ANALYTE	Frequency of Detection ²	Maximum Detected Concentration	Background Concentration ³	Maximum Exceeds Background?	USEPA Region III RBC ⁴	Risk Ratio ⁵	FDEP SCG ⁶	Maximum Exceeds SCG ?
Calcium	10 / 10	12400	25295	NO	1,000,000	NE	NA	NA
Chromium	9 / 10	16.4	4.6	YES	390	0.042	290	NO
Copper	3 / 10	30.2	4.1	YES	3,100	0.0097	NA	NA
Iron	8 / 10	660	712	NO	460,468	NE	NA	NA
Lead	8 / 10	40.9	14.5	YES	400	0.10	500	NO
Magnesium	10 / 10	175	328	NO	460,468	NE	NA	NA
Manganese	9 / 10	14.7	8.1	YES	390	0.038	370	NO
Mercury	1 / 10	0.07	0.07	NO	23	NE	23	NO
Nickel	3 / 10	9.2	4.4	YES	1,600	0.0058	1500	NO
Vanadium	6 / 10	2.5	3.1	NO	550	NE	490	NO
Zinc	6 / 10	52.9	17.2	YES	23,000	0.0023	23000	NO
TOTAL PETROLEUM HYDROCARBONS (mg/kg)								
Total Petroleum Hydrocarbons	8 / 10	40.2	ND	YES	380	0.11	NA	NA
SUMMARY NON-CANCER RISK RATIO:						0.38		

NOTES:

- ¹ Based on analytical data for the following sample identifiers: 12B00101 to 12B00401 (duplicate at 12B00401), 14B00101 to 14B00401, and 13B00501.
 - ² Frequency of Detection is equal to the number of samples in which the analyte is detected in relation to the total number of samples.
 - ³ The background screening value is twice the average of detected concentrations for inorganic analytes. For organic analytes, values are the mean of detected concentrations, presented for comparison purposes only.
 - ⁴ Values are from USEPA Region III RBC table, October 20, 1995 (USEPA, 1995). RBCs are for residential soil and are based on a hazard quotient of 1 or an excess lifetime cancer risk of 1 in 1 million.
Value for benzo(g,h,i)perylene based on value for pyrene as a conservative surrogate.
Arsenic is evaluated as a carcinogen and a non-carcinogen.
Value for chromium based on hexavalent chromium.
RBC is not available for lead; value is from Interim Guidance on Establishing Soil Lead Cleanup Levels at Superfund Sites (OSWER Directive 9355.4-12).
Value for mercury is based on inorganic mercury.
Value for nickel based on nickel soluble salts.
RBC is not available for TPH. Values are screening values for gasoline derived by ABB-ES.
 - ⁵ The risk ratio is equal to the maximum detected analyte concentration divided by the USEPA Region III RBC. Risk ratios are calculated for analytes with a maximum detected concentration greater than the background concentration.
A summary cancer risk ratio of 1 roughly corresponds to excess lifetime cancer risk of 1×10^{-6} ; a summary non-cancer risk ratio of 1 roughly corresponds to a hazard index of 1. These ratios tend to overestimate risks, since they are based on maximum detected concentrations.
 - ⁶ Florida Department of Environmental Protection Soil Cleanup Goals for Military Sites in Florida (FDEP, September 29, 1995). Values presented are for Residential.
Value for chromium based on chromium VI.
 - ⁷ Value is the leaching-based value. This analyte was detected in groundwater at a maximum concentration above the FDEP Guidance Concentration.
- NA = Not Available/Not Applicable
ND = Not Detected
NE = Not Evaluated. The maximum detected concentration is less than background.

TABLE A-5
Human Health Preliminary Risk Evaluation of Subsurface Soil ¹

Area 'C'
 Naval Training Center
 Orlando, Florida

ANALYTE	Frequency of Detection ²	Maximum Detected Concentration	Background Concentration ³	Maximum Exceeds Background?	USEPA Region III RBC ⁵	Risk Ratio ⁵	FDEP SCG ⁶	Maximum Exceeds SCG?
CARCINOGENIC EFFECTS								
VOLATILE ORGANIC COMPOUNDS (mg/kg)								
Tetrachloroethylene	4 / 17	0.031	ND	YES	12	0.0026	⁷ 0.03	YES
Trichloroethene	1 / 17	0.002	ND	YES	58	0.000034	0.01	NO
SEMIVOLATILE ORGANIC COMPOUNDS (mg/kg)								
Benzo (a) anthracene	2 / 17	0.11	ND	YES	0.88	0.13	1.4	NO
Benzo (b) fluoranthene	2 / 17	0.17	ND	YES	0.88	0.19	1.4	NO
Benzo (k) fluoranthene	1 / 17	0.13	ND	YES	8.8	0.015	14	NO
Chrysene	3 / 17	0.16	ND	YES	88	0.0018	140	NO
PESTICIDES/PCBs (mg/kg)								
4,4'-DDD	3 / 17	0.0099	ND	YES	2.7	0.0037	0.2	NO
4,4'-DDE	5 / 17	0.032	0.0392	NO	1.9	0.017	0.2	NO
4,4'-DDT	2 / 17	0.1	ND	YES	1.9	0.053	0.5	NO
Aroclor-1260	1 / 17	0.11	ND	YES	0.083	1.3	44	NO
BHC-alpha	1 / 17	0.0061	ND	YES	0.1	0.061	0.2	NO
Chlordane-alpha	1 / 17	0.0046	ND	YES	0.49	0.0094	2.1	NO
Chlordane-gamma	1 / 17	0.0044	ND	YES	0.49	0.0090	2.1	NO
INORGANICS (mg/kg)								
Arsenic	11 / 17	2.6	1.1	YES	0.43	6.0	NA	NA
Beryllium	6 / 17	0.49	ND	YES	0.15	3.3	NA	NA
SUMMARY CANCER RISK RATIO:						11		
NON-CARCINOGENIC EFFECTS								
VOLATILE ORGANIC COMPOUNDS (mg/kg)								
1,2-Dichloroethene (total)	1 / 17	0.006	ND	YES	700	0.0000086	0.2	NO
2-Butanone	1 / 17	0.004	ND	YES	47,000	0.00000085	8.7	NO
Acetone	9 / 17	0.13	ND	YES	7,800	0.000017	1.4	NO
SEMIVOLATILE ORGANIC COMPOUNDS (mg/kg)								
Benzo (g,h,i) perylene	2 / 17	0.12	ND	YES	2,300	0.000052	320	NO
Fluoranthene	3 / 17	0.26	ND	YES	3,100	0.000084	280	NO
Pyrene	3 / 17	0.2	ND	YES	2,300	0.000087	290	NO
Continued on next page								

TABLE A-5
Human Health Preliminary Risk Evaluation of Subsurface Soil ¹

Area "C"
 Naval Training Center
 Orlando, Florida

ANALYTE	Frequency of Detection ²	Maximum Detected Concentration	Background Concentration ³	Maximum Exceeds Background?	USEPA Region III RBC ⁴	Risk Ratio ⁵	FDEP SCG ⁶	Maximum Exceeds SCG?
INORGANICS (mg/kg)								
Aluminum	17 / 17	2090	2119	NO	78,000	NE	NA	NA
Arsenic	11 / 17	2.6	1.1	YES	23	0.11	NA	NA
Barium	14 / 17	19.9	3.6	YES	5,500	0.0036	NA	NA
Cadmium	1 / 17	0.72	ND	YES	39	0.018	NA	NA
Calcium	17 / 17	46700	115	YES	1,000,000	0.047	NA	NA
Chromium	17 / 17	33	3.7	YES	390	0.085	NA	NA
Cobalt	2 / 17	1	1.6	NO	4,700	NE	NA	NA
Copper	8 / 17	48.4	ND	YES	3,100	0.016	NA	NA
Iron	17 / 17	7260	264	YES	23,000	0.32	NA	NA
Lead	17 / 17	14.5	3.9	YES	400	0.036	NA	NA
Magnesium	16 / 17	949	32.8	YES	400,468	0.0024	NA	NA
Manganese	15 / 17	23.9	2.1	YES	390	0.061	NA	NA
Mercury	5 / 17	0.06	ND	YES	23	0.0026	NA	NA
Nickel	3 / 17	4	ND	YES	1,600	0.0025	NA	NA
Potassium	2 / 17	1660	185	YES	1,000,000	0.0017	NA	NA
Sodium	5 / 17	163	ND	YES	1,000,000	0.00016	NA	NA
Thallium	1 / 17	0.15	ND	YES	6.3	0.024	NA	NA
Vanadium	13 / 17	8.1	3.4	YES	550	0.015	NA	NA
Zinc	10 / 17	56.7	5.6	YES	23,000	0.0025	NA	NA
TOTAL PETROLEUM HYDROCARBONS (mg/kg)								
Total Petroleum Hydrocarbons	12 / 17	594	ND	YES	380	1.6	NA	NA
SUMMARY NON-CANCER RISK RATIO:						2.9		

- NOTES:**
- ¹ Based on analytical data from the following sampling locations: 12B00102 to 12B00402, 13B00101, 13B00401, 13B00901 to 13B01301, 14B00102 to 14B00402 (duplicate at 14B00102).
 - ² Frequency of Detection is equal to the number of samples in which the analyte is detected in relation to the total number of samples.
 - ³ The background screening value is twice the average of detected concentrations for inorganic analytes. For organic analytes, values are the mean of detected concentrations, presented for comparison purposes only.
 - ⁴ Values are from USEPA Region III RBC table, October 20, 1995 (USEPA, 1995). RBCs are for residential soil and are based on a hazard quotient of 1 or an excess lifetime cancer risk of 1 in 1 million.
 Value for pyrene used as a conservative surrogate for acenaphthylene, benzo(g,h,i)perylene, and phenanthrene.
 Value for alpha- and gamma-chlordane based on value for chlordane.
 Arsenic is evaluated as a carcinogen and as a non-carcinogen.
 Value for chromium based on hexavalent chromium.
 RBC is not available for lead; value is from Interim Guidance on Establishing Soil Lead Cleanup Levels at Superfund Sites (OSWER Directive 9355.4-12).

TABLE A-5
Human Health Preliminary Risk Evaluation of Subsurface Soil ¹

Area "C"
 Naval Training Center
 Orlando, Florida

ANALYTE	Frequency of Detection ²	Maximum Detected Concentration	Background Concentration ³	Maximum Exceeds Background?	USEPA Region III RBC ⁵	Risk Ratio ⁵	FDEP SCG ⁶	Maximum Exceeds SCG?
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Value for mercury based on inorganic mercury.

Value for nickel based on nickel soluble salts.

RBC is not available for TPH. Values are screening values for gasoline and diesel oil derived by ABB-ES; derivation will be documented in methodology text of SSI Rep.

Value for thallium is based on thallium chloride.

⁵ The risk ratio is equal to the maximum detected analyte concentration divided by the USEPA Region III RBC. Risk ratios are calculated for analytes with a maximum detected concentration greater than the background concentration.

A summary cancer risk ratio of 1 roughly corresponds to excess lifetime cancer risk of 1×10^{-6} ; a summary non-cancer risk ratio of 1 roughly corresponds to a hazard index of 1. These ratios tend to overestimate risks, since they are based on maximum detected concentrations.

⁶ Florida Department of Environmental Protection Soil Cleanup Goals for Florida (FDEP, September 29, 1995). Values presented are for leaching scenario.

Value for chromium based on chromium VI.

⁷ Value is the leaching-based value. This analyte was detected in groundwater at a maximum concentration above the FDEP Guidance Concentration.

NA = Not available/Not applicable

ND = Not Detected

NE = Not Evaluated

TABLE A-6
Ecological Preliminary Risk Evaluation of Surface Water ¹

Area "C"
 Naval Training Center
 Orlando, Florida

ANALYTE	Frequency of Detection ²	Maximum Detected Concentration	Background Concentration ³	Maximum Exceeds Background?	Surface Water Screening Value ⁴	Maximum Exceeds Screening Value ?
VOLATILES (µg/L)						
1,1-Dichloroethene	1 / 5	1.9	ND	YES	3.2	NO
1,2-Dichloroethene (cis)	3 / 5	1100	ND	YES	1350	NO
1,2-Dichloroethene (trans)	2 / 5	12	ND	YES	1350	NO
Tetrachloroethylene	2 / 5	9.4	ND	YES	84	NO
Trichloroethene	3 / 5	370	ND	YES	80.7	YES
Vinyl chloride	2 / 5	15	ND	YES	NA	NA

NOTES:

¹ Based on analytical data from the following sampling locations: 13W/D00101 to 13W/D00501.

² Frequency of Detection is equal to the number of samples in which the analyte is detected in relation to the total number of samples.

³ The background screening value is twice the average of detected concentrations for inorganic analytes. For organic analytes, values are the mean detected concentrations, presented for comparison purposes only.

⁴ The surface water screening value is the lesser of the USEPA chronic AWQC, USEPA Region IV chronic water quality standard, or FDEP Class III Fresh Water Standard.

NA = Not Available/Not Applicable

ND = Not Detected

TABLE A-7
Ecological Preliminary Risk Evaluation of Sediment ¹

Area "C"
 Naval Training Center
 Orlando, Florida

ANALYTE	Frequency of Detection ²	Maximum Detected Concentration	Background Concentration ³	Maximum Exceeds Background?	Sediment Screening Value ⁴	Maximum Exceeds Screening Value ?
VOLATILES (mg/Kg)						
1,1-Dichloroethene	2 / 5	0.021	ND	YES	NA	NA
1,2-Dichloroethene (cis)	4 / 5	23	ND	YES	NA	NA
1,2-Dichloroethene (trans)	2 / 5	0.26	ND	YES	NA	NA
Tetrachloroethylene	3 / 5	0.19	ND	YES	NA	NA
Trichloroethene	4 / 5	4.2	ND	YES	NA	NA
Vinyl chloride	2 / 5	0.069	ND	YES	NA	NA

NOTES:

¹ Based on analytical data from the following sampling locations: 13W/D00101 to 13W/D00501.

² Frequency of Detection is equal to the number of samples in which the analyte is detected in relation to the total number of samples.

³ The background screening value is twice the average of detected concentrations for inorganic analytes. For organic analytes, values are the mean detected concentrations, presented for comparison purposes only.

⁴ Sediment screening values for chlorinated VOCs are not available; see discussion in text.

NA = Not Available/Not Applicable

ND = Not Detected

TABLE A-8
Ecological Preliminary Risk Evaluation of Surface Soil ¹

Area "C"
 Naval Training Center
 Orlando, Florida

ANALYTE	Frequency of Detection ²	Maximum Detected Concentration	Background Concentration ³	Maximum Exceeds Background?	Terrestrial PCL ⁴	Maximum Exceeds PCL ?	Phytotoxicity Screening Value ⁵	Maximum Exceeds Screening Value?	Invertebrate Screening Value ⁶	Maximum Exceeds Screening Value?
VOLATILE ORGANIC COMPOUNDS (mg/kg)										
Acetone	2 / 10	0.042	ND	YES	19500	NO	200	NO	NA	NA
Tetrachloroethylene	3 / 10	0.011	ND	YES	3910	NO	1000	NO	150	NO
SEMIVOLATILE ORGANIC COMPOUNDS (mg/kg)										
Benzo (a) anthracene	1 / 10	0.11	ND	YES	214	NO	25	NO	34	NO
Benzo (b) fluoranthene	1 / 10	0.22	ND	YES	214	NO	25	NO	34	NO
Benzo (g,h,i) perylene	1 / 10	0.18	ND	YES	214	NO	25	NO	34	NO
Benzo (k) fluoranthene	1 / 10	0.18	ND	YES	214	NO	25	NO	34	NO
Chrysene	1 / 10	0.2	ND	YES	214	NO	25	NO	34	NO
Indeno (1,2,3-cd) pyrene	1 / 10	0.14	ND	YES	214	NO	25	NO	34	NO
Pyrene	1 / 10	0.23	ND	YES	214	NO	25	NO	34	NO
PESTICIDES/PCBs (mg/kg)										
4,4'-DDE	2 / 10	0.0058	ND	YES	0.284	NO	12.5	NO	12	NO
4,4'-DDT	3 / 10	0.017	ND	YES	0.722	NO	12.5	NO	12	NO
Chlordane-alpha	1 / 10	0.0018	ND	YES	1.8	NO	12.5	NO	1	NO
Chlordane-gamma	1 / 10	0.0016	ND	YES	1.8	NO	12.5	NO	1	NO
INORGANICS (mg/kg)										
Aluminum	10 / 10	2180	2088	YES	7540	NO	2088	YES	NA	NA
Arsenic	4 / 10	0.84	1	NO	107	NE	10	NE	100	NE
Barium	10 / 10	5.8	8.7	NO	6390	NE	500	NE	NA	NA
Beryllium	2 / 10	0.13	0.09	YES	216	NO	10	NO	NA	NA
Cadmium	1 / 10	1.7	0.98	YES	1.82	NO	3	NO	50	NO
Calcium	10 / 10	12400	25295	NO	NA	NA	NA	NA	NA	NA
Chromium	9 / 10	16.4	4.6	YES	15300	NO	4.6	YES	50	NO
Copper	3 / 10	30.2	4.1	YES	662	NO	100	NO	30	YES
Iron	8 / 10	660	712	NO	NA	NA	NA	NA	NA	NA
Lead	8 / 10	40.9	14.5	YES	221	NO	50	NO	1,190	NO
Magnesium	10 / 10	175	328	NO	NA	NA	NA	NA	NA	NA
Manganese	9 / 10	14.7	8.1	YES	6650	NO	500	NO	NA	NA
Mercury	1 / 10	0.07	0.07	NO	10.4	NE	0.3	NE	36	NE
Nickel	3 / 10	9.2	4.4	YES	414	NO	30	NO	400	NO
Vanadium	6 / 10	2.5	3.1	NO	195	NE	3.1	NE	NA	NA
Zinc	6 / 10	52.9	17.2	YES	251	NO	50	YES	130	NO
TOTAL PETROLEUM HYDROCARBONS (mg/kg)										
Total Petroleum Hydrocarbons	8 / 10	40.2	ND	YES	NA	NA	NA	NA	NA	NA

TABLE A-8
Ecological Preliminary Risk Evaluation of Surface Soil ¹

Area "C"
 Naval Training Center
 Orlando, Florida

ANALYTE	Frequency of Detection ²	Maximum Detected Concentration	Background Concentration ³	Maximum Exceeds Background? ⁴	Terrestrial PCL ⁴	Maximum Exceeds PCL ?	Phytotoxicity Screening Value ⁵	Maximum Exceeds Screening Value?	Invertebrate Screening Value ⁶	Maximum Exceeds Screening Value?
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NOTES:

- ¹ Based on analytical data for the following sample identifiers: 12B00101 to 12B00401 (duplicate at 12B00401), 14B00101 to 14B00401, and 13B00501.
 - ² Frequency of Detection is equal to the number of samples in which the analyte is detected in relation to the total number of samples.
 - ³ The background screening value is twice the average of detected concentrations for inorganic analytes. For organic analytes, values are the mean of detected concentrations, presented for comparison purposes only.
 - ⁴ Screening values are Protective Contaminant Levels (PCLs). The value presented represents the lowest PCL for the short-tailed shrew, american robin, and red-fox.
 - ⁵ Phytotoxicity Screening Value from Suter (1994) and Hulzebos et al. (1993)
 - ⁶ Invertebrate Screening Value from Neuhauser (1985), and others.
 - ⁷ Literature-based value is less than background value, therefore, background value is used as benchmark value.
- NA = Not Available/Not Applicable
 ND = Not Detected
 NE = Not Evaluated. The maximum detected concentration is below the background concentration.

APPENDIX B

SURFACE WATER SCREENING VALUE CALCULATIONS

TABLE B-1
INGESTION OF AND DIRECT CONTACT WITH SURFACE WATER - LAKE DRUID
CHILD RESIDENT - SWIMMING
NAVAL TRAINING CENTER
ORLANDO, FLORIDA
EXPOSURE PARAMETERS

EQUATIONS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
CONCENTRATION WATER	CW	chemical specific	ug/liter	
INGESTION RATE	IR	0.13	liters/day	USEPA, 1989a
AGE-SPECIFIC SURFACE AREA	SA _i	age-specific	cm ²	USEPA, 1989a
EVENT FREQUENCY	EV	1	events/day	Assumption
BODY WEIGHT	BW	15	kg	USEPA, 1989a
AGE-SPECIFIC BODY WEIGHT	BW _i	age-specific	kg	USEPA, 1989a
DOSE ABSORBED PER EVENT	DA _{event}	chemical specific	mg/cm ² -event	Calculated
EXPOSURE TIME	ET	2.6	hours/day	USEPA, 1989b
EXPOSURE FREQUENCY	EF	45	days/year	USEPA, 1991a
EXPOSURE DURATION	ED	11	years	Assumption
AGE-SPECIFIC EXPOSURE DURATION	ED _i	age-specific	years	USEPA, 1989a
AGE-WEIGHTED SURFACE AREA [1]	SA _{aw/dj}	3066	cm ² -yr/kg	Calculated per USEPA, 1992
DIFFUSION DEPTH PER EVENT	PC _{event}	chemical specific	cm/event	Calculated per USEPA, 1992
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991b
NONCANCER	AT	11	years	Assumption
CONVERSION FACTOR	CF1	0.001	mg/ug	
CONVERSION FACTOR	CF2	0.001	liter/cm ³	

$$\text{CANCER RISK} = \text{INTAKE (mg/kg-dy)} \times \text{CANCER SLOPE FACTOR (mg/kg-dy)}^{-1}$$

$$\text{HAZARD QUOTIENT} = \text{INTAKE (mg/kg-dy)} / \text{REFERENCE DOSE (mg/kg-dy)}$$

$$\text{INTAKE-INGESTION} = \frac{\text{CW} \times \text{IR} \times \text{EF} \times \text{ED} \times \text{CF1}}{\text{BW} \times \text{AT} \times 365 \text{ days/yr}}$$

$$\text{INTAKE-DERMAL} = \frac{\text{DA}_{\text{event}} \times \text{EV} \times \text{EF} \times \text{SA}_{\text{aw/dj}}}{\text{AT} \times 365 \text{ days/yr}}$$

Where:

$$\text{SA}_{\text{aw/dj}} = \text{Sum (SA}_i \times \text{ED}_i / \text{BW}_i)$$

$$\text{DA}_{\text{event}} = \text{PC}_{\text{event}} \times \text{CW} \times \text{CF1} \times \text{CF2}$$

Note:

For non-carcinogenic effects: AT = ED

[1] Age weighted, body weight normalized surface area
 PC_{event} calculated per Dermal Exposure Assessment Appendix of this document.
 Ingestion Rate = 0.13 l/day = 50 ml/hour x 2.6 hours/day x 0.001 l/ml
 Surface Area assumes lower legs, hands, feet are exposed.
 USEPA, 1989a. Exposure Factors Handbook; EPA/600/8-89/043; May 1989.
 USEPA, 1989b. Risk Assessment Guidance for Superfund, Volume I, Part A, EPA/540/1-89/002, December 1989.
 USEPA, 1991a. Supplemental USEPA Region IV Guidance, March 21, 1991.
 USEPA, 1991b. Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Parameters",
 USEPA, 1992. Dermal Exposure Assessment: Principles and Applications; EPA/600/8-91/011B. See Table B-3.

TABLE B-1, continued
 INGESTION OF AND DIRECT CONTACT WITH SURFACE WATER - LAKE DRUID
 CHILD RESIDENT - SWIMMING
 NAVAL TRAINING CENTER
 ORLANDO, FLORIDA
 CARCINOGENIC EFFECTS

ORLCRSWS 16-Jan-96

COMPOUND	WATER CONCENTRATION [1]	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL CSF (mg/kg-day) ⁻¹	CANCER RISK INGESTION	PC EVENT [2] (per year)	INTAKE DERMAL (mg/kg-day)	DERMAL CSF [3] (mg/kg-day) ⁻¹	CANCER RISK DERMAL	TOTAL CANCER RISK
1,1-Dichloroethene	1.9	ug/liter	3.2E-07	6.0E-01	1.9E-07	5.22E-02	5.4E-07	6.0E-01	3.2E-07	5.1E-07
Tetrachloroethene	9.4	ug/liter	1.6E-06	5.2E-02	8.2E-08	2.03E-01	1.0E-05	5.2E-02	5.4E-07	6.2E-07
Trichloroethene	370	ug/liter	6.2E-05	1.1E-02	6.8E-07	5.90E-02	1.2E-04	1.1E-02	1.3E-06	2.0E-06
Vinyl chloride	15	ug/liter	2.5E-06	1.9E+00	4.8E-06	2.20E-02	1.8E-06	1.9E+00	3.4E-06	8.2E-06
SUMMARY CANCER RISK					6E-06				6E-06	1E-05

[1] Exposure point concentrations for carcinogenic PAH compounds have been adjusted by application of USEPA Region IV Toxicity Equivalence Factors (February 10, 1992).

[2] This chemical-specific value has been calculated in a separate spreadsheet.

[3] Calculated from Oral CSFs.

ND = No data available

TABLE B-1, continued
 INGESTION OF AND DIRECT CONTACT WITH SURFACE WATER - LAKE DRUID
 CHILD RESIDENT - SWIMMING
 NAVAL TRAINING CENTER
 ORLANDO, FLORIDA
 NONCARCINOGENIC EFFECTS

COMPOUND	WATER CONCENTRATION (µg/l)	UNITS	INTAKE INGESTION (µg/kg-day)	ORAL RfD (mg/kg-day)	HAZARD QUOTIENT INGESTION	PC EVENT (1) (cm ² /year)	INTAKE DERMAL (µg/kg-day)	DERMAL RfD (2) (µg/kg-day)	HAZARD QUOTIENT DERMAL	TOTAL HAZARD QUOTIENT
1,1-Dichloroethene	1.9	ug/liter	2.0E-06	9.0E-03	2.3E-04	5.22E-02	3.4E-06	9.0E-03	3.8E-04	6.0E-04
Tetrachloroethene	9.4	ug/liter	1.0E-05	1.0E-02	1.0E-03	2.03E-01	6.6E-05	1.0E-02	6.6E-03	7.6E-03
Trichloroethene	370	ug/liter	4.0E-04	6.0E-03	6.6E-02	5.90E-02	7.5E-04	6.0E-03	1.3E-01	1.9E-01
Vinyl chloride	15	ug/liter	1.6E-05	ND	ND	2.20E-02	1.1E-05	ND	ND	ND
cis-1,2-Dichloroethene	1100	ug/liter	1.2E-03	9.0E-03	1.3E-01	3.93E-02	1.5E-03	9.0E-03	1.7E-01	3.0E-01
trans-1,2-Dichloroethene	12	ug/liter	1.3E-05	9.0E-03	1.4E-03	3.93E-02	1.6E-05	9.0E-03	1.8E-03	3.2E-03
SUMMARY HAZARD INDEX					2E-01				3E-01	5E-01

[1] This chemical-specific value has been calculated in a separate spreadsheet.

[2] Calculated from Oral RfDs.

ND = No data available

TABLE B-2

INGESTION OF AND DIRECT CONTACT WITH SURFACE WATER - LAKE DRUID
ADULT RESIDENT - SWIMMING
NAVAL TRAINING CENTER
ORLANDO, FLORIDA
EXPOSURE PARAMETERS

ORLARSWS 16-Jan-96

EQUATIONS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
CONCENTRATION WATER	CW	chemical specific	ug/liter	
INGESTION RATE	IR	0.13	liters/day	USEPA, 1989a
SURFACE AREA	SA	23,000	cm ²	USEPA, 1989a
EVENT FREQUENCY	EV	1	events/day	Assumption
BODY WEIGHT	BW	70	kg	USEPA, 1991a
DOSE ABSORBED PER EVENT	DA _{event}	chemical specific	mg/cm ² -event	Calculated
EXPOSURE TIME	ET	2.6	hours/day	USEPA, 1989b
EXPOSURE FREQUENCY	EF	45	days/year	USEPA, 1991b
EXPOSURE DURATION	ED	24	years	Assumption
DIFFUSION DEPTH PER EVENT	PC _{event}	chemical specific	cm/event	Calculated per USEPA, 1992
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991a
NONCANCER	AT	24	years	Assumption
CONVERSION FACTOR	CF1	0.001	mg/ug	
CONVERSION FACTOR	CF2	0.001	liter/cm ³	

PC_{event} calculated per Dermal Exposure Assessment Appendix of this document.

Ingestion Rate = 0.13 l/day = 50 ml/hour x 2.6 hours/day x 0.001 l/ml

Surface Area assumes total body exposed.

USEPA, 1989a. Exposure Factors Handbook; EPA/600/8-89/043; May 1989.

USEPA, 1989b. Risk Assessment Guidance for Superfund, Volume I, Part A, EPA/540/1-89/002, December 1989.

USEPA, 1991a. Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Parameters";

USEPA, 1991b. Supplemental Region IV Risk Assessment Guidance, March 26, 1991.

USEPA, 1992. Dermal Exposure Assessment: Principles and Applications; EPA/600/8-91/011B. See Table B-3.

$$\text{CANCER RISK} = \text{INTAKE (mg/kg-day)} \times \text{CANCER SLOPE FACTOR (mg/kg-day)}^{-1}$$

$$\text{HAZARD QUOTIENT} = \text{INTAKE (mg/kg-day)} / \text{REFERENCE DOSE (mg/kg-day)}$$

$$\text{INTAKE-INGESTION} = \frac{\text{CW} \times \text{IR} \times \text{EF} \times \text{ED} \times \text{CF1}}{\text{BW} \times \text{AT} \times 365 \text{ days/yr}}$$

$$\text{INTAKE-DERMAL} = \frac{\text{DA}_{\text{event}} \times \text{EV} \times \text{EF} \times \text{ED} \times \text{SA}}{\text{AT} \times \text{BW} \times 365 \text{ days/yr}}$$

Where:

$$\text{DA}_{\text{event}} = \text{PC}_{\text{event}} \times \text{CW} \times \text{CF1} \times \text{CF2}$$

Note:

For non-carcinogenic effects: AT = ED

TABLE B-2, continued
 INGESTION OF AND DIRECT CONTACT WITH SURFACE WATER - LAKE DRUID
 ADULT RESIDENT - SWIMMING
 NAVAL TRAINING CENTER
 ORLANDO, FLORIDA
 CARCINOGENIC EFFECTS

COMPOUND	WATER CONCENTRATION (1)	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL CSF (mg/kg-day) ⁻¹	CANCER RISK INGESTION	PC EVENT (2)	INTAKE DERMAL (mg/kg-day)	DERMAL CSF (3)	CANCER RISK DERMAL	TOTAL CANCER RISK
1,1-Dichloroethene	1.9	ug/liter	1.5E-07	6.0E-01	8.9E-08	5.22E-02	1.4E-06	6.0E-01	8.3E-07	9.2E-07
Tetrachloroethene	9.4	ug/liter	7.4E-07	5.2E-02	3.8E-08	2.03E-01	2.7E-05	5.2E-02	1.4E-06	1.4E-06
Trichloroethene	370	ug/liter	2.9E-05	1.1E-02	3.2E-07	5.90E-02	3.0E-04	1.1E-02	3.3E-06	3.7E-06
Vinyl chloride	15	ug/liter	1.2E-06	1.9E+00	2.2E-06	2.20E-02	4.6E-06	1.9E+00	8.7E-06	1.1E-05
SUMMARY CANCER RISK					3E-06				1E-05	2E-05

[1] Exposure point concentrations for any carcinogenic PAHs have been adjusted by application of USEPA Region IV Toxicity Equivalence Factors (February 10, 1992)

[2] This chemical-specific value has been calculated in a separate spreadsheet

[3] Calculated from Oral CSFs.

ND = No data available

TABLE B-2, continued
 INGESTION OF AND DIRECT CONTACT WITH SURFACE WATER - LAKE DRUID
 ADULT RESIDENT - SWIMMING
 NAVAL TRAINING CENTER
 ORLANDO, FLORIDA
 NON-CARCINOGENIC EFFECTS

COMPOUND	WATER CONCENTRATION (mg/l)	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL RfD (mg/kg-day)	HAZARD QUOTIENT INGESTION	PCVENT(1) (cm ² /day)	INTAKE DERMAL (mg/kg-day)	DERMAL RfD (2) (mg/kg-day)	HAZARD QUOTIENT DERMAL	TOTAL HAZARD QUOTIENT
1,1-Dichloroethene	1.9	ug/liter	4.4E-07	9.0E-03	4.8E-05	5.22E-02	4.0E-06	9.0E-03	4.5E-04	4.9E-04
Tetrachloroethene	9.4	ug/liter	2.2E-06	1.0E-02	2.2E-04	2.03E-01	7.7E-05	1.0E-02	7.7E-03	7.9E-03
Trichloroethene	370	ug/liter	8.5E-05	6.0E-03	1.4E-02	5.90E-02	8.8E-04	6.0E-03	1.5E-01	1.6E-01
Vinyl chloride	15	ug/liter	3.4E-06	NI		2.20E-02	1.3E-05	ND		
cis-1,2-Dichloroethene	1100	ug/liter	2.5E-04	9.0E-03	2.8E-02	3.93E-02	1.8E-03	9.0E-03	1.9E-01	2.2E-01
trans-1,2-Dichloroethene	12	ug/liter	2.7E-06	9.0E-03	3.1E-04	3.93E-02	1.9E-05	9.0E-03	2.1E-03	2.4E-03
SUMMARY HAZARD INDEX					4E-02				4E-01	4E-01

[1] This chemical-specific value has been calculated in a separate spreadsheet

[2] Calculated from Oral RfDs.

ND = No data available

TABLE B-3
CURRENT USB INGESTION OF AND DIRECT CONTACT WITH SURFACE WATER - LAKB DRUID
ADULT AND/OR CHILD RESIDENT/ TRANSIENT
NAVAL TRAINING CENTER
ORLANDO, FLORIDA

EXPOSURE PARAMETERS

EQUATIONS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE	
Diffusion depth per event	PC_{event}	chemical specific	cm/event		INORGANICS $PC_{event} = PC \times t_{event}$
Permeability Constant	PC	chemical specific	cm/hr	USEPA, 1992	
Duration of a Single Event	t_{event}	2.6	hr	USEPA, 1989	ORGANICS $PC_{event} = 2PC \times (6T \times t_{event}/\pi)^{0.5}$
Thickness of Stratum Corneum	L_{sc}	10	um	USEPA, 1992	Where $t_{event} < t^*$
Octanol-water partition coefficient/ 10^4	B	chemical specific	dimensionless	USEPA, 1992	
Pi	π	3.14	dimensionless	USEPA, 1992	and: $PC_{event} = PC \times ((t_{event}/(1+B)) + 2T \times ((1+3B)/(1+B)))$
Time to Reach Steady State	t^*	chemical specific	hr	USEPA, 1992	Where $t_{event} > t^*$
Stratum Corneum Diffusion Coefficient	D_{sc}	chemical specific	cm^2/hr	USEPA, 1992	Note: $T = L_{sc}^2/6D_{sc}$
REFERENCES					
USEPA, 1989. Risk Assessment Guidance for Superfund, Volume I, Part A, EPA/540/1-89/002, December 1989. This value is receptor-specific					
USEPA, 1992. Dermal Exposure Assessment: Principles and Applications.					
The term T is not calculated here. Values are provided in USEPA, 1992.					

TABLE B-3, continued

RSPCEV

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CURRENT USE INGESTION OF AND DIRECT CONTACT WITH SURFACE WATER - LAKE DRUID
 ADULT AND/OR CHILD RESIDENT/ TRANSIENT
 NAVAL TRAINING CENTER
 ORLANDO, FLORIDA

COMPOUND	INORGANIC OR ORGANIC? I/O	PC (cm/hr)	T (hr)	t (hr)	B (unitless)	PC _{event} (cm/event)
1,1-Dichloroethene	O	1.6E-02	3.4E-01	8.2E-01	1.3E-02	5.22E-02
Tetrachloroethene	O	4.8E-02	9.0E-01	4.3E+00	2.5E-01	2.03E-01
Trichloroethene	O	1.6E-02	5.5E-01	1.3E+00	2.6E-02	5.90E-02
Vinyl chloride	O	7.3E-03	2.1E-01	5.1E-01	2.3E-03	2.20E-02
cis-1,2-dichloroethene	O	1.2E-02	3.4E-01	8.2E-01	7.2E-03	3.93E-02
trans-1,2-dichloroethene	O	1.2E-02	3.4E-01	8.2E-01	7.2E-03	3.93E-02

NA = Not applicable. For inorganic analytes, this term is not used to calculate PC_{event}.

REFERENCES:

Unless otherwise noted, values are taken from USEPA, 1992. Dermal Exposure Assessment: Principles and Applications, EPA/600/8-91/011B

**TABLE B-4
CALCULATION OF SURFACE WATER SCREENING VALUES (SWSVs)**

**LAKE DRUID
NAVAL TRAINING CENTER
ORLANDO, FLORIDA**

Analyte	EPC (ug/L)	Child Resident ELCR [a]	Adult Resident ELCR [b]	Total Resident ELCR [c]	SWSV Cancer [d]	Child Resident HQ [e]	SWSV Non-cancer [d]	Selected SWSV [f] (ug/L)
1,1-Dichloroethene	1.9	5.1E-07	9.2E-07	1.4E-06	1.3	6.0E-04	3167	1.3
Tetrachloroethene	9.4	6.2E-07	1.4E-06	2.0E-06	4.7	7.6E-03	1237	4.7
Trichloroethene	370	2.0E-06	3.7E-06	5.7E-06	64.9	1.9E-01	1947	64.9
Vinyl chloride	15	8.2E-06	1.1E-05	1.9E-05	0.8	NA	NA	0.8
cis-1,2-Dichloroethene	1100	NA	NA	NA	NA	3.0E-01	3667	3667
trans-1,2-Dichloroethene	12	NA	NA	NA	NA	3.2E-03	3750	3750

Notes:

[a] Calculated in Table B-1.

[b] Calculated in Table B-2.

[c] Sum of child and adult ELCRs.

[d] Calculated by solving for the surface water concentration at $ELCR = 1 \times 10^{-6}$ or $HI = 1$, based on the total resident ELCR or child resident HI, as described in text.

[e] Calculated in Table B-1. The greater of the child or adult resident HIs is selected as the basis of the SWSV.

[f] Value is the lesser of the SWSV cancer or SWSV non-cancer.

APPENDIX C

INDOOR AIR CALCULATIONS AND PRELIMINARY RISK EVALUATION

Indoor air concentrations of VOCs were also estimated using the farmer model as presented by USEPA (USEPA 1992) in conjunction with the USEPA recommended approach shown below for calculating indoor air concentrations. The farmer model calculates the flux of VOC across the soil-building slab boundary. The flux rate, expressed as micrograms per second per square centimeter at the building floor, is a function of soil porosity, pore space geometry, air diffusion coefficients, and the difference in concentration in the soil gas and the building air.

The indoor air concentration is calculated per USEPA guidance (USEPA 1992) as:

$$C_{indoor} = E/Q \quad (2)$$

where:

- E = Contaminant infiltration rate
- Q = Building ventilation rate

The building ventilation rate is calculated by:

$$Q = (ACH/3600) \times V \quad (3)$$

where:

- ACH = Air changes per hour in building
- V = Volume of building (m³)
- 3600 = Units conversion factor (sec/hr)

The contaminant infiltration rate of VOCs due to diffusion into the building is calculated by

$$E = J \times A \times F \times CF_1 \quad (4)$$

where:

- J = Contaminant flux ($\mu\text{g}/\text{cm}^2\text{-sec}$)
- A = Area of building floor in contact with soil gas (m²) as described below.
- F = Fraction of floor through which soil gas can enter (assumed here to be 100%)
- CF₁ = Units conversion factor (10⁴ cm²/m²)

The contaminant flux is calculated per USEPA guidance (USEPA 1992):

and

$$J = D_s (C_g - C_2) CF_2 / L \quad (5)$$

$$D_s = D_A P_a^{10/3} / P_T^2 \quad (6)$$

where:

- D_s = Effective diffusion coefficient (cm²/sec)
- D_A = Vapor phase diffusion coefficient in air (cm²/sec)
- P_a = Air filled porosity (unitless)
- L = Distance from source to point of exit (cm)
- P_T = Total soil porosity (unitless)
- C_2 = Background concentration in indoor air (μg/m³) [assumed here to be zero]
- CF_2 = Units conversion factor (10⁻⁶ m³/cm³)

The estimated equilibrium soil gas concentration adjacent to the buildings is used here to represent the vapor phase concentration (C_g) at a theoretical source near the building. The equilibrium soil gas concentration is estimated by assuming that VOCs in well OLD-13-01A are in equilibrium with soil gas at the water table. The soil gas concentration is estimated by the use of the dimensionless Henry's Law Constant.

The estimated soil gas concentration, C_g is:

$$C_g = C_{gw} \times H \times CF_3 \quad (7)$$

where:

- C_{gw} = Concentration of VOC in groundwater (μg/liter)
- H = Dimensionless Henry's Law Constant
- CF_3 = Units conversion factor (1000 liters/m³)

There are several conservative assumptions included in this model. The assumption that $C_2 = 0$ tends to somewhat overestimate the vapor migration into the buildings (USEPA 1992). The area of the building used here is intended to represent a 14 foot by 14 foot bedroom with 8 foot high ceilings. It is assumed that groundwater containing VOCs is beneath the entire area of that theoretical room. It is also assumed that the fraction of the floor through which gas can enter is 100 percent. If the floor overlying the soil is a concrete pad, then potential gas infiltration would be substantially lower.

The results of the farmer model evaluation, including estimated indoor air concentrations, are presented in Table C-1. The estimated indoor air concentrations have been compared to USEPA Region III Risk-Based Concentrations for ambient air in order to provide a preliminary evaluation of the risks potentially

associated with exposure to these estimated concentrations. This comparison is presented in the following Table. Results are discussed in the PRE.

*Analyte	Estimated Indoor Air Concentration ($\mu\text{g}/\text{M}^3$)	USEPA Region III RBC For Ambient Air ($\mu\text{g}/\text{M}^3$)	Risk Ratio
Tetrachloroethylene	180	3.1	58
Trichloroethylene	8.29	1	8.3
Summary Cancer Risk Ratio:			66
cis-1,2-dichloroethene	14.4	37	0.39
Summary Noncancer Risk Ratio:			0.4

TABLE C-1
Farmer's Model approach to deriving indoor air concentrations associated with groundwater contamination

AREA "C"
NAVAL TRAINING CENTER
ORLANDO, FLORIDA

Compound	GW Concentration ug/liter (1)	Henry's Law Constant dimensionless at 20 deg C (2)	Equilibrium Soil Gas Concentration ug/cu m	Area of Building Floor sq m	Fraction of Floor	Air Changes per Hour	Volume of Building cu m	Diffusion Coefficient DsubA sq cm/sec 20 degrees C (2)	Air Filled Soil Porosity	Total Soil Porosity	Distance from Source to point of exit cm	Flux @max sg ug/sq cm-sec	Indoor Air Concentration @max sg ug/cu m
tetrachloroethylene	250	0.59	147,500	182	1	0.5	44.4	0.0759	0.35	0.55 BEAM	183	0.0000081106	180.43
trichloroethylene	18	0.38	8,060	182	1	0.5	44.4	0.0846	0.35	0.55 BEAM	183	0.000002808	8.29
cis-1,2-dichloroethene	29	0.32	9,280	182	1	0.5	44.4	0.0864	0.35	0.55 BEAM	183	0.000004883	14.42

(1) Data from well OLD-13-01 samples 3/9/85
(2) From Haarhoff, J. and J.L. Cleasby, Evaluation of air stripping for the removal of organic drinking-water contaminants Water SA Vol 18, No 1, January 1990
183 cm = 6 feet from groundwater to building slab

APPENDIX A
AREA C PRELIMINARY RISK EVALUATION

**AREA C PRELIMINARY
RISK EVALUATION**

**NAVAL TRAINING CENTER
ORLANDO, FLORIDA**

Unit Identification Code: N65928

Contract No.: N62467-89-D-0317/107

Prepared by:

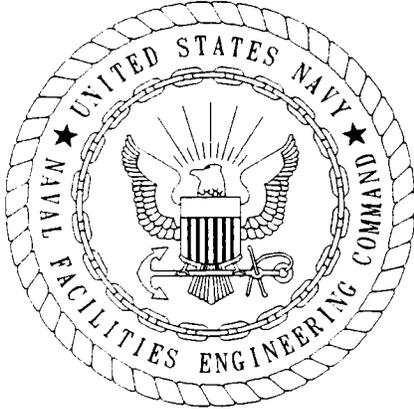
**ABB Environmental Services, Inc.
2590 Executive Center Circle, East
Tallahassee, Florida 32301**

Prepared for:

**Department of the Navy, Southern Division
Naval Facilities Engineering Command
2155 Eagle Drive
North Charleston, South Carolina 29418**

Barbara Nwokike, Code 1873, Engineer-in-Charge

April 1996



CERTIFICATION OF TECHNICAL
DATA CONFORMITY (MAY 1987)

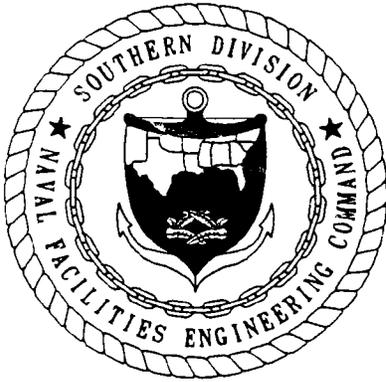
The Contractor, ABB Environmental Services, Inc., hereby certifies that, to the best of its knowledge and belief, the technical data delivered herewith under Contract No. N62467-89-D-0317/107 are complete and accurate and comply with all requirements of this contract.

DATE: April 30, 1996

NAME AND TITLE OF CERTIFYING OFFICIAL: John Kaiser
Task Order Manager

NAME AND TITLE OF CERTIFYING OFFICIAL: Mark Salvetti, P.E.
Project Technical Lead

(DFAR 252.227-7036)



FOREWORD

To meet its mission objectives, the U.S. Navy performs a variety of operations, some requiring the use, handling, storage, or disposal of hazardous materials. Through accidental spills and leaks and conventional methods of past disposal, hazardous materials may have entered the environment in ways unacceptable by today's standards. With growing knowledge of the long-term effects of hazardous materials on the environment, the Department of Defense initiated various programs to investigate and remediate conditions related to suspected past releases of hazardous materials at its facilities.

One of these programs is the Base Realignment and Closure (BRAC) cleanup program. This program complies with the BRAC Act of 1988 (Public Law (P.L.) 100-526, 102 Statute 2623) and the Defense Base Closure and Realignment Act of 1990 (P.L. 101-510, 104 Statute 1808), which require the DOD to observe pertinent environmental legal provisions of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA); the 1992 Community Environmental Response Facilitation Act; Executive Order 12580; and the statutory provisions of the Defense Environmental Restoration Program, the National Environmental Policy Act (NEPA), and any other applicable statutes that protect natural and cultural resources.

CERCLA requirements, in conjunction with corrective action requirements under Subtitle C of the Resource Conservation and Recovery Act (RCRA), govern most environmental restoration activities. Requirements under Subtitles C, D, and I, of RCRA, as well as the Toxic Substances Control Act, the Clean Water Act, the Clean Air Act, the Safe Drinking Water Act, and other statutes, govern most environmental missions or operational-related and closure-related compliance activities. These compliance laws may also be applicable or relevant and appropriate requirements for selecting and implementing remedial actions under CERCLA. NEPA requirements govern the Environmental Impact Analysis and Environmental Impact Statement preparation for the disposal and reuse of BRAC installations.

The BRAC program centers on a single goal: expediting and improving environmental response actions to facilitate the disposal and reuse of a BRAC installation, while protecting human health and the environment.

The Southern Division, Naval Facilities Engineering Command (SOUTHNAVFACENGCOM); the U.S. Environmental Protection Agency; and the Florida Department of Environmental Protection collectively coordinate the cleanup activities through the BRAC cleanup team. This team approach is intended to foster partnering, accelerate the environmental cleanup process and expedite timely, cost-effective, and environmentally responsible disposal and reuse decisions.

Questions regarding the BRAC program at Naval Training Center, Orlando should be addressed to the SOUTHNAVFACENGCOM BRAC Environmental Coordinator, Mr. Wayne Hansel, Code 18B7, at (407) 646-5294 or SOUTHNAVFACENGCOM Engineer-in-Charge (EIC), Ms. Barbara Nwokike, Code 1873, at (803) 820-5566.

EXECUTIVE SUMMARY

ABB Environmental Services, Inc. (ABB-ES), under contract to the Southern Division, Naval Facilities Engineering Command, in accordance with Base Realignment and Closure (BRAC) 1993, has prepared this Preliminary Risk Evaluation (PRE) to characterize the potential risks to human health and the environment from environmental contamination associated with Area C at Naval Training Center (NTC), Orlando, Florida. The PREs are screening-level evaluations of potential risks that environmental contaminants associated with Area C may pose to human and ecological receptors. The PREs were performed to determine whether or not environmental contamination at Area C will require any future action, including but not limited to, additional site evaluations, a baseline risk assessment, remedial measures, or no further action.

The human health and ecological PREs were conducted in accordance with methodology provided in the U.S. Environmental Protection Agency (USEPA) Region IV Memorandum "Amended Guidance on Preliminary Risk Evaluations (PREs) for the Purpose of Reaching a Finding of Suitability to Lease (FOSL)" (USEPA, 1994a), and minutes of meetings with the USEPA and Florida Department of Environmental Protection (FDEP) concerning PREs (ABB-ES, 1995c). This methodology is designed to result in a conservative evaluation that does not overlook or dismiss potentially substantial risks. The PRE is most useful in determining risks that are not significant, rather than determining the specific nature and magnitude of risks associated with the site.

In accordance with this methodology, the public health PRE was conducted by comparing maximum detected analyte concentrations in groundwater, surface water, sediment, surface soil, subsurface soil, and estimated indoor air concentrations of volatile organic compounds (VOCs), to regulatory criteria and readily available risk screening values based on potential exposures to residential populations. These evaluations were expressed as risk estimates and were compared to the USEPA target cancer risk range of 1×10^{-6} to 1×10^{-4} and the noncancer hazard index (HI) value of 1.

The results of the public health risk assessment indicate that, based on available information, potential residential exposures to groundwater used as source of drinking water may pose cancer and noncancer risks above USEPA acceptable risk levels, and maximum groundwater concentrations of chlorinated VOCs, arsenic, and beryllium exceed State and Federal regulatory criteria. In addition, under current land-use conditions, a potential may exist for VOC vapor migration from groundwater and subsurface soil to ambient air in aboveground residential structures. Potential cancer risks for residential inhalation exposures to estimated indoor VOC concentrations are within USEPA acceptable risk limits, but are above 1×10^{-6} . Cancer and noncancer risk estimates for potential residential direct-contact exposures to surface soil and subsurface soil, and potential residential swimming exposures to surface water and sediment in Lake Druid, are within USEPA acceptable risk limits. However, cancer risk estimates for surface water are above 1×10^{-6} , and maximum concentrations of arsenic, tetrachloroethylene, and beryllium in soils exceed State regulatory criteria.

The ecological PRE was conducted by comparing maximum detected analyte concentrations in surface water and sediment to State and Federal standards and maximum surface soil concentrations to soil screening values developed by ABB-ES.

Through these comparisons, analytes which were detected at maximum concentrations above the screening values were identified. The results of the ecological PRE suggest that it is unlikely that the populations of aquatic receptors occurring in Lake Druid, and terrestrial plant, invertebrate, and vertebrate receptors potentially exposed to Area C surface soils would be adversely affected by contamination associated with Area C.

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GLOSSARY

ABB-ES	ABB Environmental Services, Inc.
AWQC	Federal Ambient Water Quality Criteria
bls	below land surface
BRAC	Base Realignment and Closure
CF	conversion factor
cm	centimeter
DCE	dichloroethene
DRMO	Defense Reutilization Materials Office
EBS	Environmental Baseline Survey
ELCR	excess lifetime cancer risk
FDEP	Florida Department of Environmental Protection
FOSL	Finding of Suitability to Lease
GC	gas chromatograph
HI	hazard index
HQ	hazard quotient
ℓ/day	liters per day
MADEP	Massachusetts Department of Environmental Protection
MCL	maximum contaminant level
MEK	methyl-ethyl ketone
m ³	cubic meter
μg/kg	micrograms per kilogram
μg/ℓ	microgram per liter
mg/day	milligrams per day
mg/kg	milligram per kilogram
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NTC	Naval Training Center
OPT	Orlando Partnering Team
PCE	Tetrachloroethene
PCL	Protective Contaminant Levels

GLOSSARY (Continued)

PRE	preliminary risk evaluation
RBC	risk-based concentrations
SCG	soil cleanup goal
SQC	sediment quality criteria
SQGs	sediment quality guidelines
SWSV	surface water screening values
TCE	trichloroethene
TPH	total petroleum hydrocarbon
UCL	upper confidence limit
USEPA	U.S. Environmental Protection Agency
VOC	volatile organic compound

1.0 INTRODUCTION

This document presents Public Health and Ecological Preliminary Risk Evaluations (PREs) for Area C at the Naval Training Center (NTC) in Orlando, Florida. Soil and groundwater contamination (primarily chlorinated solvents) was discovered during site screening activities at the former laundry (Study Area 13) and the adjacent Study Areas 12 and 14 (ABB Environmental Services, Inc. [ABB-ES], 1995a).

1.1 BACKGROUND AND CONDITIONS. The following is a brief summary of Study Areas 12, 13, and 14. More detailed descriptions can be found in the Final Site Screening Plan, Groups I Through V Study Areas and Miscellaneous Sites (ABB-ES, 1995b).

1.1.1 Study Area 12 Study Area 12 includes the Defense Reutilization Materials Office (DRMO) warehouses and salvage yard (Building 1063), and the truck scales (Building 1069). These buildings are located on Port Hueneme Avenue, in the northcentral portion of Area C, south of the laundry (Study Area 13). The warehouse building was originally constructed in the early 1940s. Site use has reportedly remained consistent (i.e., salvage, scrap, and disposal yard) throughout its history. Based on review of aerial photographs, the original structure occupied approximately one-half the footprint of the current structure. The current warehouse is constructed of sheet-metal walls and roof (i.e., a Butler building) on concrete slab. This structure was added to, or replaced, the original warehouse in 1962. The asphalt paved salvage yard, located west of the warehouse, is occupied by rows of salvage scrap materials, concrete storage bins, and a drum storage area. There is also a transformer carcass storage area in the southwest corner of the study area. Salvage scrap items are also stored in this area, including desks, wheels, vehicles, transformers, and fencing. It is not known how long this area has been paved.

Historical records indicate this area was used to store small quantities (1 to 5 gallons) of hazardous waste between 1959 and 1985. These wastes were stored in the southwest corner of the salvage lot and included the following: paints, insecticides, asbestos, solvents including trichloroethene (TCE) and methyl-ethyl ketone, ammonium hydroxide, sodium sulfide, and mercury.

1.1.2 Study Area 13 Study Area 13 includes the NTC laundry facility (Building 1100) and the former location of a boiler house (Building 1101). Study Area 13 is located in the northwest corner of Area C at Port Hueneme Avenue and Davisville Street. Building 1101 was located east of Building 1100 and was demolished sometime after 1962.

Building 1100 was constructed in 1943, and is a single-story, wood-framed structure that had always been used as an industrial laundry and drycleaning facility, which served the entire military base. The surrounding property is paved asphalt, except for small areas east and west of the building that are landscaped and grass covered. The paved areas around the perimeter of the building include roads and parking lots. Prior to construction of the facility in 1943, the land was undeveloped. The laundry was closed in 1995.

Reportedly, hazardous wastes generated and materials used in the drycleaning process had been poorly managed. At the time of the environmental baseline survey

(ABB-ES, 1994), there were many containers in the building, ranging in volume from ½ to 55 gallons that were open and not labeled. The facility had received a Notice of Violation and a citation from the Florida Department of Environmental Protection (FDEP) for unlabeled and unmanifested waste.

Wastewater from the laundry machines discharged to the sanitary sewer through badly deteriorated drainage trenches in the floor. The floor trenches discharge to a single pipe that is connected to a settling-and-surge tank. Due to the volume of water discharged in this area, a 30,000-gallon surge tank was installed in the mid-1960s. Sludge was removed from this tank annually and disposed of through the DRMO. Waste filters from the drycleaning machines were also generated at the facility. Tetrachloroethene (PCE) was separated from the water and filters by heating the assemblies in a pressure cooker. The filters were disposed of through the DRMO, and the solvent was recycled. In the past, the filters were allegedly disposed of in the North Grinder Landfill (ABB-ES, 1994).

Documented discharges of water contaminated with chlorinated solvents have occurred on the property. Discharges of water from the washing machines to Lake Druid have also been documented.

1.1.3 Study Area 14 Study Area 14 includes Building 1102 and the surrounding paved and grassed areas. The facility is located off Marvin Shields Avenue in the northwest portion of Area C, west of the laundry (Study Area 13). The facilities are used for indoor and outdoor storage of salvageable equipment and materials, in support of DRMO operations. The facility includes a rectangular, one-story, corrugated-steel building constructed on a concrete slab with a gabled roof. The surrounding salvage yard is currently asphalt paved. The building was originally constructed in 1969. Prior to that time, the area between the base laundry (to the northwest) and the current structure was used as a scrap and salvage yard. Equipment and materials currently stored at this location include office furniture, mattresses, refrigerators, and drycleaning equipment.

There is documentation of a release of three gallons of PCE from scrap drycleaning equipment in 1989. Remediation included the removal and disposal of approximately 20 drums of contaminated soil and asphalt. However, the exact location of the release was not indicated (ABB-ES, 1994).

1.2 INVESTIGATION SUMMARY. The site-screening investigation conducted at Area C included a soil-gas survey, surface and subsurface soil sampling, and the installation of 16 monitoring wells to evaluate groundwater. Twelve wells were installed to evaluate the shallow surficial aquifer (approximately 15 to 20 feet below land surface [bls]). Four wells in the immediate vicinity of the laundry were screened at the base of the surficial aquifer, approximately 60 feet bls. Saturated soil samples were collected approximately every 6 feet from the interval between the shallow and deep wells and analyzed on a field gas chromatograph (GC). Combined with the groundwater samples collected from the monitoring wells, these data contributed to the evaluation of the surficial aquifer.

The results of the site screening investigation are provided in detail in the Draft Site Screening Report for Groups I and II (ABB-ES, 1995a). Volatile organic detections are summarized on Figure 1-1. PCE and TCE were detected above the Florida Maximum Contaminant Level (MCL) of 3 micrograms per liter ($\mu\text{g}/\ell$) in several shallow monitoring wells. The highest concentrations of each compound

were detected in shallow monitoring well OLD-13-07A, located west of the laundry. PCE and TCE were also detected in the deep well OLD-13-08C, but at concentrations below the MCL. Field GC data for soils collected in this vicinity detected PCE and TCE in soil approximately 18 feet bls at concentrations of 3,700 micrograms per kilogram ($\mu\text{g}/\text{kg}$) and 1,300 $\mu\text{g}/\text{kg}$, respectively.

Lake Druid was not included in the original site screening investigation. After reviewing the site-screening data, the Orlando Partnering Team (OPT) requested that surface water and sediment samples be collected from the lake.

On November 29, 1995, surface water and sediment samples were collected along the shoreline of Lake Druid. These samples were analyzed by an offsite laboratory by U.S. Environmental Protection Agency (USEPA) Method 8010. These results are also summarized on Figure 1-1. PCE, TCE, cis-1,2-dichloroethene (cis-DCE), 1,1-DCE, and vinyl chloride were detected at these locations. At some locations, TCE and cis-DCE were detected in surface water at concentrations greater than had been detected in groundwater collected from the monitoring wells. Vinyl chloride and 1,1-DCE had not been detected in groundwater.

On December 11, 1995, additional surface water and sediment samples were collected in Lake Druid approximately 50 west of the locations shown on Figure 1-1. The water depth was approximately 4 feet. Cis-DCE was detected in surface water collected from each deeper location. TCE was also detected in surface water opposite sample location 13D/W00201. TCE and PCE were detected in sediment from this deeper location, and from the location 50 feet west of sample 13W/D00301. Chlorinated solvent concentrations from the locations farther out in the lake were generally much lower than at the shoreline, sometimes by two orders of magnitude.

The PRE for Area C was conducted using the data outlined above.

2.0 PRELIMINARY RISK EVALUATION

The PREs are screening-level evaluations of potential risks that environmental analytes may pose to human and ecological receptors. The results of the PREs are used in conjunction with other information gathered during site screening to focus future site activities.

The specific objectives of the PRE are to:

- review the existing analytical data collected for surface soil, subsurface soil, surface water, sediment, and groundwater;
- characterize the current and potential future land uses and ecological status of each site to identify potential human and ecological receptors and contaminant exposure pathways;
- compare the analytical data to available human health and ecological screening guidelines and criteria to identify chemicals that may be associated with risks of concern;
- identify data gaps and make recommendations for future actions.

Specifically, the PREs at NTC, Orlando, Area C were conducted to aid in determining whether or not additional remedial investigations are needed at this site.

This chapter provides a brief summary of the methodology used to conduct the Public Health and Ecological PREs (Section 2.1), results of the Public Health and Ecological PREs (Section 2.2), and conclusions of the PREs (Section 2.3).

2.1 PRELIMINARY RISK EVALUATION METHODOLOGY. The human health and ecological PREs are generally consistent with methodology provided in the USEPA Region IV memorandum "Amended Guidance on Preliminary Risk Evaluations (PREs) for the Purpose of Reaching a Finding of Suitability to Lease (FOSL)" (USEPA, 1994a), and minutes of meetings with USEPA and FDEP concerning PREs (ABB-ES, 1995c).

In summary, the PREs provide an evaluation of the primary exposure pathways that might be expected to contribute substantially to potential human and ecological risks associated with exposures to analytes in various media at the site. The PREs are conducted by comparing maximum detected analyte concentrations with background concentrations and readily available risk screening values. This methodology is designed to result in a conservative evaluation that does not overlook or dismiss potentially substantial risks. The PRE is most useful in determining risks that are not significant, rather than determining the nature and magnitude of risks associated with the site.

The technical approaches used for the public health and ecological PREs are described below in Subsections 2.1.1 and 2.1.2, respectively.

2.1.1 Public Health PRE The public health PRE is conducted by comparing maximum detected analyte concentrations in groundwater, surface water, sediment, surface soil (soil collected 0-2 feet bls), and subsurface soil (soil collected 2 to 10

feet bls), in addition to estimated indoor air concentrations of volatile organic compounds (VOCs), with readily available screening values including the following:

- risk-based concentrations (RBCs) published by USEPA Region III (USEPA, 1995a) (all media except surface water)
- Federal MCLs (USEPA, 1995b) (groundwater only)
- FDEP guidance concentrations (FDEP, 1994) (groundwater only)
- FDEP soil cleanup goals for military sites (FDEP, 1995) (soils only).
- surface water screening values (SWSVs) developed by ABB-ES (Appendix B)

Comparisons to RBCs and SWSVs are expressed through a risk ratio. For analytes with maximum concentrations above the background concentration, risk-ratios are calculated by dividing the maximum detected analyte concentration by the RBC or SWSV. Separate risk ratios are calculated for carcinogenic and noncarcinogenic effects. Summary risk ratios for carcinogenic and noncarcinogenic effects are then calculated by summing the cancer risk ratios for all carcinogenic analytes, and the noncancer risk ratios for noncarcinogenic analytes, respectively.

For groundwater, maximum detected groundwater concentrations are also compared directly to MCLs and FDEP criteria. Any analytes with maximum concentrations that exceed these values are identified. In addition, because the potential may exist for VOCs in groundwater and subsurface soil to volatilize and accumulate in structures located on the ground surface above, potential exposures to indoor air were estimated using a VOC migration model (Farmer Model) (Appendix C). The estimated indoor air concentrations were then compared with RBCs for ambient air. Risk ratios are not calculated for the comparison to regulatory criteria.

USEPA Region III RBCs are based on toxicity constants and standard exposure scenarios and correspond to fixed levels of risk. For noncarcinogenic chemicals, the RBC is based on a hazard quotient (HQ) of 1. For carcinogenic chemicals the RBC is based on a lifetime cancer risk of 1×10^{-6} . The standard exposure scenarios (residential and industrial) for which RBCs have been developed include the inhalation of ambient air and the ingestion of tapwater, fish tissue, and soil. For groundwater at Area C, RBCs for tapwater are used for risk screening of potential direct contact exposures. Indirect exposures to groundwater VOCs, which may volatilize to aboveground structures, are evaluated with RBCs for ambient air. For surface soils, subsurface soils, and sediments, RBCs for residential soil are used. RBCs for tapwater exposures are calculated assuming that children (age 1-6 years) and adults ingest 1 liter or 2 liters per day (L/day) of groundwater that has been used as drinking water, respectively, 350 days per year for a combined total of 30 years. RBCs for ambient air use the same exposure parameters for tapwater exposure, substituting inhalation rates of 12 cubic meters (m^3) (child) and 20 m^3 per day (adult) for water ingestion rates. RBCs for residential soil exposures are calculated assuming that children (age 1-6 years) and adults ingest 200 or 100 milligrams per day of soil, respectively, 350 days per year for a combined total of 30 years. Dermal and inhalation exposures are not considered in the calculation of RBCs.

For noncarcinogenic analytes, a risk-ratio above 1 indicates that the maximum detected analyte concentration exceeds the RBC and, therefore, exceeds a HQ of

1. A noncancer summary risk ratio above 1 indicates that additive exposures to the maximum detected concentrations of all noncarcinogenic analytes exceed a hazard index (HI) of 1. An HI less than 1 indicates that noncarcinogenic toxic effects are unlikely. HIs greater than 1 indicate non-carcinogenic risk associated with potential exposures may be of concern. As the HI increases, so does the likelihood that adverse effects might be associated with exposure. However, HI values greater than 1 should be interpreted with caution, since the toxicities of all analytes are not necessarily additive. The acceptable risk level for noncarcinogenic effects is generally an HI of 1 or less (USEPA, 1989), although values greater than 1 may also be acceptable.

For carcinogenic analytes, a risk ratio above 1 indicates that the maximum detected analyte concentration exceeds the RBC and, therefore, potential exposures may be associated with excess lifetime cancer risk greater than 1×10^{-6} . A cancer summary risk ratio above 1 indicates that additive exposures to the maximum detected concentrations of all carcinogenic analytes may be associated with an excess lifetime cancer risk (ELCR) greater than 1×10^{-6} . The USEPA guidelines, established in the National Oil and Hazardous Substances Contingency Plan (NCP), indicate that the allowable total lifetime cancer risk due to exposure to the analytes at a site, by each complete exposure pathway, is within a range of 1 in 1 million (1×10^{-6}) to 1 in 10,000 (1×10^{-4}) (USEPA, 1990). These criteria are generally based on exposure to a conservative estimate of the average concentrations of analytes.

Because Lake Druid surface water is not used as a source of drinking water, comparisons of surface water data with screening values developed for potential drinking water exposures are not appropriate. Therefore, surface water screening values based on potential swimming exposures were developed by ABB-ES to evaluate surface water data. Health-based SWSVs were developed using risk assessment methodology consistent with USEPA guidance. SWSVs were developed for a child (age 1-6) and adult resident that are assumed to be exposed to surface water through incidental ingestion and dermal contact for 2.6 hours per day, 45 days per year, for 30 years. Using the ratio method described below, SWSVs were calculated for the surface water concentrations associated with 1×10^{-6} excess lifetime cancer risk with an HI of 1. The risk assessment spreadsheets, including documentation of exposure parameters and presentation of SWSV calculations, are provided in Appendix B.

$$\frac{\text{Surface water Risk}}{\text{Surface water Concentration}} = \frac{\text{Target Risk}}{\text{SWSV}} \quad (1)$$

where: Surface water risk is the ELCR or HI calculated in the risk spreadsheets (Appendix B), and
Target Risk is ELCR = 1×10^{-6} or HI = 1

For each analyte, the lower of the calculated screening concentrations for cancer or noncancer risk was selected as the final SWSV.

2.1.2 Ecological PRE The ecological PRE is conducted by comparing the maximum concentrations of analytes detected in surface water, sediment, and surface soil (soil collected 0-2 feet bls) with readily available screening values. Since ecological receptors are typically not exposed to subsurface soils (soils

collected deeper than 2 feet), this medium is not evaluated in the ecological PRE. Likewise, ecological receptors do not have direct contact exposures to groundwater and, therefore, this medium is not evaluated.

The ecological PRE for surface water is conducted by comparing maximum detected concentrations of analytes in surface water with surface water screening values based on water quality criteria for the protection of aquatic organisms. The ecological PRE for sediment is conducted by comparing maximum detected concentrations of analytes in sediment with sediment screening values based on sediment quality criteria for the protection of aquatic organisms. The ecological PRE for surface soil is conducted by comparing the maximum detected concentrations of analytes in surface soil with surface soil screening values developed to protect terrestrial vertebrate receptors, plants, and invertebrates. For all media, analytes that are detected at maximum concentrations above the background concentrations and above the screening values are identified.

Surface water screening values include the following:

- Federal Ambient Water Quality Criteria (USEPA, 1986),
- USEPA Region IV Chronic Freshwater Quality Screening Values (USEPA, 1994b), and
- Florida Class III Fresh Water Standards (Florida Administrative Code, Chapter 62-302, 1995).

Sediment screening values include the following:

- Sediment Quality Criteria (SQC) for the protection of Benthic Organisms (USEPA, 1988)
- USEPA Region IV Sediment Screening Values for Hazardous Waste Sites (USEPA, 1994c)
- Florida Sediment Quality Guidelines (SQG) (MacDonald, 1994)
- Ontario Ministry of Environment SQG; lowest effect levels (Persaud et al., 1992).

The lesser of the surface water and sediment screening values provided by each of these sources are used as the aquatic screening values to evaluate surface water and sediment data at Area C.

USEPA Region IV does not specify a methodology for assessing surface soil exposures to ecological receptors (USEPA, 1994a), and no State or Federal standards or guidelines exist for surface soil exposure. Therefore, this exposure pathway is evaluated through comparison of maximum analyte concentrations in surface soil with Protective Contaminant Levels (PCLs) for terrestrial vertebrate receptors (calculated by ABB-ES), phytotoxicity benchmark values for plants (Hill and Suter, 1994; Hulzebos et al., 1993), and invertebrate toxicity benchmark values for terrestrial invertebrates (Neuhauser, 1985; and others). This method of evaluation has been reviewed by the U.S. Army, Massachusetts Department of Environmental Protection, regulators in USEPA Regions I and IV, and the FDEP.

The PCL value is calculated using a food-web model, which assumes that terrestrial vertebrate receptors could be exposed to analytes in surface soil through incidental surface soil ingestion and food-chain uptake (e.g., ingestion of plants and invertebrates exposed to the soil). PCLs are calculated for receptors that could potentially occur at Area C, including the short-tailed shrew, the white-footed mouse, and the American Robin. The lowest PCL value for these three receptors is selected as the screening value to evaluate surface soil data. This value is expected to be protective of the population of terrestrial vertebrate receptors that could potentially be exposed to the surface soil at Area C.

2.2 PRELIMINARY RISK EVALUATION RESULTS. The results of the human health PRE are presented in Appendix A, Tables A-1 through A-5, and discussed in Subsection 2.2.1. The results of the ecological PRE are presented in Appendix A, Tables A-5 through A-8, and discussed in Subsection 2.2.2.

2.2.1 Human Health Preliminary Risk Evaluation This PRE identifies potential risks that may be associated with current and potential future exposures to groundwater associated with Area C, surface soil, and subsurface soil collected at Area C, and surface water and sediment collected at Lake Druid. Sample locations for these media are presented on Figure 1-1.

Although not part of Area C, a small area of Lake Druid adjacent to Area C was sampled (Figure 1-1). Data collected during the site investigation suggest that groundwater associated with Area C may be discharging to Lake Druid, located approximately 300 feet downgradient of the site. Analytical data for surface water and sediment samples collected in the vicinity of the potential groundwater discharge area substantiate site-screening results. Therefore, surface water and sediment samples collected in this portion of Lake Druid are included in the PRE.

Under current land use, there are no direct contact exposures to surface soil and subsurface soil, since samples were collected from beneath a paved area and there are no excavation activities presently occurring which could result in potential exposures. Groundwater associated with Area C is not used as a source of residential or industrial water and, therefore, there are no direct contact exposures. However, because the depth to groundwater is relatively shallow (i.e., approximately 6 feet), there may be potential for volatile contaminants in the groundwater to volatilize into aboveground structures; exposures to contaminated air could potentially occur. As discussed above, surface water is not used as a source of drinking water. Swimming is unlikely in the area of Lake Druid that was sampled because the area abuts U.S. Navy property, is not readily accessible to residents living on the lake, and does not present an attractive place for swimming (e.g., the area appeared "stagnant" and filled with aquatic vegetation). However, to provide a conservative evaluation of risks associated with potential exposures to surface water and sediment, swimming exposures were evaluated.

Under future land use, it is assumed that groundwater associated with this site could be used as a source of residential drinking water; exposures could occur through ingestion, dermal contact, and inhalation of volatiles. If the pavement was removed, surface soils could be made accessible for direct contact exposures (i.e., incidental ingestion, dermal contact, and inhalation of dust and vapors). If construction activities were to take place, subsurface soils could be re-located to the surface; direct contact exposures could occur through incidental ingestion, dermal uptake, and inhalation of vapors and dust.

Groundwater. Appendix A, Table A-1 presents the results of the human health PRE for groundwater. The summary cancer risk ratio is 1,300. This indicates that additive potential exposures to the maximum detected concentrations of carcinogenic analytes in groundwater might be associated with an excess lifetime cancer risk as high as 1×10^{-3} (1 in 1,000). The analytes contributing the largest percentage to the cancer risk ratio include tetrachloroethylene and arsenic. Risk ratios for these analytes are 620 and 610, respectively, which correspond to estimated cancer risks of 6×10^{-4} for each analyte. The maximum detected concentrations of trichloroethene and beryllium also exceed RBCs by factors of more than 10, corresponding to estimated cancer risks between 1×10^{-5} and 1×10^{-4} . Maximum detected concentrations of tetrachloroethylene, trichloroethene, and bis(2-ethylhexyl)phthalate also exceed Federal MCLs and FDEP guidance concentrations.

The summary noncancer risk ratio for groundwater is 5.6 (Appendix A, Table A-1). The individual risk ratios contributed by arsenic (2.5) and antimony (1.2) account for approximately one-half of the summary noncancer risk ratio. The maximum detected concentration of antimony exceeds the MCL and the FDEP guidance concentration. The maximum detected concentrations of aluminum and iron exceed secondary MCLs, which are promulgated for aesthetic or economic reasons (not health-based), and FDEP guidance concentrations. The maximum detected concentration of sodium exceeds the Federal health advisory and the FDEP guidance concentration.

The PRE for potential exposures to estimated indoor air VOC concentrations is presented in Appendix C. Of the three VOCs detected in well OLD-13-01A (which is the well adjacent to the abutting residential property), estimated indoor air concentrations of two VOCs (tetrachloroethylene and trichloroethene) exceed RBCs for ambient air. The summary cancer risk ratio is 66, with ratios for tetrachloroethylene and trichloroethene of 58 and 8.3, respectively. These ratios correspond to estimated cancer risks of 6×10^{-5} and 8×10^{-6} , respectively. The summary noncancer risk ratio is less than 1.

Surface Water. Appendix A, Table A-2 presents the public health PRE for surface water. The summary cancer risk ratio is 28. This indicates that additive potential exposures to the maximum detected concentrations of carcinogenic analytes in surface water might be associated with an excess lifetime cancer risk as high as 3×10^{-5} (3 in 10,000). The analyte contributing the largest percentage to the cancer risk ratio is vinyl chloride. The risk ratio for this analyte is 19, which corresponds to estimated cancer risks of 2×10^{-5} .

The summary noncancer risk ratio for surface water is 0.3 (Appendix A, Table A-2). The majority of this risk is contributed by cis-1,2-dichloroethene, which was detected at a maximum concentration of 1,100 $\mu\text{g}/\ell$.

Sediment. Appendix A, Table A-3 presents the public health PRE for sediment. The summary cancer risk ratio is 0.31. This indicates that additive potential exposures to the maximum detected concentrations of carcinogenic analytes in sediment might be associated with an excess lifetime cancer risk as high as 3×10^{-7} . The analyte contributing the largest percentage to the cancer risk ratio is vinyl chloride, with a cancer risk ratio of 0.2 (corresponding to an estimated cancer risk of 2×10^{-7}).

The summary noncancer risk ratio for sediment is 0.03 (Appendix A, Table A-3). The majority of this risk is contributed by cis-1,2-dichloroethene, which was detected at a maximum concentration of 23,000 mg/kg.

Surface Soil. Appendix A, Table A-4 presents the public health PRE for surface soil. The summary cancer risk ratio is 1.4. This indicates that additive potential exposures to the maximum detected concentrations of carcinogenic analytes in surface soil may be associated with excess lifetime cancer risk as high as 1×10^{-6} . No analytes are associated with individual cancer risk ratios above 1. Only arsenic was detected at a maximum concentration above the Florida Soil Cleanup Goals (SCGs). However, the maximum detected concentration is below the background concentration.

The summary noncancer risk ratio for surface soil is 0.38 (Appendix A, Table A-2). The maximum detected concentration of arsenic exceeds the SCG, but is below the background concentration.

Subsurface Soil. Appendix A, Table A-5 presents the results of the human health PRE for subsurface soil. The summary cancer risk ratio is 11. This indicates that additive potential exposures to the maximum detected concentrations of carcinogenic analytes in subsurface soil may be associated with excess lifetime cancer risk as high as 1×10^{-5} . The analytes contributing the largest percentage to the cancer risk ratio include arsenic, beryllium, and Aroclor-1260. Risk ratios for these analytes are 6, 3.3, and 1.3, respectively, which correspond to estimated cancer risks between 1×10^{-6} and 1×10^{-5} for each analyte. The maximum detected concentration of tetrachloroethylene exceeds the leaching SCG.

The summary noncancer risk ratio for subsurface soil is 2.3 (Appendix A, Table A-3). The individual risk ratio contributed by total petroleum hydrocarbons (TPH) (1.6) accounts for the majority of the summary noncancer risk ratio. The screening value for TPH is not an RBC, but rather a risk-based screening value developed by ABB-ES for potential exposures to gasoline in soil. Since volatile compounds typically associated with gasoline, which are more toxic than heavier petroleum compounds, were not detected in the subsurface soil at this site, this screening value is conservative for this site.

There are several sources of uncertainty associated with the human health PRE that should be kept in mind when interpreting the results. Among those that may influence the results most substantially are described below.

- No evaluation of potential groundwater direct-contact inhalation exposures: Tapwater RBCs account for ingestion intakes only, and do not address additional exposures that may occur to VOCs through inhalation and dermal contact during bathing or dishwashing activities. Although ingestion exposures often represent a greater percentage of the total exposure, not evaluating potential inhalation exposures from groundwater results in underestimation of potential risk for volatile compounds.
- Estimated indoor-air concentrations: Indoor-air concentrations were estimated to provide a preliminary evaluation of the potential exposures that might occur if VOCs in groundwater and subsurface soil migrated as vapor and accumulated in overlying structures, specifically the residences adjacent to Area C. For this reason, groundwater VOC concentrations detected in well OLD-13-01A were used to estimate

collected in the vicinity of a potential discharge area substantiate site-screening results (Figure 1-1). Therefore, although the portion of Lake Druid adjacent to Area C is not considered part of Area C, it is included in this PRE to determine if contamination potentially associated with Area C poses a risk to aquatic receptors.

Surface soils were collected from an area that is presently covered by pavement. Therefore, terrestrial vertebrate, plant, and invertebrate receptors are not currently exposed to surface soils at Area C. The surface soil risk evaluation provides an estimate of potential risks that may be present if the pavement in this area was to be removed in the future, allowing for direct contact with the soils.

Surface Water. Appendix A, Table A-6 presents the results of the ecological PRE for surface water. Of the six chlorinated VOCs detected in surface water, only the maximum detected concentration of trichloroethene exceeds the surface water screening value. Maximum concentrations of four other VOCs do not exceed screening values, and a screening value is not available for vinyl chloride.

Sediment. Appendix A, Table A-7 presents the results of the ecological PRE for sediment. No screening values are available for any of the six chlorinated VOCs detected in sediment. Therefore, data reported for sediment cannot be directly evaluated. A method of indirectly evaluating potential sediment impacts is discussed below.

The presumed source of the VOCs in surface water and sediment is groundwater, which discharges through the sediments and into the surface water of the lake. As groundwater discharges, some amount of each contaminant may sorb to sediment particulates, while the rest remains free in the pores between sediment particulates (i.e., the sediment porewater). The fraction of contaminant within the sediment porewater is generally considered to be more bioavailable than the fraction that is sorbed to sediments (USEPA, 1988). If it is assumed that all of the contaminants in groundwater are contained within the porewater (i.e., that none are sorbed to the sediment particulates), then groundwater concentrations may be representative of sediment porewater concentrations. Comparing these estimated sediment porewater concentrations to screening criteria provides an estimate of potential risks to aquatic organisms in sediments at the point of groundwater discharge.

A comparison of maximum groundwater concentrations (presented previously in Appendix A, Table A-1) with surface water screening values (presented in Appendix A, Table A-6) indicates that of the three VOCs detected in both groundwater and sediment (cis-1,2-dichloroethene, tetrachloroethylene, and trichloroethene), only the maximum detected groundwater concentration of tetrachloroethylene (680 µg/L) exceeds the surface water screening value (84 µg/L). However, this evaluation does not consider potential exposures to porewater concentrations of 1,1-dichloroethene, trans-1,2-dichloroethene, and vinyl chloride. These VOCs, which may result from chlorinated ethene degradation, were detected in sediment but not in groundwater and, therefore, the potential porewater concentrations are unknown.

Surface Soil. Appendix A, Table A-8 presents the results of the ecological PRE for surface soil. No organic analytes were detected at maximum concentrations above terrestrial PCL, plant, or invertebrate screening values. No inorganic analytes were detected at maximum concentrations above PCL values. Plant

- It is unlikely that the populations of aquatic receptors occurring in Lake Druid would be adversely impacted by potential exposures to VOCs in surface water and sediment in the area of suspected discharge. However, potential risks associated with sediment exposures could only be qualitatively evaluated, and this represents an uncertainty.
- The human health and ecological PREs for surface water and sediment are limited. Surface water and sediment sampling in Lake Druid was confined to an area of suspected groundwater discharge, and samples were analyzed for chlorinated VOCs only. Risks were evaluated for the data available and, therefore, are representative of potential exposures to a limited number of analytes in a defined area of the lake. The potential presence of contamination in other areas of Lake Druid has not been well characterized. Although supplemental samples collected at locations approximately 50 feet further into the lake from the original sampling points contained substantially lower concentrations of chlorinated VOCs (i.e., less than 50 parts per billion), the characteristics of groundwater discharge into Lake Druid have not been fully established. Risks associated with other areas of potential groundwater discharge and other chemicals have not been evaluated.
- There are no human or ecological receptor direct contact exposures to groundwater and subsurface soil at Area C under current land-use conditions.

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APPENDIX A

PRELIMINARY RISK EVALUATION TABLES

TABLE A-1
Human Health Preliminary Risk Evaluation of Groundwater ¹

Area "C"
Naval Training Center
Orlando, Florida

ANALYTE	Frequency of Detection ²	Maximum Detected Concentration	Background Concentration ³	Maximum Exceeds Background?	USEPA Region III RBC ⁴	Risk Ratio ⁵	Federal MCL ⁶	Maximum Exceeds Federal MCL ?	FDEP Guidance Concentration ⁷	Maximum Exceeds Guid. Conc. ?
CARCINOGENIC EFFECTS										
VOLATILES (µg/L)										
Chloroform	3 / 18	0.2	ND	YES	0.15	1.3	100	NO	• 6	NO
Methylene chloride	1 / 18	2	ND	YES	4.1	0.49	5	NO	• 5	NO
Tetrachloroethylene	11 / 18	680	ND	YES	1.1	618	5	YES	• 3	YES
Trichloroethene	9 / 18	52	ND	YES	1.8	33	5	YES	• 3	YES
SEMIVOLATILES (µg/L)										
Bis(2-Ethylhexyl) phthalate	3 / 18	33	ND	YES	4.8	6.9	6	YES	• 6	YES
INORGANICS (µg/L)										
Arsenic	8 / 18	27.6	5	YES	0.045	613	50	NO	• 50	NO
Beryllium	7 / 18	1.1	ND	YES	0.016	69	4	NO	• 4	NO
SUMMARY CANCER RISK RATIO:						1300				
NON-CARCINOGENIC EFFECTS										
VOLATILES (µg/L)										
1,2-Dichloroethene (cls)	5 / 18	38	ND	YES	61	0.62	70	NO	• 70	NO
Xylene (total)	1 / 18	0.08	ND	YES	12,000	0.0000050	10,000	NO	• 10000	NO
SEMIVOLATILES (µg/L)										
Dimethylphthalate	1 / 18	1	ND	YES	370,000	0.0000027	NA	NA	• 70000	NO
Phenol	1 / 18	1	ND	YES	22,000	0.000045	NA	NA	• 10	NO
INORGANICS (µg/L)										
Aluminum	15 / 18	17300	4067	YES	37,000	0.47	200	YES	• 200	YES
Antimony	4 / 18	17.6	4.1	YES	15	1.17	6	YES	• 6	YES
Arsenic	8 / 18	27.6	5	YES	11	2.51	50	NO	• 50	NO
Barium	18 / 18	145	31.4	YES	2,600	0.056	2,000	NO	• 2000	NO
Cadmium	1 / 18	3.2	5.8	NO	18	NE	5	NO	• 5	NO
Calcium	18 / 18	125000	36830	YES	1,055,398	0.12	NA	NA	• NA	NA
Chromium	2 / 18	20.8	7.8	YES	180	0.12	100	NO	• 100	NO
Copper	1 / 18	47.9	5.4	YES	1,500	0.032	1,300	NO	• 1000	NO
Iron	18 / 18	2010	1227	YES	11,000	0.18	300	YES	• 300	YES
Lead	1 / 18	2.1	4	NO	15	NE	15	NO	• 15	NO
Magnesium	18 / 18	5030	4560	YES	118,807	0.042	NA	NA	• NA	NA
Manganese	18 / 18	32.8	17	YES	180	0.18	50	NO	• 50	NO
Mercury	3 / 18	0.14	0.12	YES	11	0.013	2	NO	• 2	NO
Potassium	18 / 18	3730	5400	NO	297,016	NE	NA	NA	• NA	NA
Selenium	3 / 18	5.5	9.7	NO	180	NE	50	NO	• 50	NO
Silver	2 / 18	3.6	ND	YES	180	0.020	100	NO	• 100	NO
Sodium	18 / 18	41600	18222	YES	396,022	0.11	20,000	YES	• 160000	NO
Vanadium	12 / 18	16.9	20.6	NO	260	NE	NA	NA	• 49	NO
Zinc	10 / 18	24.4	4	YES	11,000	0.002	5,000	NO	• 5000	NO
WATER QUALITY PARAMETERS (mg/L)										
Total Suspended Solids	2 / 6	108	ND	YES	NA	NA	NA	NA	• NA	NA
SUMMARY NON-CANCER RISK RATIO:						5.6				

**TABLE A-1
Human Health Preliminary Risk Evaluation of Groundwater ¹**

Area "C"
Naval Training Center
Orlando, Florida

ANALYTE	Frequency of Detection ²	Maximum Detected Concentration	Background Concentration ³	Maximum Exceeds Background? ⁴	USEPA Region III RBC ⁴	Risk Ratio ⁵	Federal MCL ⁶	Maximum Exceeds Federal MCL ?	FDEP Guidance Concentration ⁷	Maximum Exceeds Guid. Conc. ?
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NOTES:

¹ Based on analytical data for the following sample identifiers: 12G00101 TO 12G00401, 13G00101 TO 13G00801 (duplicate at 13G00101), 14G00101 TO 14G00401, 1400G302 (duplicate at 14G00401)

² Frequency of Detection is equal to the number of samples in which the analyte is detected in relation to the total number of samples.

³ The background screening value is twice the average of detected concentrations for inorganic analytes. For organic analytes, values are the mean of detected concentrations, presented for comparison purposes only.

⁴ Values are from USEPA Region III RBC table, October 20, 1995 (USEPA, 1995).

RBCs are for tap water and are based on a hazard quotient of 1 or an excess lifetime cancer risk of 1 in 1 million.

Arsenic is evaluated as a carcinogen and a non-carcinogen.

Value for chromium based on chromium VI.

Values for essential nutrients (calcium, magnesium, potassium, and sodium) are based on Recommended Daily Allowances (RDAs), and are derived by ABB-ES.

RBC is not available for lead; value is the treatment technique action limit for lead in drinking water distribution systems identified in the

Drinking Water Standards and Health Advisories (USEPA, 1995).

Value for mercury based on inorganic mercury.

⁵ The risk ratio is equal to the maximum detected analyte concentration divided by the USEPA Region III RBC. Risk ratios are calculated for analytes with a maximum detected concentration greater than the background concentration.

A summary cancer risk ratio of 1 roughly corresponds to excess lifetime cancer risk of 1×10^{-6} ; a summary non-cancer risk ratio of 1 roughly corresponds to a hazard index of 1. These ratios tend to overestimate risks, since they are based on maximum detected concentrations.

⁶ Federal MCL published in Drinking Water Regulations and Health Advisories, May 1995 (USEPA, 1995).

Current MCLs listed for bromodichloromethane and chloroform. 1994 Proposed rule for disinfectants and disinfection byproducts: total for all trihalomethanes combined cannot exceed 80 ppm.

Value for aluminum is a secondary MCL and represents the upper limit of the range (50 - 200 $\mu\text{g/L}$).

Value for copper is the treatment technique action level; the secondary MCL is 1000 $\mu\text{g/L}$.

Value for iron is a secondary MCL.

Value for lead is the action level triggering treatment techniques.

Value for manganese is a secondary MCL.

Value for silver is a secondary MCL and a lifetime health advisory.

Value for sodium is a health advisory guideline value.

Value for zinc is a lifetime health advisory; the secondary MCL is 5000 $\mu\text{g/L}$.

⁷ Florida Department of Environmental Protection Groundwater Standards, June 1994.

⁸ FDEP Primary Standard

⁹ FDEP Guidance Concentration

NA = Not Available/Not Applicable

ND = Not Detected

NE = Not Evaluated

TABLE A-2
Human Health Preliminary Risk Evaluation of Surface Water ¹

Area "C"
Naval Training Center
Orlando, Florida

ANALYTE	Frequency of Detection ²	Maximum Detected Concentration	Background Concentration ³	Maximum Exceeds Background?	SWSV ⁴	Risk Ratio ⁵
CARCINOGENIC EFFECTS						
VOLATILES (µg/L)						
1,1-Dichloroethene	1 / 5	1.9	ND	YES	1.3	1.5
Tetrachloroethylene	2 / 5	9.4	ND	YES	4.7	2
Trichloroethene	3 / 5	370	ND	YES	64.9	5.70
Vinyl chloride	2 / 5	15	ND	YES	0.8	19
SUMMARY CANCER RISK RATIO:						28
NON-CARCINOGENIC EFFECTS						
VOLATILES (µg/L)						
1,2-Dichloroethene (cis)	3 / 5	1100	ND	YES	3667	0.30
1,2-Dichloroethene (trans)	2 / 5	12	ND	YES	3750	0.0032
SUMMARY NON-CANCER RISK RATIO:						0.30

NOTES:

¹ Based on analytical data from the following sampling locations: 13W/D00101 to 13W/D00501.

² Frequency of Detection is equal to the number of samples in which the analyte is detected in relation to the total number of samples.

³ The background screening value is twice the average of detected concentrations for inorganic analytes. For organic analytes, values are the mean of detected concentrations, presented for comparison purposes only.

⁴ Values have been calculated by ABB-ES in accordance with USEPA Region IV risk assessment guidance, and are based on child and adult resident ingestion and demal contact exposures to surface water during swimming. Screening values are based on a target cancer risk of 1×10^{-6} or a target HI of 1, and were calculated using the following equality: $\{(\text{Maximum surface water concentration}) / (\text{Total resident cancer risk (or child HI for non-cancer risk)}) = \{(\text{Screening value}) / (\text{Target risk})\}$
Screening values are presented in Table A-4.

⁵ The risk ratio is equal to the maximum detected analyte concentration divided by the screening value. Risk ratios are calculated for analytes with a maximum detected concentration greater than the background concentration.

A summary cancer risk ratio of 1 roughly corresponds to excess lifetime cancer risk of 1×10^{-6} ; a summary non-cancer risk ratio of 1 roughly corresponds to a hazard index of 1. These ratios tend to overestimate risks, since they are based on maximum detected concentrations.

NA = Not Available/Not Applicable

ND = Not Detected

TABLE A-3
Human Health Preliminary Risk Evaluation of Sediment ¹

Area "C"
Naval Training Center
Orlando, Florida

ANALYTE	Frequency of Detection ²	Maximum Detected Concentration	Background Concentration ³	Maximum Exceeds Background?	USEPA Region III RBC ⁴	Risk Ratio ⁵
CARCINOGENIC EFFECTS						
VOLATILES (mg/Kg)						
1,1 - Dichloroethene	2 / 5	0.021	ND	YES	1.1	0.019
Tetrachloroethylene	3 / 5	0.19	ND	YES	12	0.0158
Trichloroethene	4 / 5	4.2	ND	YES	58	0.07
Vinyl chloride	2 / 5	0.069	ND	YES	0.34	0.20
SUMMARY CANCER RISK RATIO:						0.31
NON - CARCINOGENIC EFFECTS						
VOLATILES (mg/Kg)						
1,2 - Dichloroethene (cis)	4 / 5	23	ND	YES	780	0.029
1,2 - Dichloroethene (trans)	2 / 5	0.26	ND	YES	1600	0.00016
SUMMARY NON - CANCER RISK RATIO:						0.030

- NOTES:**
- ¹ Based on analytical data from the following sampling locations: 13W/D00101 to 13W/D00501.
 - ² Frequency of Detection is equal to the number of samples in which the analyte is detected in relation to the total number of samples.
 - ³ The background screening value is twice the average of detected concentrations for inorganic analytes. For organic analytes, values are the mean of detected concentrations, presented for comparison purposes only.
 - ⁴ Values are from USEPA Region III RBC table, October 20, 1995 (USEPA, 1995).
RBCs are for residential soil and are based on a hazard quotient of 1 or an excess lifetime cancer risk of 1 in 1 million.
 - ⁵ The risk ratio is equal to the maximum detected analyte concentration divided by the USEPA Region III RBC. Risk ratios are calculated for analytes with a maximum detected concentration greater than the background concentration.
A summary cancer risk ratio of 1 roughly corresponds to excess lifetime cancer risk of 1×10^{-6} ; a summary non-cancer risk ratio of 1 roughly corresponds to a hazard index of 1. These ratios tend to overestimate risks, since they are based on maximum detected concentrations.
- NA = Not Available/Not Applicable
 ND = Not Detected
 NE = Not Evaluated

TABLE A-4
Human Health Preliminary Risk Evaluation of Surface Soil ¹

Area "C"
Naval Training Center
Orlando, Florida

ANALYTE	Frequency of Detection ²	Maximum Detected Concentration	Background Concentration ³	Maximum Exceeds Background?	USEPA Region III RBC ⁴	Risk Ratio ⁵	FDEP SCG ⁶	Maximum Exceeds SCG ?
CARCINOGENIC EFFECTS								
VOLATILE ORGANIC COMPOUNDS (mg/kg)								
Tetrachloroethylene	3 / 10	0.011	ND	YES	12	0.00092	⁷ 0.03	NO
SEMIVOLATILE ORGANIC COMPOUNDS (mg/kg)								
Benzo (a) anthracene	1 / 10	0.11	ND	YES	0.88	0.13	1.4	NO
Benzo (b) fluoranthene	1 / 10	0.22	ND	YES	0.88	0.25	1.4	NO
Benzo (k) fluoranthene	1 / 10	0.18	ND	YES	8.8	0.020	14	NO
Chrysene	1 / 10	0.2	ND	YES	88	0.0023	140	NO
Indeno (1,2,3-cd) pyrene	1 / 10	0.14	ND	YES	0.88	0.16	1.4	NO
PESTICIDES/PCBs (mg/kg)								
4,4'-DDE	2 / 10	0.0058	ND	YES	1.9	0.0031	3	NO
4,4'-DDT	3 / 10	0.017	ND	YES	1.9	0.0089	3.1	NO
Chlordane-alpha	1 / 10	0.0018	ND	YES	0.49	0.0037	0.8	NO
Chlordane-gamma	1 / 10	0.0016	ND	YES	0.49	0.0033	0.8	NO
INORGANICS (mg/kg)								
Arsenic	4 / 10	0.84	1	NO	0.43	NE	0.7	YES
Beryllium	2 / 10	0.13	0.09	YES	0.15	0.87	0.2	NO
SUMMARY CANCER RISK RATIO:						1.4		
NON-CARCINOGENIC EFFECTS								
VOLATILE ORGANIC COMPOUNDS (mg/kg)								
Acetone	2 / 10	0.042	ND	YES	7,800	0.0000054	260	NO
SEMIVOLATILE ORGANIC COMPOUNDS (mg/kg)								
Benzo (g,h,i) perylene	1 / 10	0.18	ND	YES	2,300	0.000078	14	NO
Pyrene	1 / 10	0.23	ND	YES	2,300	0.00010	2200	NO
INORGANICS (mg/kg)								
Aluminum	10 / 10	2180	2088	YES	78,000	0.028	75000	NO
Arsenic	4 / 10	0.84	1	NO	23	NE	0.7	YES
Barium	10 / 10	5.8	8.7	NO	5,500	NE	5200	NO
Cadmium	1 / 10	1.7	0.98	YES	39	0.044	37	NO

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TABLE A-4
Human Health Preliminary Risk Evaluation of Surface Soil ¹

Area "C"
Naval Training Center
Orlando, Florida

ANALYTE	Frequency of Detection ²	Maximum Detected Concentration	Background Concentration ³	Maximum Exceeds Background?	USEPA Region III RBC ⁴	Risk Ratio ⁵	FDEP SCG ⁶	Maximum Exceeds SCG ⁷
Calcium	10 / 10	12400	25295	NO	1,000,000	NE	NA	NA
Chromium	9 / 10	16.4	4.6	YES	390	0.042	290	NO
Copper	3 / 10	30.2	4.1	YES	3,100	0.0097	NA	NA
Iron	8 / 10	660	712	NO	460,468	NE	NA	NA
Lead	8 / 10	40.9	14.5	YES	400	0.10	500	NO
Magnesium	10 / 10	175	328	NO	460,468	NE	NA	NA
Manganese	9 / 10	14.7	8.1	YES	390	0.038	370	NO
Mercury	1 / 10	0.07	0.07	NO	23	NE	23	NO
Nickel	3 / 10	9.2	4.4	YES	1,600	0.0058	1500	NO
Vanadium	6 / 10	2.5	3.1	NO	550	NE	490	NO
Zinc	6 / 10	52.9	17.2	YES	23,000	0.0023	23000	NO
TOTAL PETROLEUM HYDROCARBONS (mg/kg)								
Total Petroleum Hydrocarbons	8 / 10	40.2	ND	YES	380	0.11	NA	NA
SUMMARY NON-CANCER RISK RATIO:						0.38		

NOTES:

¹ Based on analytical data for the following sample identifiers: 12B00101 to 12B00401 (duplicate at 12B00401), 14B00101 to 14B00401, and 13B00501.

² Frequency of Detection is equal to the number of samples in which the analyte is detected in relation to the total number of samples.

³ The background screening value is twice the average of detected concentrations for inorganic analytes. For organic analytes, values are the mean of detected concentrations, presented for comparison purposes only.

⁴ Values are from USEPA Region III RBC table, October 20, 1995 (USEPA, 1995). RBCs are for residential soil and are based on a hazard quotient of 1 or an excess lifetime cancer risk of 1 in 1 million.

Value for benzo(g,h,i)perylene based on value for pyrene as a conservative surrogate.

Arsenic is evaluated as a carcinogen and a non-carcinogen.

Value for chromium based on hexavalent chromium.

RBC is not available for lead; value is from Interim Guidance on Establishing Soil Lead Cleanup Levels at Superfund Sites (OSWER Directive 9355.4-12).

Value for mercury is based on inorganic mercury.

Value for nickel based on nickel soluble salts.

RBC is not available for TPH. Values are screening values for gasoline derived by ABB-ES.

⁵ The risk ratio is equal to the maximum detected analyte concentration divided by the USEPA Region III RBC. Risk ratios are calculated for analytes with a maximum detected concentration greater than the background concentration.

A summary cancer risk ratio of 1 roughly corresponds to excess lifetime cancer risk of 1×10^{-6} ; a summary non-cancer risk ratio of 1 roughly corresponds to a hazard index of 1. These ratios tend to overestimate risks, since they are based on maximum detected concentrations.

⁶ Florida Department of Environmental Protection Soil Cleanup Goals for Military Sites in Florida (FDEP, September 29, 1995). Values presented are for Residential.

Value for chromium based on chromium VI.

⁷ Value is the leaching-based value. This analyte was detected in groundwater at a maximum concentration above the FDEP Guidance Concentration.

NA = Not Available/Not Applicable

ND = Not Detected

NE = Not Evaluated. The maximum detected concentration is less than background.

TABLE A-5
Human Health Preliminary Risk Evaluation of Subsurface Soil ¹

Area "C"
 Naval Training Center
 Orlando, Florida

ANALYTE	Frequency of Detection ²	Maximum Detected Concentration	Background Concentration ³	Maximum Exceeds Background?	USEPA Region III RBC ⁵	Risk Ratio ⁵	FDEP SCG ⁶	Maximum Exceeds SCG?
CARCINOGENIC EFFECTS								
VOLATILE ORGANIC COMPOUNDS (mg/kg)								
Tetrachloroethylene	4 / 17	0.031	ND	YES	12	0.0026	⁷ 0.03	YES
Trichloroethene	1 / 17	0.002	ND	YES	58	0.000034	0.01	NO
SEMIVOLATILE ORGANIC COMPOUNDS (mg/kg)								
Benzo (a) anthracene	2 / 17	0.11	ND	YES	0.88	0.13	1.4	NO
Benzo (b) fluoranthene	2 / 17	0.17	ND	YES	0.88	0.19	1.4	NO
Benzo (k) fluoranthene	1 / 17	0.13	ND	YES	8.8	0.015	14	NO
Chrysene	3 / 17	0.16	ND	YES	88	0.0018	140	NO
PESTICIDES/PCBs (mg/kg)								
4,4'-DDD	3 / 17	0.0099	ND	YES	2.7	0.0037	0.2	NO
4,4'-DDE	5 / 17	0.032	0.0392	NO	1.9	0.017	0.2	NO
4,4'-DDT	2 / 17	0.1	ND	YES	1.9	0.053	0.5	NO
Aroclor-1260	1 / 17	0.11	ND	YES	0.083	1.3	44	NO
BHC-alpha	1 / 17	0.0061	ND	YES	0.1	0.061	0.2	NO
Chlordane-alpha	1 / 17	0.0046	ND	YES	0.49	0.0094	2.1	NO
Chlordane-gamma	1 / 17	0.0044	ND	YES	0.49	0.0090	2.1	NO
INORGANICS (mg/kg)								
Arsenic	11 / 17	2.6	1.1	YES	0.43	6.0	NA	NA
Beryllium	6 / 17	0.49	ND	YES	0.15	3.3	NA	NA
SUMMARY CANCER RISK RATIO:						11		
NON-CARCINOGENIC EFFECTS								
VOLATILE ORGANIC COMPOUNDS (mg/kg)								
1,2-Dichloroethene (total)	1 / 17	0.006	ND	YES	700	0.0000086	0.2	NO
2-Butanone	1 / 17	0.004	ND	YES	47,000	0.00000085	8.7	NO
Acetone	9 / 17	0.13	ND	YES	7,800	0.000017	1.4	NO
SEMIVOLATILE ORGANIC COMPOUNDS (mg/kg)								
Benzo (g,h,i) perylene	2 / 17	0.12	ND	YES	2,300	0.000052	320	NO
Fluoranthene	3 / 17	0.26	ND	YES	3,100	0.000084	280	NO
Pyrene	3 / 17	0.2	ND	YES	2,300	0.000087	290	NO

Continued on next page

TABLE A-5
Human Health Preliminary Risk Evaluation of Subsurface Soil ¹

Area "C"
 Naval Training Center
 Orlando, Florida

ANALYTE	Frequency of Detection ²	Maximum Detected Concentration	Background Concentration ³	Maximum Exceeds Background?	USEPA Region III RBC ⁵	Risk Ratio ⁵	FDEP SCG ⁶	Maximum Exceeds SCG?
INORGANICS (mg/kg)								
Aluminum	17 / 17	2090	2119	NO	78,000	NE	NA	NA
Arsenic	11 / 17	2.6	1.1	YES	23	0.11	NA	NA
Barium	14 / 17	19.9	3.6	YES	5,500	0.0036	NA	NA
Cadmium	1 / 17	0.72	ND	YES	39	0.018	NA	NA
Calcium	17 / 17	46700	115	YES	1,000,000	0.047	NA	NA
Chromium	17 / 17	33	3.7	YES	390	0.085	NA	NA
Cobalt	2 / 17	1	1.6	NO	4,700	NE	NA	NA
Copper	8 / 17	48.4	ND	YES	3,100	0.016	NA	NA
Iron	17 / 17	7260	264	YES	23,000	0.32	NA	NA
Lead	17 / 17	14.5	3.9	YES	400	0.036	NA	NA
Magnesium	16 / 17	949	32.8	YES	400,468	0.0024	NA	NA
Manganese	15 / 17	23.9	2.1	YES	390	0.061	NA	NA
Mercury	5 / 17	0.06	ND	YES	23	0.0026	NA	NA
Nickel	3 / 17	4	ND	YES	1,600	0.0025	NA	NA
Potassium	2 / 17	1660	185	YES	1,000,000	0.0017	NA	NA
Sodium	5 / 17	163	ND	YES	1,000,000	0.00016	NA	NA
Thallium	1 / 17	0.15	ND	YES	6.3	0.024	NA	NA
Vanadium	13 / 17	8.1	3.4	YES	550	0.015	NA	NA
Zinc	10 / 17	56.7	5.6	YES	23,000	0.0025	NA	NA
TOTAL PETROLEUM HYDROCARBONS (mg/kg)								
Total Petroleum Hydrocarbons	12 / 17	594	ND	YES	380	1.6	NA	NA
SUMMARY NON-CANCER RISK RATIO:						2.3		

NOTES:

¹ Based on analytical data from the following sampling locations: 12B00102 to 12B00402, 13B00101, 13B00401, 13B00901 to 13B01301, 14B00102 to 14B00402 (duplicate at 14B00102).

² Frequency of Detection is equal to the number of samples in which the analyte is detected in relation to the total number of samples.

³ The background screening value is twice the average of detected concentrations for inorganic analytes. For organic analytes, values are the mean of detected concentrations, presented for comparison purposes only.

⁴ Values are from USEPA Region III RBC table, October 20, 1995 (USEPA, 1995). RBCs are for residential soil and are based on a hazard quotient of 1 or an excess lifetime cancer risk of 1 in 1 million.

Value for pyrene used as a conservative surrogate for acenaphthylene, benzo(g,h,i)perylene, and phenanthrene.

Value for alpha- and gamma-chlordane based on value for chlordane.

Arsenic is evaluated as a carcinogen and as a non-carcinogen.

Value for chromium based on hexavalent chromium.

RBC is not available for lead; value is from Interim Guidance on Establishing Soil Lead Cleanup Levels at Superfund Sites (OSWER Directive 9355.4-12).

APPENDIX B

SURFACE WATER SCREENING VALUE CALCULATIONS

TABLE B-1, continued
 INGESTION OF AND DIRECT CONTACT WITH SURFACE WATER - LAKE DRUID
 CHILD RESIDENT - SWIMMING
 NAVAL TRAINING CENTER
 ORLANDO, FLORIDA
 CARCINOGENIC EFFECTS

ORLCRSWS 16-Jan-96

COMPOUND	WATER CONCENTRATION (1)	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL CSP (mg/kg-day) ⁻¹	CANCER RISK INGESTION	PC EVENT (2) (cm/yr)	INTAKE DERMAL (mg/kg-day)	DERMAL CSF (3) (mg/kg-day) ⁻¹	CANCER RISK DERMAL	TOTAL CANCER RISK
1,1-Dichloroethene	1.9	ug/liter	3.2E-07	6.0E-01	1.9E-07	5.22E-02	5.4E-07	6.0E-01	3.2E-07	5.1E-07
Tetrachloroethene	9.4	ug/liter	1.6E-06	5.2E-02	8.2E-08	2.03E-01	1.0E-05	5.2E-02	5.4E-07	6.2E-07
Trichloroethene	370	ug/liter	6.2E-05	1.1E-02	6.8E-07	5.90E-02	1.2E-04	1.1E-02	1.3E-06	2.0E-06
Vinyl chloride	15	ug/liter	2.5E-06	1.9E+00	4.8E-06	2.20E-02	1.8E-06	1.9E+00	3.4E-06	8.2E-06
SUMMARY CANCER RISK					6E-06				6E-06	1E-05

[1] Exposure point concentrations for carcinogenic PAH compounds have been adjusted by application of USEPA Region IV Toxicity Equivalence Factors (February 10, 1992).

[2] This chemical-specific value has been calculated in a separate spreadsheet.

[3] Calculated from Oral CSFs.

ND = No data available

TABLE B-1
INGESTION OF AND DIRECT CONTACT WITH SURFACE WATER - LAKE DRUID
CHILD RESIDENT - SWIMMING
NAVAL TRAINING CENTER
ORLANDO, FLORIDA
EXPOSURE PARAMETERS

EQUATIONS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
CONCENTRATION WATER	CW	chemical specific	ug/liter	
INGESTION RATE	IR	0.13	liters/day	USEPA, 1989a
AGE-SPECIFIC SURFACE AREA	SA _i	age-specific	cm ²	USEPA, 1989a
EVENT FREQUENCY	EV	1	events/day	Assumption
BODY WEIGHT	BW	15	kg	USEPA, 1989a
AGE-SPECIFIC BODY WEIGHT	BW _i	age-specific	kg	USEPA, 1989a
DOSE ABSORBED PER EVENT	DA _{event}	chemical specific	mg/cm ² -event	Calculated
EXPOSURE TIME	ET	2.6	hours/day	USEPA, 1989b
EXPOSURE FREQUENCY	EF	45	days/year	USEPA, 1991a
EXPOSURE DURATION	ED	11	years	Assumption
AGE-SPECIFIC EXPOSURE DURATION	ED _i	age-specific	years	USEPA, 1989a
AGE-WEIGHTED SURFACE AREA [1]	SA _{awhdj}	3066	cm ² -yr/kg	Calculated per USEPA, 1992
DIFFUSION DEPTH PER EVENT	PC _{event}	chemical specific	cm/event	Calculated per USEPA, 1992
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991b
NONCANCER	AT	11	years	Assumption
CONVERSION FACTOR	CF1	0.001	mg/ug	
CONVERSION FACTOR	CF2	0.001	liter/cm ³	

CANCER RISK = INTAKE (mg/kg-day) x CANCER SLOPE FACTOR (mg/kg-day)⁻¹

HAZARD QUOTIENT = INTAKE (mg/kg-day) / REFERENCE DOSE (mg/kg-day)

INTAKE-INGESTION = $\frac{CW \times IR \times EF \times ED \times CF1}{BW \times AT \times 365 \text{ days/yr}}$

INTAKE-DERMAL = $\frac{DA_{event} \times EV \times EF \times SA_{awhdj}}{AT \times 365 \text{ days/yr}}$

Where:

SA_{awhdj} = Sum (SA_i x ED_i / BW_i)

DA_{event} = PC_{event} x CW x CF1 x CF2

Note:

For non-carcinogenic effects AT = ED

[1] Age weighted, body weight normalized surface area
 PC_{event} calculated per Dermal Exposure Assessment Appendix of this document.
 Ingestion Rate = 0.13 l/day = 50 ml/hour x 2.6 hours/day x 0.001 l/ml
 Surface Area assumes lower legs, hands, feet are exposed.
 USEPA, 1989a. Exposure Factors Handbook; EPA/600/8-89/043; May 1989.
 USEPA, 1989b. Risk Assessment Guidance for Superfund, Volume 1, Part A, EPA/540/1-89/002, December 1989.
 USEPA, 1991a. Supplemental USEPA Region IV Guidance, March 21, 1991.
 USEPA, 1991b. Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Parameters".
 USEPA, 1992. Dermal Exposure Assessment: Principles and Applications; EPA/600/8-91/011B. See Table B-3.

TABLE A-5
Human Health Preliminary Risk Evaluation of Subsurface Soil ¹

Area "C"
Naval Training Center
Orlando, Florida

ANALYTE	Frequency of Detection ²	Maximum Detected Concentration	Background Concentration ³	Maximum Exceeds Background?	USEPA Region III RBC ⁵	Risk Ratio ⁵	FDEP SCG ⁶	Maximum Exceeds SCG?
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Value for mercury based on inorganic mercury.

Value for nickel based on nickel soluble salts.

RBC is not available for TPH. Values are screening values for gasoline and diesel oil derived by ABB-ES; derivation will be documented in methodology text of SSI Report.

Value for thallium is based on thallium chloride.

⁵ The risk ratio is equal to the maximum detected analyte concentration divided by the USEPA Region III RBC. Risk ratios are calculated for analytes with a maximum detected concentration greater than the background concentration.

A summary cancer risk ratio of 1 roughly corresponds to excess lifetime cancer risk of 1×10^{-6} ; a summary non-cancer risk ratio of 1 roughly corresponds to a hazard index of 1. These ratios tend to overestimate risks, since they are based on maximum detected concentrations.

⁶ Florida Department of Environmental Protection Soil Cleanup Goals for Florida (FDEP, September 29, 1995). Values presented are for leaching scenario.

Value for chromium based on chromium VI.

⁷ Value is the leaching-based value. This analyte was detected in groundwater at a maximum concentration above the FDEP Guidance Concentration.

NA = Not available/Not applicable

ND = Not Detected

NE = Not Evaluated

TABLE A-6
Ecological Preliminary Risk Evaluation of Surface Water ¹

Area "C"
 Naval Training Center
 Orlando, Florida

ANALYTE	Frequency of Detection ²	Maximum Detected Concentration	Background Concentration ³	Maximum Exceeds Background?	Surface Water Screening Value ⁴	Maximum Exceeds Screening Value ?
VOLATILES (µg/L)						
1,1-Dichloroethene	1 / 5	1.9	ND	YES	3.2	NO
1,2-Dichloroethene (cis)	3 / 5	1100	ND	YES	1350	NO
1,2-Dichloroethene (trans)	2 / 5	12	ND	YES	1350	NO
Tetrachloroethylene	2 / 5	9.4	ND	YES	84	NO
Trichloroethene	3 / 5	370	ND	YES	80.7	YES
Vinyl chloride	2 / 5	15	ND	YES	NA	NA

NOTES:

¹ Based on analytical data from the following sampling locations: 13W/D00101 to 13W/D00501.

² Frequency of Detection is equal to the number of samples in which the analyte is detected in relation to the total number of samples.

³ The background screening value is twice the average of detected concentrations for inorganic analytes. For organic analytes, values are the mean detected concentrations, presented for comparison purposes only.

⁴ The surface water screening value is the lesser of the USEPA chronic AWQC, USEPA Region IV chronic water quality standard, or FDEP Class III Fresh Water Standard.

NA = Not Available/Not Applicable

ND = Not Detected

**TABLE A-7
Ecological Preliminary Risk Evaluation of Sediment ¹**

Area "C"
Naval Training Center
Orlando, Florida

ANALYTE	Frequency of Detection ²	Maximum Detected Concentration	Background Concentration ³	Maximum Exceeds Background?	Sediment Screening Value ⁴	Maximum Exceeds Screening Value ?
VOLATILES (mg/Kg)						
1,1-Dichloroethene	2 / 5	0.021	ND	YES	NA	NA
1,2-Dichloroethene (cis)	4 / 5	23	ND	YES	NA	NA
1,2-Dichloroethene (trans)	2 / 5	0.26	ND	YES	NA	NA
Tetrachloroethylene	3 / 5	0.19	ND	YES	NA	NA
Trichloroethene	4 / 5	4.2	ND	YES	NA	NA
Vinyl chloride	2 / 5	0.069	ND	YES	NA	NA

NOTES:

¹ Based on analytical data from the following sampling locations: 13W/D00101 to 13W/D00501.

² Frequency of Detection is equal to the number of samples in which the analyte is detected in relation to the total number of samples.

³ The background screening value is twice the average of detected concentrations for inorganic analytes. For organic analytes, values are the mean detected concentrations, presented for comparison purposes only.

⁴ Sediment screening values for chlorinated VOCs are not available; see discussion in text.

NA = Not Available/Not Applicable

ND = Not Detected

TABLE A-8
Ecological Preliminary Risk Evaluation of Surface Soil ¹

Area "C"
 Naval Training Center
 Orlando, Florida

ANALYTE	Frequency of Detection ²	Maximum Detected Concentration	Background Concentration ³	Maximum Exceeds Background?	Terrestrial PCL ⁴	Maximum Exceeds PCL ?	Phytotoxicity Screening Value ⁵	Maximum Exceeds Screening Value?	Invertebrate Screening Value ⁶	Maximum Exceeds Screening Value?
VOLATILE ORGANIC COMPOUNDS (mg/kg)										
Acetone	2 / 10	0.042	ND	YES	19500	NO	200	NO	NA	NA
Tetrachloroethylene	3 / 10	0.011	ND	YES	3910	NO	1000	NO	150	NO
SEMIVOLATILE ORGANIC COMPOUNDS (mg/kg)										
Benzo (a) anthracene	1 / 10	0.11	ND	YES	214	NO	25	NO	34	NO
Benzo (b) fluoranthene	1 / 10	0.22	ND	YES	214	NO	25	NO	34	NO
Benzo (g,h,i) perylene	1 / 10	0.18	ND	YES	214	NO	25	NO	34	NO
Benzo (k) fluoranthene	1 / 10	0.18	ND	YES	214	NO	25	NO	34	NO
Chrysene	1 / 10	0.2	ND	YES	214	NO	25	NO	34	NO
Indeno (1,2,3-cd) pyrene	1 / 10	0.14	ND	YES	214	NO	25	NO	34	NO
Pyrene	1 / 10	0.23	ND	YES	214	NO	25	NO	34	NO
PESTICIDES/PCBs (mg/kg)										
4,4'-DDE	2 / 10	0.0058	ND	YES	0.284	NO	12.5	NO	12	NO
4,4'-DDT	3 / 10	0.017	ND	YES	0.722	NO	12.5	NO	12	NO
Chlordane-alpha	1 / 10	0.0018	ND	YES	1.8	NO	12.5	NO	1	NO
Chlordane-gamma	1 / 10	0.0016	ND	YES	1.8	NO	12.5	NO	1	NO
INORGANICS (mg/kg)										
Aluminum	10 / 10	2180	2088	YES	7540	NO	2088	YES	NA	NA
Arsenic	4 / 10	0.84	1	NO	107	NE	10	NE	100	NE
Barium	10 / 10	5.8	8.7	NO	6390	NE	500	NE	NA	NA
Beryllium	2 / 10	0.13	0.09	YES	216	NO	10	NO	NA	NA
Cadmium	1 / 10	1.7	0.98	YES	1.82	NO	3	NO	50	NO
Calcium	10 / 10	12400	25295	NO	NA	NA	NA	NA	NA	NA
Chromium	9 / 10	16.4	4.6	YES	15300	NO	4.6	YES	50	NO
Copper	3 / 10	30.2	4.1	YES	662	NO	100	NO	30	YES
Iron	8 / 10	660	712	NO	NA	NA	NA	NA	NA	NA
Lead	8 / 10	40.9	14.5	YES	221	NO	50	NO	1,190	NO
Magnesium	10 / 10	175	328	NO	NA	NA	NA	NA	NA	NA
Manganese	9 / 10	14.7	8.1	YES	6650	NO	500	NO	NA	NA
Mercury	1 / 10	0.07	0.07	NO	10.4	NE	0.3	NE	36	NE
Nickel	3 / 10	9.2	4.4	YES	414	NO	30	NO	400	NO
Vanadium	6 / 10	2.5	3.1	NO	195	NE	3.1	NE	NA	NA
Zinc	6 / 10	52.9	17.2	YES	251	NO	50	YES	130	NO
TOTAL PETROLEUM HYDROCARBONS (mg/kg)										
Total Petroleum Hydrocarbons	8 / 10	40.2	ND	YES	NA	NA	NA	NA	NA	NA

**TABLE A-8
Ecological Preliminary Risk Evaluation of Surface Soil ¹**

Area "C"
Naval Training Center
Orlando, Florida

ANALYTE	Frequency of Detection ²	Maximum Detected Concentration	Background Concentration ³	Maximum Exceeds Background? ⁴	Terrestrial PCL ⁴	Maximum Exceeds PCL ?	Phytotoxicity Screening Value ⁵	Maximum Exceeds Screening Value?	Invertebrate Screening Value ⁶	Maximum Exceeds Screening Value?
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NOTES:

¹ Based on analytical data for the following sample identifiers: 12B00101 to 12B00401 (duplicate at 12B00401), 14B00101 to 14B00401, and 13B00501.

² Frequency of Detection is equal to the number of samples in which the analyte is detected in relation to the total number of samples.

³ The background screening value is twice the average of detected concentrations for inorganic analytes. For organic analytes, values are the mean of detected concentrations, presented for comparison purposes only.

⁴ Screening values are Protective Contaminant Levels (PCLs). The value presented represents the lowest PCL for the short-tailed shrew, american robin, and red-fox.

⁵ Phytotoxicity Screening Value from Suter (1994) and Hulzebos et al. (1993)

⁶ Invertebrate Screening Value from Neuhauser (1985), and others.

⁷ Literature-based value is less than background value, therefore, background value is used as benchmark value.

NA = Not Available/Not Applicable

ND = Not Detected

NE = Not Evaluated. The maximum detected concentration is below the background concentration.

The summary noncancer risk ratio for sediment is 0.03 (Appendix A, Table A-3). The majority of this risk is contributed by cis-1,2-dichloroethene, which was detected at a maximum concentration of 23,000 mg/kg.

Surface Soil. Appendix A, Table A-4 presents the public health PRE for surface soil. The summary cancer risk ratio is 1.4. This indicates that additive potential exposures to the maximum detected concentrations of carcinogenic analytes in surface soil may be associated with excess lifetime cancer risk as high as 1×10^{-6} . No analytes are associated with individual cancer risk ratios above 1. Only arsenic was detected at a maximum concentration above the Florida Soil Cleanup Goals (SCGs). However, the maximum detected concentration is below the background concentration.

The summary noncancer risk ratio for surface soil is 0.38 (Appendix A, Table A-2). The maximum detected concentration of arsenic exceeds the SCG, but is below the background concentration.

Subsurface Soil. Appendix A, Table A-5 presents the results of the human health PRE for subsurface soil. The summary cancer risk ratio is 11. This indicates that additive potential exposures to the maximum detected concentrations of carcinogenic analytes in subsurface soil may be associated with excess lifetime cancer risk as high as 1×10^{-5} . The analytes contributing the largest percentage to the cancer risk ratio include arsenic, beryllium, and Aroclor-1260. Risk ratios for these analytes are 6, 3.3, and 1.3, respectively, which correspond to estimated cancer risks between 1×10^{-6} and 1×10^{-5} for each analyte. The maximum detected concentration of tetrachloroethylene exceeds the leaching SCG.

The summary noncancer risk ratio for subsurface soil is 2.3 (Appendix A, Table A-3). The individual risk ratio contributed by total petroleum hydrocarbons (TPH) (1.6) accounts for the majority of the summary noncancer risk ratio. The screening value for TPH is not an RBC, but rather a risk-based screening value developed by ABB-ES for potential exposures to gasoline in soil. Since volatile compounds typically associated with gasoline, which are more toxic than heavier petroleum compounds, were not detected in the subsurface soil at this site, this screening value is conservative for this site.

There are several sources of uncertainty associated with the human health PRE that should be kept in mind when interpreting the results. Among those that may influence the results most substantially are described below.

- No evaluation of potential groundwater direct-contact inhalation exposures: Tapwater RBCs account for ingestion intakes only, and do not address additional exposures that may occur to VOCs through inhalation and dermal contact during bathing or dishwashing activities. Although ingestion exposures often represent a greater percentage of the total exposure, not evaluating potential inhalation exposures from groundwater results in underestimation of potential risk for volatile compounds.
- Estimated indoor-air concentrations: Indoor-air concentrations were estimated to provide a preliminary evaluation of the potential exposures that might occur if VOCs in groundwater and subsurface soil migrated as vapor and accumulated in overlying structures, specifically the residences adjacent to Area C. For this reason, groundwater VOC concentrations detected in well OLD-13-01A were used to estimate

potential indoor air concentrations. This well was selected to represent groundwater concentrations because it is located closest to the residences and, lacking more sufficient data, provides the best estimate of potential concentrations associated with this exposure pathway. However, it is unknown whether or not VOC contamination is present under the residential area. This, in addition to several other variables such as potential VOC concentration in groundwater, depth to groundwater, soil moisture and porosity, and building construction details, lends considerable uncertainty to this evaluation.

- Potential exposures to surface water and sediment in Lake Druid: Exposures to Lake Druid surface water were evaluated for potential swimming activities by a resident living on the lake. Evaluation of this exposure scenario represents a conservative approach because it is based on activities that would result in a reasonable maximum exposure to surface water. Potential exposures to surface water from fishing and boating activities would be considerably lower, as VOCs do not substantially accumulate in fish tissue, and inhalation exposures to VOCs in surface water and sediment would be lower than surface water ingestion and dermal contact exposures. However, risks for these potential exposures would be additive to risks for swimming exposures.
- Evaluation of the maximum detected analyte concentration: Developing summary risk estimates using maximum detected analyte concentrations provides a conservative evaluation, as it is unlikely that a receptor would be simultaneously exposed to all sample locations associated with maximum detected concentrations. Evaluation of the average concentration or 95th percent upper confidence limit (UCL) on the arithmetic mean concentration results in lower and more realistic risk estimates.
- No evaluation of potential noncancer risks from exposures to carcinogenic analytes: With the exception of arsenic, published RBCs are based on either a noncancer or cancer endpoint, depending upon which basis results in a lower (more protective) RBC; chemicals with RBCs based on a cancer endpoint are not included in the noncancer risk evaluation. Because all chemicals have an inherent noncancer (systemic) toxicity, excluding carcinogenic chemicals from the noncancer risk evaluation results in an underestimation of potential noncancer risk.
- Relative contribution of background to the risk estimate: For some inorganic analytes such as arsenic and beryllium, background concentrations exceed RBCs. The background groundwater arsenic concentration, for example, contributes approximately 18 percent of the estimated risk. This suggests that estimated risks for these analytes are not entirely attributable to site-related contamination.

2.2.2 Ecological Preliminary Risk Evaluation This PRE identifies potential risks that may be associated with exposures to surface soils collected at Area C and surface water and sediment collected at Lake Druid. Sample locations for these media are presented on Figure 1-1.

Data collected during the site investigation suggest that groundwater associated with Area C may be discharging to Lake Druid, located approximately 300 feet downgradient of the site. Analytical data for surface water and sediment samples

collected in the vicinity of a potential discharge area substantiate site-screening results (Figure 1-1). Therefore, although the portion of Lake Druid adjacent to Area C is not considered part of Area C, it is included in this PRE to determine if contamination potentially associated with Area C poses a risk to aquatic receptors.

Surface soils were collected from an area that is presently covered by pavement. Therefore, terrestrial vertebrate, plant, and invertebrate receptors are not currently exposed to surface soils at Area C. The surface soil risk evaluation provides an estimate of potential risks that may be present if the pavement in this area was to be removed in the future, allowing for direct contact with the soils.

Surface Water. Appendix A, Table A-6 presents the results of the ecological PRE for surface water. Of the six chlorinated VOCs detected in surface water, only the maximum detected concentration of trichloroethene exceeds the surface water screening value. Maximum concentrations of four other VOCs do not exceed screening values, and a screening value is not available for vinyl chloride.

Sediment. Appendix A, Table A-7 presents the results of the ecological PRE for sediment. No screening values are available for any of the six chlorinated VOCs detected in sediment. Therefore, data reported for sediment cannot be directly evaluated. A method of indirectly evaluating potential sediment impacts is discussed below.

The presumed source of the VOCs in surface water and sediment is groundwater, which discharges through the sediments and into the surface water of the lake. As groundwater discharges, some amount of each contaminant may sorb to sediment particulates, while the rest remains free in the pores between sediment particulates (i.e., the sediment porewater). The fraction of contaminant within the sediment porewater is generally considered to be more bioavailable than the fraction that is sorbed to sediments (USEPA, 1988). If it is assumed that all of the contaminants in groundwater are contained within the porewater (i.e., that none are sorbed to the sediment particulates), then groundwater concentrations may be representative of sediment porewater concentrations. Comparing these estimated sediment porewater concentrations to screening criteria provides an estimate of potential risks to aquatic organisms in sediments at the point of groundwater discharge.

A comparison of maximum groundwater concentrations (presented previously in Appendix A, Table A-1) with surface water screening values (presented in Appendix A, Table A-6) indicates that of the three VOCs detected in both groundwater and sediment (cis-1,2-dichloroethene, tetrachloroethylene, and trichloroethene), only the maximum detected groundwater concentration of tetrachloroethylene (680 $\mu\text{g}/\text{L}$) exceeds the surface water screening value (84 $\mu\text{g}/\text{L}$). However, this evaluation does not consider potential exposures to porewater concentrations of 1,1-dichloroethene, trans-1,2-dichloroethene, and vinyl chloride. These VOCs, which may result from chlorinated ethene degradation, were detected in sediment but not in groundwater and, therefore, the potential porewater concentrations are unknown.

Surface Soil. Appendix A, Table A-8 presents the results of the ecological PRE for surface soil. No organic analytes were detected at maximum concentrations above terrestrial PCL, plant, or invertebrate screening values. No inorganic analytes were detected at maximum concentrations above PCL values. Plant

screening values are exceeded by the maximum detected concentrations of aluminum, chromium, and zinc. The maximum concentration of copper exceeds the invertebrate screening value.

The screening values for aluminum, copper, and zinc are exceeded by factors of less than two, whereas the chromium screening value is exceeded by a factor of four. However, plant screening values for aluminum and chromium are based on background soil concentrations because the published literature-based screening values are below the soil background concentrations for Area C. Plants that may occur in the vicinity of this site would not be adversely affected by background concentrations of these inorganic analytes. Although the concentrations at which phytotoxicity may occur are unknown, it is unlikely that plants would be adversely affected by exposures to concentrations slightly above background. Likewise, it is unlikely that plant and invertebrate exposures to zinc and copper concentrations, respectively, that are slightly above the screening values would adversely affect plants and invertebrates.

2.3 PRELIMINARY RISK EVALUATION CONCLUSIONS. Conclusions of the public health and ecological PREs are presented below.

- Under current land-use conditions, a potential may exist for VOC vapor migration from groundwater and subsurface soil to ambient air in above-ground residential structures. Potential cancer risks based on estimated indoor air concentrations for a theoretical structure located on the Area C boundary adjacent to the residential area are within the USEPA acceptable cancer risk limits, but are greater than 1×10^{-6} . However, additional data are required to determine the nature and extent of potential groundwater and subsurface soil contamination in the vicinity of the residential property.
- Potential human receptor exposures to tetrachloroethylene, trichloroethene, arsenic, and beryllium in groundwater used as a residential source of water may pose cancer and noncancer risks above USEPA acceptable risk levels.
- Maximum detected concentrations of tetrachloroethylene, trichloroethene, and arsenic in groundwater, arsenic in surface soil, and tetrachloroethylene, arsenic, and beryllium in subsurface soil exceed Federal and State regulatory criteria.
- Based on available sampling and analytical data, potential exposures to VOC contamination in surface water and sediment from recreational swimming do not pose cancer and noncancer risks above USEPA acceptable risk levels. Cancer risks associated with potential surface water exposures are greater than 1×10^{-6} . However, these risk estimates do not consider additive exposures from other surface water and sediment exposure pathways that could potentially exist.
- It is unlikely that the populations of terrestrial vertebrate, plant, and soil invertebrate receptors would be adversely impacted by potential future exposures to surface soils at Area C.

- It is unlikely that the populations of aquatic receptors occurring in Lake Druid would be adversely impacted by potential exposures to VOCs in surface water and sediment in the area of suspected discharge. However, potential risks associated with sediment exposures could only be qualitatively evaluated, and this represents an uncertainty.
- The human health and ecological PREs for surface water and sediment are limited. Surface water and sediment sampling in Lake Druid was confined to an area of suspected groundwater discharge, and samples were analyzed for chlorinated VOCs only. Risks were evaluated for the data available and, therefore, are representative of potential exposures to a limited number of analytes in a defined area of the lake. The potential presence of contamination in other areas of Lake Druid has not been well characterized. Although supplemental samples collected at locations approximately 50 feet further into the lake from the original sampling points contained substantially lower concentrations of chlorinated VOCs (i.e., less than 50 parts per billion), the characteristics of groundwater discharge into Lake Druid have not been fully established. Risks associated with other areas of potential groundwater discharge and other chemicals have not been evaluated.
- There are no human or ecological receptor direct contact exposures to groundwater and subsurface soil at Area C under current land-use conditions.

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TABLE B-1, continued
 INGESTION OF AND DIRECT CONTACT WITH SURFACE WATER - LAKE DRUID
 CHILD RESIDENT - SWIMMING
 NAVAL TRAINING CENTER
 ORLANDO, FLORIDA
 NONCARCINOGENIC EFFECTS

COMPOUND	WATER CONCENTRATION (mg/l)	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL RfD (mg/kg-day)	HAZARD QUOTIENT INGESTION	PC EVENT (1) (cm/week)	INTAKE DERMAL (mg/kg-day)	DERMAL RfD (2) (mg/kg-day)	HAZARD QUOTIENT DERMAL	TOTAL HAZARD QUOTIENT
1,1-Dichloroethene	1.9	ug/liter	2.0E-06	9.0E-03	2.3E-04	5.22E-02	3.4E-06	9.0E-03	3.8E-04	6.0E-04
Tetrachloroethene	9.4	ug/liter	1.0E-05	1.0E-02	1.0E-03	2.03E-01	6.6E-05	1.0E-02	6.6E-03	7.6E-03
Trichloroethene	370	ug/liter	4.0E-04	6.0E-03	6.6E-02	5.90E-02	7.5E-04	6.0E-03	1.3E-01	1.9E-01
Vinyl chloride	15	ug/liter	1.6E-05	ND	ND	2.20E-02	1.1E-05	ND	ND	ND
cis-1,2-Dichloroethene	1100	ug/liter	1.2E-03	9.0E-03	1.3E-01	3.93E+02	1.5E-03	9.0E-03	1.7E-01	3.0E-01
trans-1,2-Dichloroethene	12	ug/liter	1.3E-05	9.0E-03	1.4E-03	3.93E-02	1.6E-05	9.0E-03	1.8E-03	3.2E-03
SUMMARY HAZARD INDEX					2E-01				3E-01	5E-01

[1] This chemical-specific value has been calculated in a separate spreadsheet.

[2] Calculated from Oral RfDs.

ND = No data available

TABLE B-2
 INGESTION OF AND DIRECT CONTACT WITH SURFACE WATER -- LAKE DRUID
 ADULT RESIDENT -- SWIMMING
 NAVAL TRAINING CENTER
 ORLANDO, FLORIDA
 EXPOSURE PARAMETERS

EQUATIONS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
CONCENTRATION WATER	CW	chemical specific	ug/liter	
INGESTION RATE	IR	0.13	liters/day	USEPA, 1989a
SURFACE AREA	SA	23,000	cm ²	USEPA, 1989a
EVENT FREQUENCY	EV	1	events/day	Assumption
BODY WEIGHT	BW	70	kg	USEPA, 1991a
DOSE ABSORBED PER EVENT	DA _{event}	chemical specific	mg/cm ² -event	Calculated
EXPOSURE TIME	ET	2.6	hours/day	USEPA, 1989b
EXPOSURE FREQUENCY	EF	45	days/year	USEPA, 1991b
EXPOSURE DURATION	ED	24	years	Assumption
DIFFUSION DEPTH PER EVENT	PC _{event}	chemical specific	cm/event	Calculated per USEPA, 1992
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991a
NONCANCER	AT	24	years	Assumption
CONVERSION FACTOR	CF1	0.001	mg/ug	
CONVERSION FACTOR	CF2	0.001	liter/cm ³	

PC_{event} calculated per Dermal Exposure Assessment Appendix of this document.
 Ingestion Rate = 0.13 l/day = 50 ml/hour x 2.6 hours/day x 0.001 l/ml
 Surface Area assumes total body exposed.
 USEPA, 1989a. Exposure Factors Handbook; EPA/600/8-89/043; May 1989.
 USEPA, 1989b. Risk Assessment Guidance for Superfund, Volume I, Part A, EPA/540/1-89/002, December 1989.
 USEPA, 1991a. Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Parameters";
 USEPA, 1991b. Supplemental Region IV Risk Assessment Guidance, March 26, 1991.
 USEPA, 1992. Dermal Exposure Assessment: Principles and Applications; EPA/600/8-91/011B. See Table B-3.

CANCER RISK = INTAKE (mg/kg-day) x CANCER SLOPE FACTOR (mg/kg-day)⁻¹

HAZARD QUOTIENT = INTAKE (mg/kg-day) / REFERENCE DOSE (mg/kg-day)

INTAKE-INGESTION = $\frac{CW \times IR \times EF \times ED \times CF1}{BW \times AT \times 365 \text{ days/yr}}$

INTAKE-DERMAL = $\frac{DA_{event} \times EV \times EF \times ED \times SA}{AT \times BW \times 365 \text{ days/yr}}$

Where:
 DA_{event} = PC_{event} x CW x CF1 x CF2

Note:
 For non-carcinogenic effects AT = ED

TABLE B-2, continued
 INGESTION OF AND DIRECT CONTACT WITH SURFACE WATER - LAKE DRUID
 ADULT RESIDENT - SWIMMING
 NAVAL TRAINING CENTER
 ORLANDO, FLORIDA
 CARCINOGENIC EFFECTS

COMPOUND	WATER CONCENTRATION (1)	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL CSF (mg/kg-day) ⁻¹	CANCER RISK INGESTION	PC EVENT(2) (cm ² /year)	INTAKE DERMAL (mg/kg-day)	DERMAL CSF (3) (mg/kg-day) ⁻¹	CANCER RISK DERMAL	TOTAL CANCER RISK
1,1-Dichloroethene	1.9	ug/liter	1.5E-07	6.0E-01	8.9E-08	5.22E-02	1.4E-06	6.0E-01	8.3E-07	9.2E-07
Tetrachloroethene	9.4	ug/liter	7.4E-07	5.2E-02	3.8E-08	2.03E-01	2.7E-05	5.2E-02	1.4E-06	1.4E-06
Trichloroethene	370	ug/liter	2.9E-05	1.1E-02	3.2E-07	5.90E-02	3.0E-04	1.1E-02	3.3E-06	3.7E-06
Vinyl chloride	15	ug/liter	1.2E-06	1.9E+00	2.2E-06	2.20E-02	4.6E-06	1.9E+00	8.7E-06	1.1E-05
SUMMARY CANCER RISK					3E-06				1E-05	2E-05

[1] Exposure point concentrations for any carcinogenic PAHs have been adjusted by application of USEPA Region IV Toxicity Equivalence Factors (February 10, 1992)

[2] This chemical-specific value has been calculated in a separate spreadsheet

[3] Calculated from Oral CSFs.

ND = No data available

TABLE B-2, continued
 INGESTION OF AND DIRECT CONTACT WITH SURFACE WATER - LAKB DRUID
 ADULT RESIDENT - SWIMMING
 NAVAL TRAINING CENTER
 ORLANDO, FLORIDA
 NONCARCINOGENIC EFFECTS

COMPOUND	WATER CONCENTRATION (mg/L)	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL RfD (mg/kg-day)	HAZARD QUOTIENT INGESTION	PC EVENT [1] (cm ² /year)	INTAKE DERMAL (mg/kg-day)	DERMAL RfD [2] (mg/kg-day)	HAZARD QUOTIENT DERMAL	TOTAL HAZARD QUOTIENT
1,1-Dichloroethene	1.9	ug/liter	4.4E-07	9.0E-03	4.8E-05	5.22E-02	4.0E-06	9.0E-03	4.5E-04	4.9E-04
Tetrachloroethene	9.4	ug/liter	2.2E-06	1.0E-02	2.2E-04	2.03E-01	7.7E-05	1.0E-02	7.7E-03	7.9E-03
Trichloroethene	370	ug/liter	8.5E-05	6.0E-03	1.4E-02	5.90E-02	8.8E-04	6.0E-03	1.5E-01	1.6E-01
Vinyl chloride	15	ug/liter	3.4E-06	NI		2.20E-02	1.3E-05	ND		
cis-1,2-Dichloroethene	1100	ug/liter	2.5E-04	9.0E-03	2.8E-02	3.93E-02	1.8E-03	9.0E-03	1.9E-01	2.2E-01
trans-1,2-Dichloroethene	12	ug/liter	2.7E-06	9.0E-03	3.1E-04	3.93E-02	1.9E-05	9.0E-03	2.1E-03	2.4E-03
SUMMARY HAZARD INDEX					4E-02				4E-01	4E-01

[1] This chemical-specific value has been calculated in a separate spreadsheet
 [2] Calculated from Oral RfDs.
 ND = No data available

TABLE B-3
CURRENT USE INGESTION OF AND DIRECT CONTACT WITH SURFACE WATER - LAKE DRUID
ADULT AND/OR CHILD RESIDENT/ TRANSIENT
NAVAL TRAINING CENTER
ORLANDO, FLORIDA

EXPOSURE PARAMETERS

EQUATIONS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
Diffusion depth per event	PC_{event}	chemical specific	cm/event	
Permeability Constant	PC	chemical specific	cm/hr	USEPA, 1992
Duration of a Single Event	t_{event}	2.6	hr	USEPA, 1989
Thickness of Stratum Corneum	L_{sc}	10	um	USEPA, 1992
Octanol-water partition coefficient/ 10^4	B	chemical specific	dimensionless	USEPA, 1992
Pi	π	3.14	dimensionless	USEPA, 1992
Time to Reach Steady State	T	chemical specific	hr	USEPA, 1992
Stratum Corneum Diffusion Coefficient	D_{sc}	chemical specific	cm^2/hr	USEPA, 1992

INORGANICS	
$PC_{event} = PC \times t_{event}$	
ORGANICS	
$PC_{event} = 2PC \times (6T \times t_{event}/\pi)^{0.5}$	
Where $t_{event} < t^*$	
and: $PC_{event} = PC \times ((t_{event}/(1+B)) + 2T \times ((1+3B)/(1+B)))$	
Where $t_{event} > t^*$	
Note: $T = L_{sc}^2/6D_{sc}$	

REFERENCES

USEPA, 1989. Risk Assessment Guidance for Superfund, Volume I, Part A, EPA/540/1-89/002, December 1989. This value is receptor-specific

USEPA, 1992. Dermal Exposure Assessment: Principles and Applications.

The term T is not calculated here. Values are provided in USEPA, 1992.

TABLE B-3, continued
 CURRENT USE INGESTION OF AND DIRECT CONTACT WITH SURFACE WATER - LAKE DRUID
 ADULT AND/OR CHILD RESIDENT/ TRANSIENT
 NAVAL TRAINING CENTER
 ORLANDO, FLORIDA

COMPOUND	INORGANIC OR ORGANIC? I/O	PC (cm/hr)	T (hr)	t (hr)	B (unitless)	PC _{event} (cm/event)
1,1-Dichloroethene	O	1.6E-02	3.4E-01	8.2E-01	1.3E-02	5.22E-02
Tetrachloroethene	O	4.8E-02	9.0E-01	4.3E+00	2.5E-01	2.03E-01
Trichloroethene	O	1.6E-02	5.5E-01	1.3E+00	2.6E-02	5.90E-02
Vinyl chloride	O	7.3E-03	2.1E-01	5.1E-01	2.3E-03	2.20E-02
cis-1,2-dichloroethene	O	1.2E-02	3.4E-01	8.2E-01	7.2E-03	3.93E-02
trans-1,2-dichloroethene	O	1.2E-02	3.4E-01	8.2E-01	7.2E-03	3.93E-02

NA = Not applicable. For inorganic analytes, this term is not used to calculate PCevent.

REFERENCES:
 Unless otherwise noted, values are taken from USEPA, 1992. Dermal Exposure Assessment: Principles and Applications, EPA/600/8-91/011B

**TABLE B-4
CALCULATION OF SURFACE WATER SCREENING VALUES (SWSVs)**

**LAKE DRUID
NAVAL TRAINING CENTER
ORLANDO, FLORIDA**

Analyte	EPC (ug/L)	Child Resident ELCR [a]	Adult Resident ELCR [b]	Total Resident ELCR [c]	SWSV Cancer [d]	Child Resident HQ [e]	SWSV Non-cancer [d]	Selected SWSV [f] (ug/L)
1,1-Dichloroethene	1.9	5.1E-07	9.2E-07	1.4E-06	1.3	6.0E-04	3167	1.3
Tetrachloroethene	9.4	6.2E-07	1.4E-06	2.0E-06	4.7	7.6E-03	1237	4.7
Trichloroethene	370	2.0E-06	3.7E-06	5.7E-06	64.9	1.9E-01	1947	64.9
Vinyl chloride	15	8.2E-06	1.1E-05	1.9E-05	0.8	NA	NA	0.8
cis-1,2-Dichloroethene	1100	NA	NA	NA	NA	3.0E-01	3667	3667
trans-1,2-Dichloroethene	12	NA	NA	NA	NA	3.2E-03	3750	3750

Notes:

[a] Calculated in Table B-1.

[b] Calculated in Table B-2.

[c] Sum of child and adult ELCRs.

[d] Calculated by solving for the surface water concentration at $ELCR = 1 \times 10^{-6}$ or $HI = 1$, based on the total resident ELCR or child resident HI, as described in text.

[e] Calculated in Table B-1. The greater of the child or adult resident HIs is selected as the basis of the SWSV.

[f] Value is the lesser of the SWSV cancer or SWSV non-cancer.

APPENDIX C

INDOOR AIR CALCULATIONS AND PRELIMINARY RISK EVALUATION

Indoor air concentrations of VOCs were also estimated using the farmer model as presented by USEPA (USEPA 1992) in conjunction with the USEPA recommended approach shown below for calculating indoor air concentrations. The farmer model calculates the flux of VOC across the soil-building slab boundary. The flux rate, expressed as micrograms per second per square centimeter at the building floor, is a function of soil porosity, pore space geometry, air diffusion coefficients, and the difference in concentration in the soil gas and the building air.

The indoor air concentration is calculated per USEPA guidance (USEPA 1992) as:

$$C_{indoor} = E/Q \quad (2)$$

where:

- E = Contaminant infiltration rate
- Q = Building ventilation rate

The building ventilation rate is calculated by:

$$Q = (ACH/3600) \times V \quad (3)$$

where:

- ACH = Air changes per hour in building
- V = Volume of building (m³)
- 3600 = Units conversion factor (sec/hr)

The contaminant infiltration rate of VOCs due to diffusion into the building is calculated by

$$E = J \times A \times F \times CF_1 \quad (4)$$

where:

- J = Contaminant flux ($\mu\text{g}/\text{cm}^2\text{-sec}$)
- A = Area of building floor in contact with soil gas (m²) as described below.
- F = Fraction of floor through which soil gas can enter (assumed here to be 100%)
- CF₁ = Units conversion factor (10⁴ cm²/m²)

The contaminant flux is calculated per USEPA guidance (USEPA 1992):

and

$$J = D_s (C_g - C_2) CF_2 / L \quad (5)$$

$$D_s = D_A P_a^{10/3} / P_T^2 \quad (6)$$

where:

- D_s = Effective diffusion coefficient (cm²/sec)
- D_A = Vapor phase diffusion coefficient in air (cm²/sec)
- P_a = Air filled porosity (unitless)
- L = Distance from source to point of exit (cm)
- P_T = Total soil porosity (unitless)
- C_2 = Background concentration in indoor air (μg/m³) [assumed here to be zero]
- CF_2 = Units conversion factor (10⁻⁶ m³/cm³)

The estimated equilibrium soil gas concentration adjacent to the buildings is used here to represent the vapor phase concentration (C_g) at a theoretical source near the building. The equilibrium soil gas concentration is estimated by assuming that VOCs in well OLD-13-01A are in equilibrium with soil gas at the water table. The soil gas concentration is estimated by the use of the dimensionless Henry's Law Constant.

The estimated soil gas concentration, C_g is:

$$C_g = C_{gw} \times H \times CF_3 \quad (7)$$

where:

- C_{gw} = Concentration of VOC in groundwater (μg/liter)
- H = Dimensionless Henry's Law Constant
- CF_3 = Units conversion factor (1000 liters/m³)

There are several conservative assumptions included in this model. The assumption that $C_2 = 0$ tends to somewhat overestimate the vapor migration into the buildings (USEPA 1992). The area of the building used here is intended to represent a 14 foot by 14 foot bedroom with 8 foot high ceilings. It is assumed that groundwater containing VOCs is beneath the entire area of that theoretical room. It is also assumed that the fraction of the floor through which gas can enter is 100 percent. If the floor overlying the soil is a concrete pad, then potential gas infiltration would be substantially lower.

The results of the farmer model evaluation, including estimated indoor air concentrations, are presented in Table C-1. The estimated indoor air concentrations have been compared to USEPA Region III Risk-Based Concentrations for ambient air in order to provide a preliminary evaluation of the risks potentially

associated with exposure to these estimated concentrations. This comparison is presented in the following Table. Results are discussed in the PRE.

*Analyte	Estimated Indoor Air Concentration ($\mu\text{g}/\text{M}^3$)	USEPA Region III RBC For Ambient Air ($\mu\text{g}/\text{M}^3$)	Risk Ratio
Tetrachloroethylene	180	3.1	58
Trichloroethylene	8.29	1	8.3
Summary Cancer Risk Ratio:			66
cis-1,2-dichloroethene	14.4	37	0.39
Summary Noncancer Risk Ratio:			0.4

TABLE C-1
Farmer's Model approach to deriving indoor air concentrations associated with groundwater contamination

AREA "C"
NAVAL TRAINING CENTER
ORLANDO, FLORIDA

Compound	GW Concentration ug/liter (1)	Henry's Law Constant dimensionless at 20 deg C (2)	Equilibrium Soil Gas Concentration ug/cu m	Area of Building Floor sq m	Fraction of Floor	Air Changes per Hour	Volume of Building cu m	Diffusion Coefficient DaubA sq cm/sec 20 degrees C (2)	Air Filled Soil Porosity	Total Soil Porosity	Distance from Source to point of exit cm	Flux @max sg ug/sq cm-sec	Indoor Air Concentration @max sg ug/cu m
tetrachloroethylene	250	0.59	147,500	18.2	1	0.5	44.4	0.0759	0.35	0.55 SEAM	183	0.0000081106	180.43
trichloroethylene	18	0.38	6,080	18.2	1	0.5	44.4	0.0846	0.35	0.55 SEAM	183	0.000002808	8.29
dis-1,2-dichloroethene	29	0.32	9,280	18.2	1	0.5	44.4	0.0984	0.35	0.55 SEAM	183	0.000004883	14.42

(1) Data from well OLD-13-01 samples 3/9/85

(2) From Hearhoff, J. and J.L. Cleasby, Evaluation of air stripping for the removal of organic drinking-water contaminants Water SA Vol. 16, No. 1, January 1990.

183 cm = 8 feet from groundwater to building slab

APPENDIX B

· SURFACE WATER AND SEDIMENT SAMPLING LOGS

SURFACE WATER AND SEDIMENT SAMPLE FIELD DATA RECORD

Project: NTC ORLANDO OIA IRA
 Project Number: 08519.70
 Sample Location ID: U4W00101 / U4D00101
 Time: Start: 14:15 End: 16:55

Site: OIA LAKE DRUID
 Date: 5-2-96
 Signature of Sampler: *Robert J. Burns Jr*

SURFACE WATER INFORMATION WATER DEPTH: <u>1.0</u> (FT) SAMPLE DEPTH: <u>0-6"</u> (FT BELOW SURFACE) VELOCITY MEASUREMENT OBTAINED <input type="checkbox"/> YES, SEE RECORD <input checked="" type="checkbox"/> NO TEMPERATURE: <u>28.5 °C</u> pH: <u>6.31</u> SPECIFIC CONDUCTIVITY: <u>172 µmhos</u> DISSOLVED O ₂ : <u>NA</u> REDUCTION/OXIDATION POTENTIAL: <u>NA</u> OTHER: _____ _____ _____	TYPE OF SURFACE WATER: <input type="checkbox"/> STREAM <input type="checkbox"/> RIVER <input checked="" type="checkbox"/> POND/LAKE <input type="checkbox"/> SEEP	DECONTAMINATION FLUIDS USED: <input checked="" type="checkbox"/> ISOPROPYL ALCOHOL <input checked="" type="checkbox"/> DEIONIZED WATER <input checked="" type="checkbox"/> ALCONOX <input type="checkbox"/> HNO ₃ SOLUTION <input checked="" type="checkbox"/> POTABLE WATER <input type="checkbox"/> NONE
EQUIPMENT USED FOR SAMPLING: <input checked="" type="checkbox"/> NONE, GRAB INTO BOTTLE <input type="checkbox"/> BOMB SAMPLER <input type="checkbox"/> PUMP TYPE: _____ _____ _____		

SEDIMENT INFORMATION DEPTH OF SEDIMENT SAMPLE: <u>0-1.5' B.L.S.</u> QA SAMPLES COLLECTED AT THIS LOCATION? <input type="checkbox"/> YES <input type="checkbox"/> NO TYPE: _____ SAMPLE OBSERVATIONS: <input type="checkbox"/> ODOR _____ <input type="checkbox"/> COLOR _____ OTHER: _____ _____ _____	EQUIPMENT USED FOR COLLECTION: <input checked="" type="checkbox"/> GRAVITY CORER <input type="checkbox"/> S.S. SPLIT SPOON <input type="checkbox"/> DREDGE <input type="checkbox"/> HAND SPOON <input type="checkbox"/> S.S. BOWL <input type="checkbox"/> S.S. BUCKET <input type="checkbox"/> _____ _____ TYPE OF SAMPLE COLLECTED: <input checked="" type="checkbox"/> DISCRETE <input type="checkbox"/> COMPOSITE	DECONTAMINATION FLUIDS USED: <input checked="" type="checkbox"/> ISOPROPYL ALCOHOL <input checked="" type="checkbox"/> DEIONIZED WATER <input checked="" type="checkbox"/> ALCONOX <input type="checkbox"/> HNO ₃ SOLUTION <input checked="" type="checkbox"/> POTABLE WATER <input type="checkbox"/> NONE SEDIMENT TYPE: <input type="checkbox"/> CLAY <input checked="" type="checkbox"/> SILT <input checked="" type="checkbox"/> SAND <input checked="" type="checkbox"/> ORGANIC <input type="checkbox"/> GRAVEL COMMENTS: <u>SILTY-SAND, HIGH ORGANIC</u> <u>CONTENT, 15% RECOVERY</u>
--	--	---

SAMPLES COLLECTED						
SURFACE WATER	SEDIMENT	PRESERVATIVE	VOLUME REQUIRED	SAMPLE BOTTLE ID'S	COMMENTS:	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	NONE, ICE		U4W00101		
<input type="checkbox"/>	<input checked="" type="checkbox"/>	NONE, ICE		U4D00101		
<input type="checkbox"/>	<input type="checkbox"/>					
<input type="checkbox"/>	<input type="checkbox"/>					
<input type="checkbox"/>	<input type="checkbox"/>					

NOTES/SKETCH

SURFACE WATER AND SEDIMENT SAMPLE FIELD DATA RECORD

Project: NTC ORLANDO OUA IRA
 Project Number: 08519.70
 Sample Location ID: U4W00201/U4D00201
 Time: Start: 10:06 End: 11:20

Site: OUA LAKE DRUID
 Date: 5-7-96
 Signature of Sampler: [Signature]

SURFACE WATER INFORMATION

TYPE OF SURFACE WATER:
 STREAM RIVER
 POND/LAKE SEEP CREEK

DECONTAMINATION FLUIDS USED:
 ISOPROPYL ALCOHOL
 DEIONIZED WATER
 ALCONOX
 HNO3 SOLUTION
 POTABLE WATER
 NONE

WATER DEPTH: 0.5 (FT)
 SAMPLE DEPTH: 0-0.5 (FT BELOW SURFACE)
 VELOCITY MEASUREMENT OBTAINED YES, SEE RECORD NO
 TEMPERATURE: NA pH: 6.16
 SPECIFIC CONDUCTIVITY: 155 μ mhos
 DISSOLVED O₂: NA
 REDUCTION/OXIDATION POTENTIAL: NA
 OTHER: _____

EQUIPMENT USED FOR SAMPLING:

NONE, GRAB INTO BOTTLE
 BOMB SAMPLER
 PUMP TYPE: _____

SEDIMENT INFORMATION

DEPTH OF SEDIMENT SAMPLE:
0-1.5' BLS
 QA SAMPLES COLLECTED
 AT THIS LOCATION? YES NO
 TYPE: MS, MSD
 SAMPLE OBSERVATIONS:
 ODOR _____
 COLOR _____
 OTHER: _____

EQUIPMENT USED FOR COLLECTION:
 GRAVITY CORER
 S.S. SPLIT SPOON
 DREDGE
 HAND SPOON
 S.S. BOWL
 S.S. BUCKET

DECONTAMINATION FLUIDS USED:
 ISOPROPYL ALCOHOL
 DEIONIZED WATER
 ALCONOX
 HNO3 SOLUTION
 POTABLE WATER
 NONE

TYPE OF SAMPLE COLLECTED:
 DISCRETE
 COMPOSITE

SEDIMENT TYPE:
 CLAY
 SILT 40% RECOVERY
 SAND
 ORGANIC
 GRAVEL

SAMPLES COLLECTED

SURFACE WATER	SEDIMENT	PRESERVATIVE	VOLUME REQUIRED	SAMPLE BOTTLE ID'S	COMMENTS:
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	ICE		U4W00201, U4W00201 MS, MSD	
<input type="checkbox"/>	<input type="checkbox"/>	ICE		U4W00201, U4D00201 MS, MSD	
<input type="checkbox"/>	<input type="checkbox"/>				
<input type="checkbox"/>	<input type="checkbox"/>				

NOTES/SKETCH

SURFACE WATER AND SEDIMENT SAMPLE FIELD DATA RECORD

Project: NTC ORLANDO OVA IRA
 Project Number: 08519.70
 Sample Location ID: U4W00301 / U4D00301
 Time: Start: 14:45 End: 15:00

Site: OLL4 LAKE DRUID
 Date: 5-7-96
 Signature of Sampler: [Signature]

SURFACE WATER INFORMATION

TYPE OF SURFACE WATER:
 STREAM RIVER
 POND/LAKE SEEP CREEK

DECONTAMINATION FLUIDS USED:
 ISOPROPYL ALCOHOL
 DEIONIZED WATER
 ALCONOX
 HNO3 SOLUTION
 POTABLE WATER
 NONE

WATER DEPTH: 0.5 (FT)
 SAMPLE DEPTH: 0-0.5 (FT BELOW SURFACE)
 VELOCITY MEASUREMENT OBTAINED YES, SEE RECORD NO
 TEMPERATURE: 85 °F pH: 6.03
 SPECIFIC CONDUCTIVITY: 180 umhos
 DISSOLVED O₂: NA
 REDUCTION/OXIDATION POTENTIAL: NA
 OTHER: _____

EQUIPMENT USED FOR SAMPLING:
 NONE, GRAB INTO BOTTLE
 BOMB SAMPLER
 PUMP TYPE: _____

SEDIMENT INFORMATION

EQUIPMENT USED FOR COLLECTION:
 GRAVITY CORER
 S.S. SPLIT SPOON
 DREDGE
 HAND SPOON
 S.S. BOWL
 S.S. BUCKET

DECONTAMINATION FLUIDS USED:
 ISOPROPYL ALCOHOL
 DEIONIZED WATER
 ALCONOX
 HNO3 SOLUTION
 POTABLE WATER
 NONE

DEPTH OF SEDIMENT SAMPLE:
0-1.5' BLS
 QA SAMPLES COLLECTED
 AT THIS LOCATION? YES NO
 TYPE: _____
 SAMPLE OBSERVATIONS:
 ODOR _____
 COLOR DARK GREY TO BLACK
 OTHER: _____

TYPE OF SAMPLE COLLECTED:
 DISCRETE
 COMPOSITE

SEDIMENT TYPE:
 CLAY
 SILT 50% RECOVERY
 SAND SILTY SAND DARK GREY TO BLACK
 ORGANIC
 GRAVEL

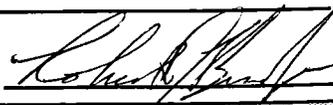
SAMPLES COLLECTED

SURFACE WATER	SEDIMENT	PRESERVATIVE	VOLUME REQUIRED	SAMPLE BOTTLE ID'S	COMMENTS:
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	ICE		U4W00301	
<input type="checkbox"/>	<input type="checkbox"/>	ICE		U4D00301	
<input type="checkbox"/>	<input type="checkbox"/>				
<input type="checkbox"/>	<input type="checkbox"/>				
<input type="checkbox"/>	<input type="checkbox"/>				

NOTES/SKETCH

SURFACE WATER AND SEDIMENT SAMPLE FIELD DATA RECORD

Project: NTC ORLANDO OUA IRA
 Project Number: 08519.70
 Sample Location ID: U4D00401
 Time: Start: 15:51 End: NA

Site: OUA LAKE DRUID
 Date: 5-7-96
 Signature of Sampler: 

SURFACE WATER INFORMATION WATER DEPTH: _____ (FT) SAMPLE DEPTH: _____ (FT BELOW SURFACE) VELOCITY MEASUREMENT OBTAINED <input type="checkbox"/> YES, SEE RECORD <input type="checkbox"/> NO TEMPERATURE: _____ pH: _____ SPECIFIC CONDUCTIVITY: _____ DISSOLVED O ₂ : _____ REDUCTION/OXIDATION POTENTIAL: _____ OTHER: _____	TYPE OF SURFACE WATER: <input type="checkbox"/> STREAM <input type="checkbox"/> RIVER <input type="checkbox"/> POND/LAKE <input type="checkbox"/> SEEP	DECONTAMINATION FLUIDS USED: <input type="checkbox"/> ISOPROPYL ALCOHOL <input type="checkbox"/> DEIONIZED WATER <input type="checkbox"/> ALCONOX <input type="checkbox"/> HNO ₃ SOLUTION <input type="checkbox"/> POTABLE WATER <input type="checkbox"/> NONE
EQUIPMENT USED FOR SAMPLING: <input type="checkbox"/> NONE, GRAB INTO BOTTLE <input type="checkbox"/> BOMB SAMPLER <input type="checkbox"/> PUMP TYPE: _____		

SEDIMENT INFORMATION DEPTH OF SEDIMENT SAMPLE: <u>0-1.5' BLS.</u> QA SAMPLES COLLECTED AT THIS LOCATION? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO TYPE: _____ SAMPLE OBSERVATIONS: <input type="checkbox"/> ODOR _____ <input checked="" type="checkbox"/> COLOR <u>DARK GREY TO BLACK</u> OTHER: _____	EQUIPMENT USED FOR COLLECTION: <input checked="" type="checkbox"/> GRAVITY CORER <input type="checkbox"/> S.S. SPLIT SPOON <input type="checkbox"/> DREDGE <input type="checkbox"/> HAND SPOON <input type="checkbox"/> S.S. BOWL <input type="checkbox"/> S.S. BUCKET <input type="checkbox"/> _____ TYPE OF SAMPLE COLLECTED: <input checked="" type="checkbox"/> DISCRETE <input type="checkbox"/> COMPOSITE	DECONTAMINATION FLUIDS USED: <input checked="" type="checkbox"/> ISOPROPYL ALCOHOL <input checked="" type="checkbox"/> DEIONIZED WATER <input checked="" type="checkbox"/> ALCONOX <input type="checkbox"/> HNO ₃ SOLUTION <input checked="" type="checkbox"/> POTABLE WATER <input type="checkbox"/> NONE SEDIMENT TYPE: <input type="checkbox"/> CLAY <input checked="" type="checkbox"/> SILT <input checked="" type="checkbox"/> SAND <input checked="" type="checkbox"/> ORGANIC <input type="checkbox"/> GRAVEL COMMENTS: <u>70% RECOVERY</u>
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SAMPLES COLLECTED						
SURFACE WATER	SEDIMENT	PRESERVATIVE	VOLUME REQUIRED	SAMPLE BOTTLE ID'S	COMMENTS:	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<u>ICE</u>		<u>U4D00401</u>		
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<u>ICE</u>		<u>U4D00402</u>		
<input type="checkbox"/>	<input type="checkbox"/>					
<input type="checkbox"/>	<input type="checkbox"/>					
<input type="checkbox"/>	<input type="checkbox"/>					

NOTES/SKETCH
U4D00401 WAS TAKEN FROM TOP OF CORE, U4D00402 FROM BOTTOM.

SURFACE WATER AND SEDIMENT SAMPLE FIELD DATA RECORD

Project: NTC ORLANDO OWA TRA
 Project Number: 08519.70
 Sample Location ID: U4D00501
 Time: Start: 16:29 End: 16:51

Site: OWA LAKE DRUID
 Date: 5-7-96
 Signature of Sampler: [Signature]

SURFACE WATER INFORMATION WATER DEPTH: _____ (FT) SAMPLE DEPTH: _____ (FT BELOW SURFACE) VELOCITY MEASUREMENT OBTAINED <input type="checkbox"/> YES, SEE RECORD <input checked="" type="checkbox"/> NO TEMPERATURE: _____ pH: _____ SPECIFIC CONDUCTIVITY: _____ DISSOLVED O ₂ : _____ REDUCTION/OXIDATION POTENTIAL: _____ OTHER: _____	TYPE OF SURFACE WATER: <input type="checkbox"/> STREAM <input type="checkbox"/> RIVER <input type="checkbox"/> POND/LAKE <input type="checkbox"/> SEEP	DECONTAMINATION FLUIDS USED: <input type="checkbox"/> ISOPROPYL ALCOHOL <input type="checkbox"/> DEIONIZED WATER <input type="checkbox"/> ALCONOX <input type="checkbox"/> HNO ₃ SOLUTION <input type="checkbox"/> POTABLE WATER <input type="checkbox"/> NONE
EQUIPMENT USED FOR SAMPLING: <input type="checkbox"/> NONE, GRAB INTO BOTTLE <input type="checkbox"/> BOMB SAMPLER <input type="checkbox"/> PUMP TYPE: _____		

SEDIMENT INFORMATION DEPTH OF SEDIMENT SAMPLE: <u>0 - 1.5' BLS</u> QA SAMPLES COLLECTED AT THIS LOCATION? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO TYPE: _____ SAMPLE OBSERVATIONS: <input type="checkbox"/> ODOR _____ <input checked="" type="checkbox"/> COLOR <u>DARK BROWN TO BLACK</u> OTHER: _____	EQUIPMENT USED FOR COLLECTION: <input checked="" type="checkbox"/> GRAVITY CORER <input type="checkbox"/> S.S. SPLIT SPOON <input type="checkbox"/> DREDGE <input type="checkbox"/> HAND SPOON <input type="checkbox"/> S.S. BOWL <input type="checkbox"/> S.S. BUCKET <input type="checkbox"/> _____ TYPE OF SAMPLE COLLECTED: <input checked="" type="checkbox"/> DISCRETE <input type="checkbox"/> COMPOSITE	DECONTAMINATION FLUIDS USED: <input checked="" type="checkbox"/> ISOPROPYL ALCOHOL <input checked="" type="checkbox"/> DEIONIZED WATER <input checked="" type="checkbox"/> ALCONOX <input type="checkbox"/> HNO ₃ SOLUTION <input checked="" type="checkbox"/> POTABLE WATER <input type="checkbox"/> NONE SEDIMENT TYPE: <input type="checkbox"/> CLAY <input checked="" type="checkbox"/> SILT <u>SILTY SAND 80%</u> <input checked="" type="checkbox"/> SAND <u>RECOVERY</u> <input type="checkbox"/> ORGANIC <input type="checkbox"/> GRAVEL
COMMENTS: _____		

SAMPLES COLLECTED

SURFACE WATER	SEDIMENT	PRESERVATIVE	VOLUME REQUIRED	SAMPLE BOTTLE ID'S	COMMENTS:
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<u>ICE</u>		<u>U4D00501</u>	<u>TOP OF CORE</u>
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<u>ICE</u>		<u>U4D00502</u>	<u>BOTTOM OF CORE</u>
<input type="checkbox"/>	<input type="checkbox"/>				
<input type="checkbox"/>	<input type="checkbox"/>				

NOTES/SKETCH

SURFACE WATER AND SEDIMENT SAMPLE FIELD DATA RECORD

Project: NTC ORLANDO OUA IRA
 Project Number: 08519.70
 Sample Location ID: U4W00601/U4D00601
 Time: Start: 16:51 End: 16:59

Site: OUA LAKE DRUID
 Date: 5-7-96
 Signature of Sampler: [Signature]

SURFACE WATER INFORMATION

TYPE OF SURFACE WATER:
 STREAM RIVER
 POND/LAKE SEEP

DECONTAMINATION FLUIDS USED:

ISOPROPYL ALCOHOL
 DEIONIZED WATER
 ALCONOX
 HNO3 SOLUTION
 POTABLE WATER
 NONE

WATER DEPTH: 0-1 (FT)
 SAMPLE DEPTH: 0-0.5 (FT BELOW SURFACE)
 VELOCITY MEASUREMENT OBTAINED YES, SEE RECORD NO
 TEMPERATURE: 82°F pH: 5.95
 SPECIFIC CONDUCTIVITY: 160 µmhos
 DISSOLVED O₂: NA
 REDUCTION/OXIDATION POTENTIAL: NA
 OTHER: _____

EQUIPMENT USED FOR SAMPLING:

NONE, GRAB INTO BOTTLE
 BOMB SAMPLER
 PUMP TYPE: _____

SEDIMENT INFORMATION

DEPTH OF SEDIMENT SAMPLE:
0-1.5' BLS
 QA SAMPLES COLLECTED
 AT THIS LOCATION? YES NO
 TYPE: _____
 SAMPLE OBSERVATIONS:
 ODOR _____
 COLOR _____
 OTHER: _____

EQUIPMENT USED FOR COLLECTION:

GRAVITY CORER
 S.S. SPLIT SPOON
 DREDGE
 HAND SPOON
 S.S. BOWL
 S.S. BUCKET

DECONTAMINATION FLUIDS USED:

ISOPROPYL ALCOHOL
 DEIONIZED WATER
 ALCONOX
 HNO3 SOLUTION
 POTABLE WATER
 NONE

SEDIMENT TYPE:

CLAY COMMENTS: _____
 SILT NA
 SAND _____
 ORGANIC _____
 GRAVEL _____

TYPE OF SAMPLE COLLECTED:

DISCRETE
 COMPOSITE

SAMPLES COLLECTED

SURFACE WATER	SEDIMENT	PRESERVATIVE	VOLUME REQUIRED	SAMPLE BOTTLE ID'S	COMMENTS:
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<u>ICE</u>		<u>U4W00601</u>	
<input type="checkbox"/>	<input type="checkbox"/>	<u>ICE</u>		<u>U4D00601</u>	
<input type="checkbox"/>	<input type="checkbox"/>				
<input type="checkbox"/>	<input type="checkbox"/>				
<input type="checkbox"/>	<input type="checkbox"/>				

NOTES/SKETCH

SURFACE WATER AND SEDIMENT SAMPLE FIELD DATA RECORD

Project: NTC ORLANDO OUA IRA
 Project Number: 08519.70
 Sample Location ID: UAW00701/UA000701
 Time: Start: 10:23 End: 10:42

Site: OUA LAKE DRUID
 Date: 5-8-96
 Signature of Sampler: [Signature]

SURFACE WATER INFORMATION WATER DEPTH: <u>0-1</u> (FT) SAMPLE DEPTH: <u>0-0.5</u> (FT BELOW SURFACE) VELOCITY MEASUREMENT OBTAINED [] YES, SEE RECORD [X] NO TEMPERATURE: <u>76.0 °F</u> pH: <u>5.29</u> SPECIFIC CONDUCTIVITY: <u>188 µmhos</u> DISSOLVED O ₂ : <u>NA</u> REDUCTION/OXIDATION POTENTIAL: <u>NA</u> OTHER: _____ _____ _____	TYPE OF SURFACE WATER: [] STREAM [] RIVER [X] POND/LAKE [] SEEP	DECONTAMINATION FLUIDS USED: [X] ISOPROPYL ALCOHOL [X] DEIONIZED WATER [X] ALCONOX [] HNO ₃ SOLUTION [X] POTABLE WATER [] NONE
EQUIPMENT USED FOR SAMPLING: [X] NONE, GRAB INTO BOTTLE [] BOMB SAMPLER [] PUMP TYPE: _____ _____ _____		

SEDIMENT INFORMATION DEPTH OF SEDIMENT SAMPLE: <u>0-1.5' BLS</u> QA SAMPLES COLLECTED AT THIS LOCATION? [] YES [X] NO TYPE: _____ SAMPLE OBSERVATIONS: [] ODOR _____ [X] COLOR <u>TAN-BROWN</u> OTHER: _____ _____	EQUIPMENT USED FOR COLLECTION: [X] GRAVITY CORER [] S.S. SPLIT SPOON [] DREDGE [] HAND SPOON [] S.S. BOWL [] S.S. BUCKET [] _____ _____ TYPE OF SAMPLE COLLECTED: [X] DISCRETE [] COMPOSITE	DECONTAMINATION FLUIDS USED: [X] ISOPROPYL ALCOHOL [X] DEIONIZED WATER [X] ALCONOX [X] HNO ₃ SOLUTION <u>10-30-96</u> [X] POTABLE WATER [] NONE SEDIMENT TYPE: [] CLAY [X] SILT [X] SAND [] ORGANIC [] GRAVEL COMMENTS: <u>SILTY-SAND 90% RECOVERY</u>
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SAMPLES COLLECTED						
SURFACE WATER	SEDIMENT	PRESERVATIVE	VOLUME REQUIRED	SAMPLE BOTTLE ID'S	COMMENTS:	
[X]	[X]	ICE		UAW00701		
[]	[]	ICE		UA000701		
[]	[]					
[]	[]					
[]	[]					

NOTES/SKETCH

SURFACE WATER AND SEDIMENT SAMPLE FIELD DATA RECORD

Project: NTL ORLANDO OUA IRA
 Project Number: 08519.70
 Sample Location ID: U4W00801 / U4D00801
 Time: Start: 11:03 End: 11:28

Site: OUA LAKE DRUID
 Date: 5-8-96
 Signature of Sampler: [Signature]

SURFACE WATER INFORMATION

TYPE OF SURFACE WATER:
 STREAM RIVER
 POND/LAKE SEEP

DECONTAMINATION FLUIDS USED:
 ISOPROPYL ALCOHOL
 DEIONIZED WATER
 ALCONOX
 HNO3 SOLUTION
 POTABLE WATER
 NONE

WATER DEPTH: 0-1 (FT)
 SAMPLE DEPTH: 0-0.5 (FT BELOW SURFACE)
 VELOCITY MEASUREMENT OBTAINED YES, SEE RECORD NO
 TEMPERATURE: 77.0 °F pH: 6.33
 SPECIFIC CONDUCTIVITY: 205 μ mhos
 DISSOLVED O₂: NA
 REDUCTION/OXIDATION POTENTIAL: NA
 OTHER: _____

EQUIPMENT USED FOR SAMPLING:

NONE, GRAB INTO BOTTLE
 BOMB SAMPLER
 PUMP TYPE: _____

SEDIMENT INFORMATION

DEPTH OF SEDIMENT SAMPLE:
0-1.5' BLS
 QA SAMPLES COLLECTED
 AT THIS LOCATION? YES NO
 TYPE: _____
 SAMPLE OBSERVATIONS:
 ODOR _____
 COLOR BROWN-TAN
 OTHER: _____

EQUIPMENT USED FOR COLLECTION:

GRAVITY CORER
 S.S. SPLIT SPOON
 DREDGE
 HAND SPOON
 S.S. BOWL
 S.S. BUCKET

DECONTAMINATION FLUIDS USED:

ISOPROPYL ALCOHOL
 DEIONIZED WATER
 ALCONOX
 HNO3 SOLUTION
 POTABLE WATER
 NONE

TYPE OF SAMPLE COLLECTED:

DISCRETE
 COMPOSITE

SEDIMENT TYPE:

CLAY **COMMENTS:**
 SILT SILTY-SAND, 50% RECOVERY
 SAND
 ORGANIC
 GRAVEL

SAMPLES COLLECTED

SURFACE WATER	SEDIMENT	PRESERVATIVE	VOLUME REQUIRED	SAMPLE BOTTLE ID'S	COMMENTS:
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			<u>U4W00801</u>	
<input type="checkbox"/>	<input checked="" type="checkbox"/>			<u>U4D00801</u>	<u>TSP OF CORE</u>
<input type="checkbox"/>	<input checked="" type="checkbox"/>			<u>U4D00802</u>	<u>BOTTOM OF CORE</u>
<input type="checkbox"/>	<input type="checkbox"/>				
<input type="checkbox"/>	<input type="checkbox"/>				

NOTES/SKETCH

SURFACE WATER AND SEDIMENT SAMPLE FIELD DATA RECORD

Project: NTC ORLANDO OUA IRA
 Project Number: 08519.70
 Sample Location ID: U4W00901/U4D00901
 Time: Start: 14:40 End: 14:55

Site: OUA LAKE DRUID
 Date: 5-8-96
 Signature of Sampler: *Robert A. [Signature]*

SURFACE WATER INFORMATION WATER DEPTH: <u>4</u> (FT) SAMPLE DEPTH: <u>0-0.5'</u> (FT BELOW SURFACE) VELOCITY MEASUREMENT OBTAINED [] YES, SEE RECORD [X] NO TEMPERATURE: <u>89.0 °F</u> pH: <u>6.50</u> SPECIFIC CONDUCTIVITY: <u>200 µmhos</u> DISSOLVED O ₂ : <u>NA</u> REDUCTION/OXIDATION POTENTIAL: <u>NA</u> OTHER: _____ _____ _____	TYPE OF SURFACE WATER: [] STREAM [] RIVER [X] POND/LAKE [] SEEP	DECONTAMINATION FLUIDS USED: [X] ISOPROPYL ALCOHOL [X] DEIONIZED WATER [X] ALCONOX [] HNO ₃ SOLUTION [X] POTABLE WATER [] NONE
EQUIPMENT USED FOR SAMPLING: [X] NONE, GRAB INTO BOTTLE [] BOMB SAMPLER [] PUMP TYPE: _____ _____ _____		

SEDIMENT INFORMATION DEPTH OF SEDIMENT SAMPLE: <u>0-15' BLS</u> QA SAMPLES COLLECTED AT THIS LOCATION? [X] YES [] NO TYPE: <u>DUPLICATE</u> SAMPLE OBSERVATIONS: [] ODOR _____ [] COLOR <u>DARK BROWN TO TAN</u> OTHER: _____ _____	EQUIPMENT USED FOR COLLECTION: [X] GRAVITY CORER [] S.S. SPLIT SPOON [] DREDGE [] HAND SPOON [] S.S. BOWL [] S.S. BUCKET [] _____ TYPE OF SAMPLE COLLECTED: [X] DISCRETE [] COMPOSITE	DECONTAMINATION FLUIDS USED: [X] ISOPROPYL ALCOHOL [X] DEIONIZED WATER [X] ALCONOX [] HNO ₃ SOLUTION [X] POTABLE WATER [] NONE SEDIMENT TYPE: [] CLAY [X] SILT [X] SAND [] ORGANIC [] GRAVEL
		COMMENTS: <u>SILTY SAND 75% RECOVERY</u>

SAMPLES COLLECTED						
SURFACE WATER	SEDIMENT	PRESERVATIVE	VOLUME REQUIRED	SAMPLE BOTTLE ID'S	COMMENTS:	
[X]		ICE		U4W00901		
[X]		ICE		U4W00901 DUPLICATE		
[]	[X]	ICE		U4D00901		
[]	[X]	ICE		U4D00901 DUPLICATE		
[]						
[]						

NOTES/SKETCH

SURFACE WATER AND SEDIMENT SAMPLE FIELD DATA RECORD

Project: NTC ORLANDO OUA TRA Site: OUA LAKE DRUID
 Project Number: 08519.70 Date: 5-8-96
 Sample Location ID: U4WD1001/U4D01001
 Time: Start: 15:25 End: 16:43 Signature of Sampler: [Signature]

SURFACE WATER INFORMATION WATER DEPTH: <u>NA</u> (FT) SAMPLE DEPTH: <u>0-0.5</u> (FT BELOW SURFACE) VELOCITY MEASUREMENT OBTAINED <input type="checkbox"/> YES, SEE RECORD <input checked="" type="checkbox"/> NO TEMPERATURE: <u>87.0 °F</u> pH: <u>4.72</u> SPECIFIC CONDUCTIVITY: <u>160 umhos</u> DISSOLVED O ₂ : <u>NA</u> REDUCTION/OXIDATION POTENTIAL: <u>NA</u> OTHER: _____ _____ _____	TYPE OF SURFACE WATER: <input type="checkbox"/> STREAM <input type="checkbox"/> RIVER <input checked="" type="checkbox"/> POND/LAKE <input type="checkbox"/> SEEP	DECONTAMINATION FLUIDS USED: <input checked="" type="checkbox"/> ISOPROPYL ALCOHOL <input checked="" type="checkbox"/> DEIONIZED WATER <input checked="" type="checkbox"/> ALCONOX <input type="checkbox"/> HNO ₃ SOLUTION <input checked="" type="checkbox"/> POTABLE WATER <input type="checkbox"/> NONE
EQUIPMENT USED FOR SAMPLING: <input checked="" type="checkbox"/> NONE, GRAB INTO BOTTLE <input type="checkbox"/> BOMB SAMPLER <input type="checkbox"/> PUMP TYPE: _____ _____ _____		

SEDIMENT INFORMATION DEPTH OF SEDIMENT SAMPLE: <u>0 - 1.5' BLS</u> QA SAMPLES COLLECTED AT THIS LOCATION? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO TYPE: _____ SAMPLE OBSERVATIONS: <input type="checkbox"/> ODOR _____ <input type="checkbox"/> COLOR _____ OTHER: _____ _____ _____	EQUIPMENT USED FOR COLLECTION: <input checked="" type="checkbox"/> GRAVITY CORER <input type="checkbox"/> S.S. SPLIT SPOON <input type="checkbox"/> DREDGE <input type="checkbox"/> HAND SPOON <input type="checkbox"/> S.S. BOWL <input type="checkbox"/> S.S. BUCKET <input type="checkbox"/> _____ _____ TYPE OF SAMPLE COLLECTED: <input type="checkbox"/> DISCRETE <input type="checkbox"/> COMPOSITE	DECONTAMINATION FLUIDS USED: <input checked="" type="checkbox"/> ISOPROPYL ALCOHOL <input checked="" type="checkbox"/> DEIONIZED WATER <input checked="" type="checkbox"/> ALCONOX <input type="checkbox"/> HNO ₃ SOLUTION <input checked="" type="checkbox"/> POTABLE WATER <input type="checkbox"/> NONE SEDIMENT TYPE: <input type="checkbox"/> CLAY <input type="checkbox"/> SILT <input type="checkbox"/> SAND <input checked="" type="checkbox"/> ORGANIC <input type="checkbox"/> GRAVEL COMMENTS: <u>25% RECOVERY, MOSTLY ORGANIC</u>
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SAMPLES COLLECTED						
SURFACE WATER	SEDIMENT	PRESERVATIVE	VOLUME REQUIRED	SAMPLE BOTTLE ID'S	COMMENTS:	
<input checked="" type="checkbox"/>		ICE		U4WD1001		
		ICE		U4D01001		

NOTES/SKETCH

SURFACE WATER AND SEDIMENT SAMPLE FIELD DATA RECORD

Project: NTC ORLANDO OUA IRA
 Project Number: 08519.70
 Sample Location ID: U4W01101 / U4D01101
 Time: Start: 16:30 End: 16:35

Site: OUA LAKE DRUID
 Date: 5-8-96
 Signature of Sampler: *Robert [Signature]*

SURFACE WATER INFORMATION WATER DEPTH: <u>0-1'</u> (FT) SAMPLE DEPTH: <u>0-0.5'</u> (FT BELOW SURFACE) VELOCITY MEASUREMENT OBTAINED [] YES, SEE RECORD [] NO TEMPERATURE: <u>77°F</u> pH: <u>5.37</u> SPECIFIC CONDUCTIVITY: <u>110 μmhos</u> DISSOLVED O ₂ : <u>NA</u> REDUCTION/OXIDATION POTENTIAL: <u>NA</u> OTHER: _____ _____ _____	TYPE OF SURFACE WATER: [] STREAM [] RIVER <input checked="" type="checkbox"/> POND/LAKE [] SEEP	DECONTAMINATION FLUIDS USED: <input checked="" type="checkbox"/> ISOPROPYL ALCOHOL <input checked="" type="checkbox"/> DEIONIZED WATER <input checked="" type="checkbox"/> ALCONOX [] HNO ₃ SOLUTION <input checked="" type="checkbox"/> POTABLE WATER [] NONE
EQUIPMENT USED FOR SAMPLING: <input checked="" type="checkbox"/> NONE, GRAB INTO BOTTLE [] BOMB SAMPLER [] PUMP TYPE: _____		

SEDIMENT INFORMATION DEPTH OF SEDIMENT SAMPLE: _____ QA SAMPLES COLLECTED AT THIS LOCATION? [] YES <input checked="" type="checkbox"/> NO TYPE: _____ SAMPLE OBSERVATIONS: [] ODOR _____ <input checked="" type="checkbox"/> COLOR <u>DARK BROWN TO GREY</u> OTHER: _____ _____	EQUIPMENT USED FOR COLLECTION: <input checked="" type="checkbox"/> GRAVITY CORER [] S.S. SPLIT SPOON [] DREDGE [] HAND SPOON [] S.S. BOWL [] S.S. BUCKET [] _____ _____ TYPE OF SAMPLE COLLECTED: <input checked="" type="checkbox"/> DISCRETE [] COMPOSITE	DECONTAMINATION FLUIDS USED: <input checked="" type="checkbox"/> ISOPROPYL ALCOHOL <input checked="" type="checkbox"/> DEIONIZED WATER <input checked="" type="checkbox"/> ALCONOX [] HNO ₃ SOLUTION <input checked="" type="checkbox"/> POTABLE WATER [] NONE SEDIMENT TYPE: [] CLAY <input checked="" type="checkbox"/> SILT <input checked="" type="checkbox"/> SAND [] ORGANIC [] GRAVEL
COMMENTS: <u>SILTY-SAND 40% RECOVERY</u>		

SAMPLES COLLECTED

SURFACE WATER	SEDIMENT	PRESERVATIVE	VOLUME REQUIRED	SAMPLE BOTTLE ID'S	COMMENTS:
<input checked="" type="checkbox"/>	[]	<u>ICE</u>		<u>U4W01101</u>	
[]	<input checked="" type="checkbox"/>	<u>ICE</u>		<u>U4D01101</u>	
[]	[]				
[]	[]				
[]	[]				
[]	[]				

NOTES/SKETCH

SURFACE WATER AND SEDIMENT SAMPLE FIELD DATA RECORD

Project: NTC ORLANDO OUT IRA
 Project Number: 08519.70
 Sample Location ID: UAW01201/U4D01201
 Time: Start: 09:20 End: 09:25

Site: DL4 LAKE DEWID
 Date: 5-9-96
 Signature of Sampler: [Signature]

SURFACE WATER INFORMATION

TYPE OF SURFACE WATER:
 STREAM RIVER
 POND/LAKE SEEP

DECONTAMINATION FLUIDS USED:
 ISOPROPYL ALCOHOL
 DEIONIZED WATER
 ALCONOX
 HNO3 SOLUTION
 POTABLE WATER
 NONE

WATER DEPTH: 1 (FT)
 SAMPLE DEPTH: 0-0.5 (FT BELOW SURFACE)
 VELOCITY MEASUREMENT OBTAINED YES, SEE RECORD NO
 TEMPERATURE: 75.0 °F pH: 5.70
 SPECIFIC CONDUCTIVITY: 265 µmhos
 DISSOLVED O₂: NA
 REDUCTION/OXIDATION POTENTIAL: NA
 OTHER: _____

EQUIPMENT USED FOR SAMPLING:
 NONE, GRAB INTO BOTTLE
 BOMB SAMPLER
 PUMP TYPE: _____

SEDIMENT INFORMATION

DEPTH OF SEDIMENT SAMPLE:
0-1.5' BLS.
 QA SAMPLES COLLECTED
 AT THIS LOCATION? YES NO
 TYPE: _____
 SAMPLE OBSERVATIONS:
 ODOR _____
 COLOR DARK BROWN TO GREY
 OTHER: _____

EQUIPMENT USED FOR COLLECTION:
 GRAVITY CORER
 S.S. SPLIT SPOON
 DREDGE
 HAND SPOON
 S.S. BOWL
 S.S. BUCKET

DECONTAMINATION FLUIDS USED:
 ISOPROPYL ALCOHOL
 DEIONIZED WATER
 ALCONOX
 HNO3 SOLUTION
 POTABLE WATER
 NONE

TYPE OF SAMPLE COLLECTED:
 DISCRETE
 COMPOSITE

SEDIMENT TYPE:
 CLAY
 SILT SILTY-SAND 40% RECOVERY
 SAND 20% ORGANIC
 ORGANIC
 GRAVEL

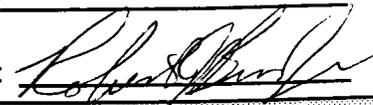
SAMPLES COLLECTED

SURFACE WATER	SEDIMENT	PRESERVATIVE	VOLUME REQUIRED	SAMPLE BOTTLE ID'S	COMMENTS:
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<u>ICE</u>		<u>UAW01201</u>	
<input type="checkbox"/>	<input type="checkbox"/>	<u>ICE</u>		<u>U4D01201</u>	
<input type="checkbox"/>	<input type="checkbox"/>				
<input type="checkbox"/>	<input type="checkbox"/>				
<input type="checkbox"/>	<input type="checkbox"/>				

NOTES/SKETCH

SURFACE WATER AND SEDIMENT SAMPLE FIELD DATA RECORD

Project: ATL ORLANDO D14 TRA
 Project Number: 08519.70
 Sample Location ID: U4W01301/U4D01301
 Time: Start: 09:51 End: 09:54

Site: ON4 LAKE DRUID
 Date: 5-9-96
 Signature of Sampler: 

SURFACE WATER INFORMATION WATER DEPTH: <u>1</u> (FT) SAMPLE DEPTH: <u>0-0.5</u> (FT BELOW SURFACE) VELOCITY MEASUREMENT OBTAINED [] YES, SEE RECORD [X] NO TEMPERATURE: <u>76.0 °F</u> pH: <u>4.26</u> SPECIFIC CONDUCTIVITY: <u>255 umhos</u> DISSOLVED O ₂ : <u>NA</u> REDUCTION/OXIDATION POTENTIAL: <u>10.1 mV</u> OTHER: _____ _____ _____	TYPE OF SURFACE WATER: [] STREAM [] RIVER [X] POND/LAKE [] SEEP	DECONTAMINATION FLUIDS USED: [X] ISOPROPYL ALCOHOL [X] DEIONIZED WATER [X] ALCONOX [] HNO ₃ SOLUTION [X] POTABLE WATER [] NONE
EQUIPMENT USED FOR SAMPLING: [X] NONE, GRAB INTO BOTTLE [] BOMB SAMPLER [] PUMP TYPE: _____		

SEDIMENT INFORMATION DEPTH OF SEDIMENT SAMPLE: <u>0 - 1.5' BLS</u> QA SAMPLES COLLECTED AT THIS LOCATION? [] YES [X] NO TYPE: _____ SAMPLE OBSERVATIONS: [] ODOR _____ [X] COLOR <u>DARK BROWN, GREY</u> OTHER: _____ _____	EQUIPMENT USED FOR COLLECTION: [X] GRAVITY CORER [] S.S. SPLIT SPOON [] DREDGE [] HAND SPOON [] S.S. BOWL [] S.S. BUCKET [] _____ _____ TYPE OF SAMPLE COLLECTED: [X] DISCRETE [] COMPOSITE	DECONTAMINATION FLUIDS USED: [X] ISOPROPYL ALCOHOL [X] DEIONIZED WATER [X] ALCONOX [] HNO ₃ SOLUTION [X] POTABLE WATER [] NONE SEDIMENT TYPE: [] CLAY [X] SILT [X] SAND [] ORGANIC [] GRAVEL
COMMENTS: <u>SILTY SAND 60%</u> <u>RECOVERY</u>		

SAMPLES COLLECTED

SURFACE WATER	SEDIMENT	PRESERVATIVE	VOLUME REQUIRED	SAMPLE BOTTLE ID'S	COMMENTS:
[X]	[]	<u>ICE</u>		<u>U4W01301</u>	
[]	[X]	<u>ICE</u>		<u>U4D01301</u>	
[]	[]				
[]	[]				
[]	[]				
[]	[]				

NOTES/SKETCH

SURFACE WATER AND SEDIMENT SAMPLE FIELD DATA RECORD

Project: NTC ORLANDO OUL4 TRA
 Project Number: 08519.70
 Sample Location ID: U4WD1401/U4DO1401
 Time: Start: 14:20 End: 14:50

Site: OUL4 LAKE DAVID
 Date: 5-9-96
 Signature of Sampler: [Signature]

SURFACE WATER INFORMATION WATER DEPTH: <u>1</u> (FT) SAMPLE DEPTH: <u>0-0.5</u> (FT BELOW SURFACE) VELOCITY MEASUREMENT OBTAINED [] YES, SEE RECORD [X] NO TEMPERATURE: <u>78.0 °F</u> pH: <u>5.29</u> SPECIFIC CONDUCTIVITY: <u>195.0 μmhos</u> DISSOLVED O ₂ : <u>NA</u> REDUCTION/OXIDATION POTENTIAL: <u>-111.4 mV</u> OTHER: _____ _____ _____	TYPE OF SURFACE WATER: [] STREAM [] RIVER [X] POND/LAKE [] SEEP	DECONTAMINATION FLUIDS USED: [X] ISOPROPYL ALCOHOL [X] DEIONIZED WATER [X] ALCONOX [] HNO ₃ SOLUTION [X] POTABLE WATER [] NONE
EQUIPMENT USED FOR SAMPLING: [X] NONE, GRAB INTO BOTTLE [] BOMB SAMPLER [] PUMP TYPE: _____		

SEDIMENT INFORMATION DEPTH OF SEDIMENT SAMPLE: <u>0-1.5 BLS</u> QA SAMPLES COLLECTED AT THIS LOCATION? [] YES [X] NO TYPE: _____ SAMPLE OBSERVATIONS: [] ODOR _____ [X] COLOR <u>BROWN TO GREY</u> OTHER: _____ _____	EQUIPMENT USED FOR COLLECTION: [X] GRAVITY CORER [] S.S. SPLIT SPOON [] DREDGE [] HAND SPOON [] S.S. BOWL [] S.S. BUCKET [] _____ _____ TYPE OF SAMPLE COLLECTED: [X] DISCRETE [] COMPOSITE	DECONTAMINATION FLUIDS USED: [X] ISOPROPYL ALCOHOL [X] DEIONIZED WATER [X] ALCONOX [] HNO ₃ SOLUTION [X] POTABLE WATER [] NONE SEDIMENT TYPE: [] CLAY [X] SILT [X] SAND [X] ORGANIC [] GRAVEL COMMENTS: <u>SILTY-SAND 50% RECOVER</u> <u>20% ORGANIC</u>
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SAMPLES COLLECTED						
SURFACE WATER	SEDIMENT	PRESERVATIVE	VOLUME REQUIRED	SAMPLE BOTTLE ID'S	COMMENTS:	
[X]	[]	ICE		U4WD1401		
[]	[X]	ICE		U4DO1401	TOP OF CORE	
[]	[X]	ICE		U4DO1402	BOTTOM OF CORE	
[]	[]					
[]	[]					

NOTES/SKETCH

SURFACE WATER AND SEDIMENT SAMPLE FIELD DATA RECORD

Project: NTC ORLANDO OLA IRA
 Project Number: 08519.70
 Sample Location ID: UAW01501/UAD01501
 Time: Start: 15:11 End: 15:25

Site: OLA LAKE DRUID
 Date: 5-9-96
 Signature of Sampler: [Signature]

SURFACE WATER INFORMATION WATER DEPTH: <u>1</u> (FT) SAMPLE DEPTH: <u>0-0.5</u> (FT BELOW SURFACE) VELOCITY MEASUREMENT OBTAINED: <input type="checkbox"/> YES, SEE RECORD <input checked="" type="checkbox"/> NO TEMPERATURE: <u>78° F</u> pH: <u>4.58</u> SPECIFIC CONDUCTIVITY: <u>175 μmhos</u> DISSOLVED O ₂ : <u>NA</u> REDUCTION/OXIDATION POTENTIAL: <u>-35.9 mV</u> OTHER: _____	TYPE OF SURFACE WATER: <input type="checkbox"/> STREAM <input type="checkbox"/> RIVER <input checked="" type="checkbox"/> POND/LAKE <input type="checkbox"/> SEEP	DECONTAMINATION FLUIDS USED: <input checked="" type="checkbox"/> ISOPROPYL ALCOHOL <input checked="" type="checkbox"/> DEIONIZED WATER <input checked="" type="checkbox"/> ALCONOX <input type="checkbox"/> HNO ₃ SOLUTION <input checked="" type="checkbox"/> POTABLE WATER <input type="checkbox"/> NONE
EQUIPMENT USED FOR SAMPLING: <input checked="" type="checkbox"/> NONE, GRAB INTO BOTTLE <input type="checkbox"/> BOMB SAMPLER <input type="checkbox"/> PUMP TYPE: _____		

SEDIMENT INFORMATION DEPTH OF SEDIMENT SAMPLE: <u>0-65' BLS</u> QA SAMPLES COLLECTED AT THIS LOCATION? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO TYPE: _____ SAMPLE OBSERVATIONS: <input type="checkbox"/> ODOR _____ <input checked="" type="checkbox"/> COLOR <u>BROWN TO GREY</u> OTHER: _____	EQUIPMENT USED FOR COLLECTION: <input checked="" type="checkbox"/> GRAVITY CORER <input type="checkbox"/> S.S. SPLIT SPOON <input type="checkbox"/> DREDGE <input type="checkbox"/> HAND SPOON <input type="checkbox"/> S.S. BOWL <input type="checkbox"/> S.S. BUCKET <input type="checkbox"/> _____ TYPE OF SAMPLE COLLECTED: <input checked="" type="checkbox"/> DISCRETE <input type="checkbox"/> COMPOSITE	DECONTAMINATION FLUIDS USED: <input checked="" type="checkbox"/> ISOPROPYL ALCOHOL <input checked="" type="checkbox"/> DEIONIZED WATER <input checked="" type="checkbox"/> ALCONOX <input type="checkbox"/> HNO ₃ SOLUTION <input checked="" type="checkbox"/> POTABLE WATER <input type="checkbox"/> NONE SEDIMENT TYPE: <input type="checkbox"/> CLAY <input checked="" type="checkbox"/> SILT <u>SILTY-SAND 50% RECOVERY</u> <input checked="" type="checkbox"/> SAND <u>20% ORGANICS</u> <input checked="" type="checkbox"/> ORGANIC <input type="checkbox"/> GRAVEL COMMENTS:
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SAMPLES COLLECTED						
SURFACE WATER	SEDIMENT	PRESERVATIVE	VOLUME REQUIRED	SAMPLE BOTTLE ID'S	COMMENTS:	
<input checked="" type="checkbox"/>		ICE		UAW01501		
<input type="checkbox"/>	<input checked="" type="checkbox"/>	ICE		UAD01501		TOP OF CORE
<input type="checkbox"/>	<input checked="" type="checkbox"/>	ICE		UAD01502		BOTTOM OF CORE
<input type="checkbox"/>						
<input type="checkbox"/>						

NOTES/SKETCH

SURFACE WATER AND SEDIMENT SAMPLE FIELD DATA RECORD

Project: NTC ORLANDO OUL4 IRA
 Project Number: 08519.70
 Sample Location ID: U4W01601 / U4D01601
 Time: Start: 15:35 End: 15:50

Site: OUL4 LAKE DRUID
 Date: 5-9-96
 Signature of Sampler: Robert J. Bump

SURFACE WATER INFORMATION

TYPE OF SURFACE WATER:
 STREAM RIVER
 POND/LAKE SEEP

DECONTAMINATION FLUIDS USED:
 ISOPROPYL ALCOHOL
 DEIONIZED WATER
 ALCONOX
 HNO3 SOLUTION
 POTABLE WATER
 NONE

WATER DEPTH: 1 (FT)
 SAMPLE DEPTH: 0-0.5 (FT BELOW SURFACE)
 VELOCITY MEASUREMENT OBTAINED YES, SEE RECORD NO
 TEMPERATURE: 79 °F pH: 3.94
 SPECIFIC CONDUCTIVITY: 132.0 μ mhos
 DISSOLVED O₂: NA
 REDUCTION/OXIDATION POTENTIAL: 98.4 mV
 OTHER: _____

EQUIPMENT USED FOR SAMPLING:

NONE, GRAB INTO BOTTLE
 BOMB SAMPLER
 PUMP TYPE: _____

SEDIMENT INFORMATION

DEPTH OF SEDIMENT SAMPLE:
0-1.5 BLS
 QA SAMPLES COLLECTED
 AT THIS LOCATION? YES NO
 TYPE: _____
 SAMPLE OBSERVATIONS:
 ODOR _____
 COLOR DARK BROWN TO GREY
 OTHER: _____

EQUIPMENT USED FOR COLLECTION:

GRAVITY CORER
 S.S. SPLIT SPOON
 DREDGE
 HAND SPOON
 S.S. BOWL
 S.S. BUCKET

DECONTAMINATION FLUIDS USED:

ISOPROPYL ALCOHOL
 DEIONIZED WATER
 ALCONOX
 HNO3 SOLUTION
 POTABLE WATER
 NONE

SEDIMENT TYPE:

CLAY
 SILT 50% RECOVERY, 20%
 SAND ORGANICS, SILTY-SAND
 ORGANIC
 GRAVEL

TYPE OF SAMPLE COLLECTED:

DISCRETE
 COMPOSITE

COMMENTS:

SAMPLES COLLECTED

SURFACE WATER	SEDIMENT	PRESERVATIVE	VOLUME REQUIRED	SAMPLE BOTTLE ID'S	COMMENTS:
<input checked="" type="checkbox"/>	<input type="checkbox"/>	ICE		U4W01601	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	ICE		U4D01601	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	ICE		U4D01602	
<input type="checkbox"/>	<input type="checkbox"/>				
<input type="checkbox"/>	<input type="checkbox"/>				

NOTES/SKETCH

SURFACE WATER AND SEDIMENT SAMPLE FIELD DATA RECORD

Project: NTC ORLANDO OUA IRA
 Project Number: 08519.70
 Sample Location ID: UAW01801/UAO01801
 Time: Start: 09:55 End: 10:02

Site: OUA LAKE DRUID
 Date: 5-10-96
 Signature of Sampler: [Signature]

SURFACE WATER INFORMATION

TYPE OF SURFACE WATER:
 STREAM RIVER
 POND/LAKE SEEP

DECONTAMINATION FLUIDS USED:

ISOPROPYL ALCOHOL
 DEIONIZED WATER
 ALCONOX
 HNO3 SOLUTION
 POTABLE WATER
 NONE

WATER DEPTH: 1 (FT)
 SAMPLE DEPTH: 0-0.5 (FT BELOW SURFACE)
 VELOCITY MEASUREMENT OBTAINED YES, SEE RECORD NO
 TEMPERATURE: 74.0°F pH: 5.25
 SPECIFIC CONDUCTIVITY: 140 µmhos
 DISSOLVED O₂: NA
 REDUCTION/OXIDATION POTENTIAL: -88.9mV
 OTHER: _____

EQUIPMENT USED FOR SAMPLING:

NONE, GRAB INTO BOTTLE
 BOMB SAMPLER
 PUMP TYPE: _____

SEDIMENT INFORMATION

DEPTH OF SEDIMENT SAMPLE:
0-1.5' BLS
 QA SAMPLES COLLECTED
 AT THIS LOCATION? YES NO
 TYPE: _____
 SAMPLE OBSERVATIONS:
 JODOR _____
 COLOR DARK BROWN TO GREY
 OTHER: _____

EQUIPMENT USED FOR COLLECTION:

GRAVITY CORER
 S.S. SPLIT SPOON
 DREDGE
 HAND SPOON
 S.S. BOWL
 S.S. BUCKET

DECONTAMINATION FLUIDS USED:

ISOPROPYL ALCOHOL
 DEIONIZED WATER
 ALCONOX
 HNO3 SOLUTION
 POTABLE WATER
 NONE

SEDIMENT TYPE:

CLAY COMMENTS:
 SILT SILTY SAND, 40% RECOVERY
 SAND 15% ORGANIC
 ORGANIC
 GRAVEL

TYPE OF SAMPLE COLLECTED:

DISCRETE
 COMPOSITE

SAMPLES COLLECTED

SURFACE WATER	SEDIMENT	PRESERVATIVE	VOLUME REQUIRED	SAMPLE BOTTLE ID'S	COMMENTS:
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	ICE		UAW01801	
<input type="checkbox"/>	<input type="checkbox"/>	ICE		UAO01801	
<input type="checkbox"/>	<input type="checkbox"/>				
<input type="checkbox"/>	<input type="checkbox"/>				
<input type="checkbox"/>	<input type="checkbox"/>				

NOTES/SKETCH

SURFACE WATER AND SEDIMENT SAMPLE FIELD DATA RECORD

Project: ATC ORLANDO OUA IFA
 Project Number: 08519.70
 Sample Location ID: U4W01701/U4D01701
 Time: Start: 10:41 End: 10:48

Site: OU4 LAKE DRUID
 Date: 5-10-96
 Signature of Sampler: 

SURFACE WATER INFORMATION WATER DEPTH: <u>1</u> (FT) SAMPLE DEPTH: <u>0-0.5</u> (FT BELOW SURFACE) VELOCITY MEASUREMENT OBTAINED [] YES, SEE RECORD [<input checked="" type="checkbox"/>] NO TEMPERATURE: <u>75.0 °F</u> pH: <u>5.30</u> SPECIFIC CONDUCTIVITY: <u>115 µmhos</u> DISSOLVED O ₂ : <u>NA</u> REDUCTION/OXIDATION POTENTIAL: <u>121.9 mV</u> OTHER: _____ _____ _____	TYPE OF SURFACE WATER: [] STREAM [] RIVER [<input checked="" type="checkbox"/>] POND/LAKE [] SEEP	DECONTAMINATION FLUIDS USED: [<input checked="" type="checkbox"/>] ISOPROPYL ALCOHOL [<input checked="" type="checkbox"/>] DEIONIZED WATER [<input checked="" type="checkbox"/>] ALCONOX [] HNO ₃ SOLUTION [<input checked="" type="checkbox"/>] POTABLE WATER [] NONE
EQUIPMENT USED FOR SAMPLING: [<input checked="" type="checkbox"/>] NONE, GRAB INTO BOTTLE [] BOMB SAMPLER [] PUMP TYPE: _____ _____ _____		

SEDIMENT INFORMATION DEPTH OF SEDIMENT SAMPLE: _____ QA SAMPLES COLLECTED AT THIS LOCATION? [] YES [<input checked="" type="checkbox"/>] NO TYPE: _____ SAMPLE OBSERVATIONS: [] ODOR _____ [<input checked="" type="checkbox"/>] COLOR <u>DARK BROWN TO GREY</u> OTHER: _____ _____	EQUIPMENT USED FOR COLLECTION: [<input checked="" type="checkbox"/>] GRAVITY CORER [] S.S. SPLIT SPOON [] DREDGE [] HAND SPOON [] S.S. BOWL [] S.S. BUCKET [] _____ _____ TYPE OF SAMPLE COLLECTED: [<input checked="" type="checkbox"/>] DISCRETE [] COMPOSITE	DECONTAMINATION FLUIDS USED: [<input checked="" type="checkbox"/>] ISOPROPYL ALCOHOL [] DEIONIZED WATER [] ALCONOX [] HNO ₃ SOLUTION [] POTABLE WATER [] NONE SEDIMENT TYPE: [] CLAY [<input checked="" type="checkbox"/>] SILT <u>SILTY-SAND, 35% RECOVERY</u> [<input checked="" type="checkbox"/>] SAND <u>15% ORGANICS</u> [<input checked="" type="checkbox"/>] ORGANIC [] GRAVEL
COMMENTS: _____ _____		

SAMPLES COLLECTED						
SURFACE WATER	SEDIMENT	PRESERVATIVE	VOLUME REQUIRED	SAMPLE BOTTLE ID'S	COMMENTS:	
[<input checked="" type="checkbox"/>]	[]	ICE		U4W01701		
[]	[<input checked="" type="checkbox"/>]	ICE		U4D01701		
[]	[]					
[]	[]					
[]	[]					
[]	[]					

NOTES/SKETCH

SURFACE WATER AND SEDIMENT SAMPLE FIELD DATA RECORD

Project: NTC ORLANDO OWA TRA
 Project Number: 08519.70
 Sample Location ID: U4W01901
 Time: Start: 14:50 End: 15:00

Site: OVA LAKE DRUID
 Date: 5-10-96
 Signature of Sampler: *Robert [Signature]*

SURFACE WATER INFORMATION WATER DEPTH: <u>NA</u> (FT) SAMPLE DEPTH: <u>0-6"</u> (FT BELOW SURFACE) VELOCITY MEASUREMENT OBTAINED <input type="checkbox"/> YES, SEE RECORD <input checked="" type="checkbox"/> NO TEMPERATURE: <u>89°F</u> pH: <u>6.25</u> SPECIFIC CONDUCTIVITY: <u>220 µmhos</u> DISSOLVED O ₂ : <u>3.6 mg/L</u> REDUCTION/OXIDATION POTENTIAL: <u>179.4 mV</u> OTHER: _____ _____ _____	TYPE OF SURFACE WATER: <input type="checkbox"/> STREAM <input type="checkbox"/> RIVER <input checked="" type="checkbox"/> POND/LAKE <input type="checkbox"/> SEEP	DECONTAMINATION FLUIDS USED: <input checked="" type="checkbox"/> ISOPROPYL ALCOHOL <input checked="" type="checkbox"/> DEIONIZED WATER <input checked="" type="checkbox"/> ALCONOX <input type="checkbox"/> HNO ₃ SOLUTION <input checked="" type="checkbox"/> POTABLE WATER <input type="checkbox"/> NONE
EQUIPMENT USED FOR SAMPLING: <input checked="" type="checkbox"/> NONE, GRAB INTO BOTTLE <input type="checkbox"/> BOMB SAMPLER <input type="checkbox"/> PUMP TYPE: _____		

SEDIMENT INFORMATION DEPTH OF SEDIMENT SAMPLE: <u>0-1.5' BLS</u> QA SAMPLES COLLECTED AT THIS LOCATION? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO TYPE: _____ SAMPLE OBSERVATIONS: <input type="checkbox"/> ODOR _____ <input type="checkbox"/> COLOR _____ OTHER: _____	EQUIPMENT USED FOR COLLECTION: <input checked="" type="checkbox"/> GRAVITY CORER <input type="checkbox"/> S.S. SPLIT SPOON <input type="checkbox"/> DREDGE <input type="checkbox"/> HAND SPOON <input type="checkbox"/> S.S. BOWL <input type="checkbox"/> S.S. BUCKET <input type="checkbox"/> _____ TYPE OF SAMPLE COLLECTED: <input checked="" type="checkbox"/> DISCRETE <input type="checkbox"/> COMPOSITE	DECONTAMINATION FLUIDS USED: <input checked="" type="checkbox"/> ISOPROPYL ALCOHOL <input checked="" type="checkbox"/> DEIONIZED WATER <input checked="" type="checkbox"/> ALCONOX <input type="checkbox"/> HNO ₃ SOLUTION <input checked="" type="checkbox"/> POTABLE WATER <input type="checkbox"/> NONE SEDIMENT TYPE: <input type="checkbox"/> CLAY COMMENTS: _____ <input type="checkbox"/> SILT _____ <input type="checkbox"/> SAND _____ <input type="checkbox"/> ORGANIC _____ <input type="checkbox"/> GRAVEL _____
--	---	--

SAMPLES COLLECTED						
SURFACE WATER	SEDIMENT	PRESERVATIVE	VOLUME REQUIRED	SAMPLE BOTTLE ID'S	COMMENTS:	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<u>ICE</u>		<u>U4W01901</u>		
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<u>ICE</u>		<u>U4D01901</u>		
<input type="checkbox"/>	<input type="checkbox"/>					
<input type="checkbox"/>	<input type="checkbox"/>					

NOTES/SKETCH

SURFACE WATER AND SEDIMENT SAMPLE FIELD DATA RECORD

Project: NTC ORLANDO OUA TRA
 Project Number: 08519.70
 Sample Location ID: U4W02001/U4D02001
 Time: Start: 15:04 End: 15:48

Site: OUA LAKE DRUID
 Date: 5-10-96
 Signature of Sampler: Robert Bump

SURFACE WATER INFORMATION WATER DEPTH: <u>NA</u> (FT) SAMPLE DEPTH: <u>0-0.5</u> (FT BELOW SURFACE) VELOCITY MEASUREMENT OBTAINED <input type="checkbox"/> YES, SEE RECORD <input checked="" type="checkbox"/> NO TEMPERATURE: <u>85°F</u> pH: <u>5.70</u> SPECIFIC CONDUCTIVITY: <u>200 µmhos</u> DISSOLVED O ₂ : <u>4.0 mg/L</u> REDUCTION/OXIDATION POTENTIAL: <u>159.0 mV</u> OTHER: _____ _____ _____	TYPE OF SURFACE WATER: <input type="checkbox"/> STREAM <input type="checkbox"/> RIVER <input checked="" type="checkbox"/> POND/LAKE <input type="checkbox"/> SEEP	DECONTAMINATION FLUIDS USED: <input checked="" type="checkbox"/> ISOPROPYL ALCOHOL <input checked="" type="checkbox"/> DEIONIZED WATER <input checked="" type="checkbox"/> ALCONOX <input type="checkbox"/> HNO ₃ SOLUTION <input checked="" type="checkbox"/> POTABLE WATER <input type="checkbox"/> NONE
EQUIPMENT USED FOR SAMPLING: <input checked="" type="checkbox"/> NONE, GRAB INTO BOTTLE <input type="checkbox"/> BOMB SAMPLER <input type="checkbox"/> PUMP TYPE: _____		

SEDIMENT INFORMATION DEPTH OF SEDIMENT SAMPLE: <u>0-1.5' BLS</u> QA SAMPLES COLLECTED AT THIS LOCATION? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO TYPE: _____ SAMPLE OBSERVATIONS: <input type="checkbox"/> ODOR _____ <input type="checkbox"/> COLOR _____ OTHER: _____	EQUIPMENT USED FOR COLLECTION: <input checked="" type="checkbox"/> GRAVITY CORER <input type="checkbox"/> S.S. SPLIT SPOON <input type="checkbox"/> DREDGE <input type="checkbox"/> HAND SPOON <input type="checkbox"/> S.S. BOWL <input type="checkbox"/> S.S. BUCKET <input type="checkbox"/> _____ _____ TYPE OF SAMPLE COLLECTED: <input checked="" type="checkbox"/> DISCRETE <input type="checkbox"/> COMPOSITE	DECONTAMINATION FLUIDS USED: <input checked="" type="checkbox"/> ISOPROPYL ALCOHOL <input checked="" type="checkbox"/> DEIONIZED WATER <input checked="" type="checkbox"/> ALCONOX <input type="checkbox"/> HNO ₃ SOLUTION <input checked="" type="checkbox"/> POTABLE WATER <input type="checkbox"/> NONE SEDIMENT TYPE: <input type="checkbox"/> CLAY <input type="checkbox"/> SILT <input type="checkbox"/> SAND <input type="checkbox"/> ORGANIC <input type="checkbox"/> GRAVEL COMMENTS: _____ _____
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SAMPLES COLLECTED						
SURFACE WATER	SEDIMENT	PRESERVATIVE	VOLUME REQUIRED	SAMPLE BOTTLE ID'S	COMMENTS:	
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<u>ICE</u>		<u>U4W02001</u>		
<input type="checkbox"/>	<input type="checkbox"/>	<u>ICE</u>		<u>U4D02001</u>		
<input type="checkbox"/>	<input type="checkbox"/>					
<input type="checkbox"/>	<input type="checkbox"/>					
<input type="checkbox"/>	<input type="checkbox"/>					

NOTES/SKETCH

SURFACE WATER AND SEDIMENT SAMPLE FIELD DATA RECORD

Project: NTC ORLANDO OUT TRA
 Project Number: 08519.70
 Sample Location ID: U4W02101/U4D02101
 Time: Start: 16:13 End: 16:32

Site: OUT LAKE DEWID
 Date: 5-10-96
 Signature of Sampler: [Signature]

SURFACE WATER INFORMATION	TYPE OF SURFACE WATER: <input type="checkbox"/> STREAM <input type="checkbox"/> RIVER <input checked="" type="checkbox"/> POND/LAKE <input type="checkbox"/> SEEP	DECONTAMINATION FLUIDS USED: <input checked="" type="checkbox"/> ISOPROPYL ALCOHOL <input checked="" type="checkbox"/> DEIONIZED WATER <input checked="" type="checkbox"/> ALCONOX <input type="checkbox"/> HNO3 SOLUTION <input checked="" type="checkbox"/> POTABLE WATER <input type="checkbox"/> NONE
WATER DEPTH: <u>NA</u> (FT) SAMPLE DEPTH: <u>0-0.5</u> (FT BELOW SURFACE) VELOCITY MEASUREMENT OBTAINED <input type="checkbox"/> YES, SEE RECORD <input checked="" type="checkbox"/> NO TEMPERATURE: <u>88°F</u> pH: <u>6.67</u> SPECIFIC CONDUCTIVITY: <u>210 µmhos</u> DISSOLVED O ₂ : <u>5.0 mg/L</u> REDUCTION/OXIDATION POTENTIAL: <u>165.2 mV</u> OTHER: _____ _____ _____	EQUIPMENT USED FOR SAMPLING: <input checked="" type="checkbox"/> NONE, GRAB INTO BOTTLE <input type="checkbox"/> BOMB SAMPLER <input type="checkbox"/> PUMP TYPE: _____ _____ _____	

SEDIMENT INFORMATION	EQUIPMENT USED FOR COLLECTION: <input checked="" type="checkbox"/> GRAVITY CORER <input type="checkbox"/> S.S. SPLIT SPOON <input type="checkbox"/> DREDGE <input type="checkbox"/> HAND SPOON <input type="checkbox"/> S.S. BOWL <input type="checkbox"/> S.S. BUCKET <input type="checkbox"/> _____ _____ _____	DECONTAMINATION FLUIDS USED: <input checked="" type="checkbox"/> ISOPROPYL ALCOHOL <input checked="" type="checkbox"/> DEIONIZED WATER <input checked="" type="checkbox"/> ALCONOX <input type="checkbox"/> HNO3 SOLUTION <input checked="" type="checkbox"/> POTABLE WATER <input type="checkbox"/> NONE SEDIMENT TYPE: <input type="checkbox"/> CLAY COMMENTS: _____ <input type="checkbox"/> SILT _____ <input type="checkbox"/> SAND _____ <input type="checkbox"/> ORGANIC <input type="checkbox"/> GRAVEL
DEPTH OF SEDIMENT SAMPLE: <u>0-1.5' BLS</u> QA SAMPLES COLLECTED AT THIS LOCATION? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO TYPE: _____ SAMPLE OBSERVATIONS: <input type="checkbox"/> ODOR _____ <input type="checkbox"/> COLOR _____ OTHER: _____ _____ _____	TYPE OF SAMPLE COLLECTED: <input checked="" type="checkbox"/> DISCRETE <input type="checkbox"/> COMPOSITE	

SAMPLES COLLECTED						
SURFACE WATER	SEDIMENT	PRESERVATIVE	VOLUME REQUIRED	SAMPLE BOTTLE ID'S	COMMENTS:	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<u>HA₁₀₀ ICE</u>		<u>U4W02101</u>		
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<u>ICE</u>		<u>U4D02101</u>		
<input type="checkbox"/>	<input type="checkbox"/>					
<input type="checkbox"/>	<input type="checkbox"/>					
<input type="checkbox"/>	<input type="checkbox"/>					

NOTES/SKETCH

SURFACE WATER AND SEDIMENT SAMPLE FIELD DATA RECORD

Project: NTC ORLANDO OUA IRA
 Project Number: 08519.70
 Sample Location ID: U4W02201/U4D02201
 Time: Start: 17:17 End: 17:35

Site: OUA4 LAKE DRUID
 Date: 5-10-96
 Signature of Sampler: *[Signature]*

SURFACE WATER INFORMATION WATER DEPTH: <u>NA</u> (FT) SAMPLE DEPTH: <u>0-0.5</u> (FT BELOW SURFACE) VELOCITY MEASUREMENT OBTAINED <input type="checkbox"/> YES, SEE RECORD <input checked="" type="checkbox"/> NO TEMPERATURE: <u>90°F</u> pH: <u>7.00</u> SPECIFIC CONDUCTIVITY: <u>195 µmhos</u> DISSOLVED O ₂ : <u>4.4 mg/L</u> REDUCTION/OXIDATION POTENTIAL: <u>177.8 mV</u> OTHER: _____ _____ _____	TYPE OF SURFACE WATER: <input type="checkbox"/> STREAM <input type="checkbox"/> RIVER <input checked="" type="checkbox"/> POND/LAKE <input type="checkbox"/> SEEP	DECONTAMINATION FLUIDS USED: <input checked="" type="checkbox"/> ISOPROPYL ALCOHOL <input checked="" type="checkbox"/> DEIONIZED WATER <input checked="" type="checkbox"/> ALCONOX <input type="checkbox"/> HNO ₃ SOLUTION <input checked="" type="checkbox"/> POTABLE WATER <input type="checkbox"/> NONE
EQUIPMENT USED FOR SAMPLING: <input checked="" type="checkbox"/> NONE, GRAB INTO BOTTLE <input type="checkbox"/> BOMB SAMPLER <input type="checkbox"/> PUMP TYPE: _____		

SEDIMENT INFORMATION DEPTH OF SEDIMENT SAMPLE: <u>0-1.5' BLS</u> QA SAMPLES COLLECTED AT THIS LOCATION? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO TYPE: _____ SAMPLE OBSERVATIONS: <input type="checkbox"/> ODOR _____ <input type="checkbox"/> COLOR _____ OTHER: _____	EQUIPMENT USED FOR COLLECTION: <input checked="" type="checkbox"/> GRAVITY CORER <input type="checkbox"/> S.S. SPLIT SPOON <input type="checkbox"/> DREDGE <input type="checkbox"/> HAND SPOON <input type="checkbox"/> S.S. BOWL <input type="checkbox"/> S.S. BUCKET <input type="checkbox"/> _____ _____ TYPE OF SAMPLE COLLECTED: <input checked="" type="checkbox"/> DISCRETE <input type="checkbox"/> COMPOSITE	DECONTAMINATION FLUIDS USED: <input checked="" type="checkbox"/> ISOPROPYL ALCOHOL <input checked="" type="checkbox"/> DEIONIZED WATER <input checked="" type="checkbox"/> ALCONOX <input type="checkbox"/> HNO ₃ SOLUTION <input checked="" type="checkbox"/> POTABLE WATER <input type="checkbox"/> NONE SEDIMENT TYPE: <input type="checkbox"/> CLAY COMMENTS: <input type="checkbox"/> SILT _____ <input type="checkbox"/> SAND _____ <input type="checkbox"/> ORGANIC _____ <input type="checkbox"/> GRAVEL _____
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SAMPLES COLLECTED						
SURFACE WATER	SEDIMENT	PRESERVATIVE	VOLUME REQUIRED	SAMPLE BOTTLE ID'S	COMMENTS:	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	ICE		U4W02201		
<input type="checkbox"/>	<input checked="" type="checkbox"/>	ICE		U4D02201		
<input type="checkbox"/>	<input type="checkbox"/>					
<input type="checkbox"/>	<input type="checkbox"/>					
<input type="checkbox"/>	<input type="checkbox"/>					

NOTES/SKETCH

SURFACE WATER AND SEDIMENT SAMPLE FIELD DATA RECORD

Project: NTC ORLANDO OUA IRA
 Project Number: 08519.70
 Sample Location ID: U4W02301/U4D02301
 Time: Start: 10:07 End: 10:24

Site: OUA LAKE DRUID
 Date: 5-11-96
 Signature of Sampler: [Signature]

SURFACE WATER INFORMATION WATER DEPTH: <u>NA</u> (FT) SAMPLE DEPTH: _____ (FT BELOW SURFACE) VELOCITY MEASUREMENT OBTAINED [] YES, SEE RECORD [X] NO TEMPERATURE: <u>69 °F</u> pH: <u>6.41</u> SPECIFIC CONDUCTIVITY: <u>160 umhos</u> DISSOLVED O ₂ : <u>4.0 mg/L</u> REDUCTION/OXIDATION POTENTIAL: <u>191.8 mV</u> OTHER: _____ _____ _____	TYPE OF SURFACE WATER: [] STREAM [] RIVER [X] POND/LAKE [] SEEP	DECONTAMINATION FLUIDS USED: [X] ISOPROPYL ALCOHOL [X] DEIONIZED WATER [X] ALCONOX [] HNO ₃ SOLUTION [X] POTABLE WATER [] NONE
EQUIPMENT USED FOR SAMPLING: [X] NONE, GRAB INTO BOTTLE [] BOMB SAMPLER [] PUMP TYPE: _____ _____ _____		

SEDIMENT INFORMATION DEPTH OF SEDIMENT SAMPLE: <u>0-1.5' BLS</u> QA SAMPLES COLLECTED AT THIS LOCATION? [] YES [X] NO TYPE: _____ SAMPLE OBSERVATIONS: [] ODOR _____ [] COLOR _____ OTHER: _____ _____ _____	EQUIPMENT USED FOR COLLECTION: [X] GRAVITY CORER [] S.S. SPLIT SPOON [] DREDGE [] HAND SPOON [] S.S. BOWL [] S.S. BUCKET [] _____ _____ _____ TYPE OF SAMPLE COLLECTED: [X] DISCRETE [] COMPOSITE	DECONTAMINATION FLUIDS USED: [X] ISOPROPYL ALCOHOL [X] DEIONIZED WATER [X] ALCONOX [] HNO ₃ SOLUTION [X] POTABLE WATER [] NONE SEDIMENT TYPE: [] CLAY [] SILT [] SAND [] ORGANIC [] GRAVEL COMMENTS: _____ _____ _____
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SAMPLES COLLECTED						
SURFACE WATER	SEDIMENT	PRESERVATIVE	VOLUME REQUIRED	SAMPLE BOTTLE ID'S	COMMENTS:	
[X]		ICE		U4W02301		
	[X]	ICE		U4D02301		

NOTES/SKETCH

SURFACE WATER AND SEDIMENT SAMPLE FIELD DATA RECORD

Project: NTC ORLANDO OWA TRA
 Project Number: OPS19.70
 Sample Location ID: U4W02401/U4D02401
 Time: Start: 13:09 End: 13:35

Site: OWA LAKE DRUID
 Date: 5-11-96
 Signature of Sampler: *Robert [Signature]*

SURFACE WATER INFORMATION WATER DEPTH: <u>NA</u> (FT) SAMPLE DEPTH: <u>0-0.5'</u> (FT BELOW SURFACE) VELOCITY MEASUREMENT OBTAINED <input type="checkbox"/> YES, SEE RECORD <input checked="" type="checkbox"/> NO TEMPERATURE: <u>95° F</u> pH: <u>7.21</u> SPECIFIC CONDUCTIVITY: <u>220 μmhos</u> DISSOLVED O ₂ : <u>7.0 mg/L</u> REDUCTION/OXIDATION POTENTIAL: <u>151.5 mV</u> OTHER: _____ _____ _____	TYPE OF SURFACE WATER: <input type="checkbox"/> STREAM <input type="checkbox"/> RIVER <input checked="" type="checkbox"/> POND/LAKE <input type="checkbox"/> SEEP	DECONTAMINATION FLUIDS USED: <input checked="" type="checkbox"/> ISOPROPYL ALCOHOL <input checked="" type="checkbox"/> DEIONIZED WATER <input checked="" type="checkbox"/> ALCONOX <input type="checkbox"/> HNO ₃ SOLUTION <input checked="" type="checkbox"/> POTABLE WATER <input type="checkbox"/> NONE
EQUIPMENT USED FOR SAMPLING: <input checked="" type="checkbox"/> NONE, GRAB INTO BOTTLE <input type="checkbox"/> BOMB SAMPLER <input type="checkbox"/> PUMP TYPE: _____ _____ _____		

SEDIMENT INFORMATION DEPTH OF SEDIMENT SAMPLE: <u>0-1.5' BLS</u> QA SAMPLES COLLECTED AT THIS LOCATION? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO TYPE: _____ SAMPLE OBSERVATIONS: <input type="checkbox"/> ODOR _____ <input type="checkbox"/> COLOR _____ OTHER: _____ _____ _____	EQUIPMENT USED FOR COLLECTION: <input checked="" type="checkbox"/> GRAVITY CORER <input type="checkbox"/> S.S. SPLIT SPOON <input type="checkbox"/> DREDGE <input type="checkbox"/> HAND SPOON <input type="checkbox"/> S.S. BOWL <input type="checkbox"/> S.S. BUCKET <input type="checkbox"/> _____ _____ TYPE OF SAMPLE COLLECTED: <input checked="" type="checkbox"/> DISCRETE <input type="checkbox"/> COMPOSITE	DECONTAMINATION FLUIDS USED: <input checked="" type="checkbox"/> ISOPROPYL ALCOHOL <input checked="" type="checkbox"/> DEIONIZED WATER <input checked="" type="checkbox"/> ALCONOX <input type="checkbox"/> HNO ₃ SOLUTION <input checked="" type="checkbox"/> POTABLE WATER <input type="checkbox"/> NONE SEDIMENT TYPE: <input type="checkbox"/> CLAY COMMENTS: <input type="checkbox"/> SILT _____ <input type="checkbox"/> SAND _____ <input type="checkbox"/> ORGANIC _____ <input type="checkbox"/> GRAVEL _____
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SAMPLES COLLECTED						
SURFACE WATER	SEDIMENT	PRESERVATIVE	VOLUME REQUIRED	SAMPLE BOTTLE ID'S	COMMENTS:	
<input checked="" type="checkbox"/>		ICE		U4W02401		
	<input checked="" type="checkbox"/>	ICE		U4D02401		

NOTES/SKETCH

SURFACE WATER AND SEDIMENT SAMPLE FIELD DATA RECORD

Project: NTC ORLANDO OUA IRA
 Project Number: ~~088~~ 19710-30-46 08519.70
 Sample Location ID: U4W02501/U4D02501
 Time: Start: 14:10 ^{13:40} ~~14:30~~ ^{14:30} End: 14:20

Site: OUA LAKE DRUID
 Date: 5-11-96
 Signature of Sampler: [Signature]

SURFACE WATER INFORMATION WATER DEPTH: <u>NA</u> (FT) SAMPLE DEPTH: _____ (FT BELOW SURFACE) VELOCITY MEASUREMENT OBTAINED [] YES, SEE RECORD [X] NO TEMPERATURE: <u>88°F</u> pH: <u>6.40</u> SPECIFIC CONDUCTIVITY: <u>255 μmhos</u> DISSOLVED O ₂ : <u>5.0 mg/L</u> REDUCTION/OXIDATION POTENTIAL: <u>207.9 mV</u> OTHER: _____ _____ _____	TYPE OF SURFACE WATER: [] STREAM [] RIVER [X] POND/LAKE [] SEEP	DECONTAMINATION FLUIDS USED: [X] ISOPROPYL ALCOHOL [X] DEIONIZED WATER [X] ALCONOX [] HNO ₃ SOLUTION [X] POTABLE WATER [] NONE
EQUIPMENT USED FOR SAMPLING: [X] NONE, GRAB INTO BOTTLE [] BOMB SAMPLER [] PUMP TYPE: _____		

SEDIMENT INFORMATION DEPTH OF SEDIMENT SAMPLE: <u>0 - 1.5' BLS</u> QA SAMPLES COLLECTED AT THIS LOCATION? [] YES [X] NO TYPE: _____ SAMPLE OBSERVATIONS: [] ODOR _____ [] COLOR _____ OTHER: _____	EQUIPMENT USED FOR COLLECTION: [X] GRAVITY CORER [] S.S. SPLIT SPOON [] DREDGE [] HAND SPOON [] S.S. BOWL [] S.S. BUCKET [] _____ _____ TYPE OF SAMPLE COLLECTED: [X] DISCRETE [] COMPOSITE	DECONTAMINATION FLUIDS USED: [X] ISOPROPYL ALCOHOL [X] DEIONIZED WATER [X] ALCONOX [] HNO ₃ SOLUTION [X] POTABLE WATER [] NONE SEDIMENT TYPE: [] CLAY [] SILT [] SAND [] ORGANIC [] GRAVEL COMMENTS: _____ _____
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SAMPLES COLLECTED						
SURFACE WATER	SEDIMENT	PRESERVATIVE	VOLUME REQUIRED	SAMPLE BOTTLE ID'S	COMMENTS:	
[X]		ICE		U4W02501		
	[X]	ICE		U4D02501		

NOTES/SKETCH

SURFACE WATER AND SEDIMENT SAMPLE FIELD DATA RECORD

Project: NTE ORLANDO OWA IRA
 Project Number: 08519.70
 Sample Location ID: U4W02601/U4D02601
 Time: Start: 14:58 End: 15:40

Site: OWA LAKE DRAID
 Date: 5-11-96
 Signature of Sampler: [Signature]

SURFACE WATER INFORMATION WATER DEPTH: <u>NA</u> (FT) SAMPLE DEPTH: <u>0-0.5</u> (FT BELOW SURFACE) VELOCITY MEASUREMENT OBTAINED [] YES, SEE RECORD [X] NO TEMPERATURE: <u>86° F</u> pH: <u>5.01</u> SPECIFIC CONDUCTIVITY: <u>245 μmhos</u> DISSOLVED O ₂ : <u>4.1 mg/L</u> REDUCTION/OXIDATION POTENTIAL: <u>262.3 mV</u> OTHER: _____ _____ _____	TYPE OF SURFACE WATER: [] STREAM [] RIVER [X] POND/LAKE [] SEEP	DECONTAMINATION FLUIDS USED: [X] ISOPROPYL ALCOHOL [X] DEIONIZED WATER [X] ALCONOX [X] HNO ₃ SOLUTION <u>APB 10-30-96</u> [X] POTABLE WATER [] NONE
EQUIPMENT USED FOR SAMPLING: [X] NONE, GRAB INTO BOTTLE [] BOMB SAMPLER [] PUMP TYPE: _____ _____ _____		

SEDIMENT INFORMATION DEPTH OF SEDIMENT SAMPLE: <u>0-1.5' BLS</u> QA SAMPLES COLLECTED AT THIS LOCATION? [X] YES [] NO TYPE: <u>DUPLICATE</u> SAMPLE OBSERVATIONS: [] ODOR _____ [] COLOR _____ OTHER: _____ _____ _____	EQUIPMENT USED FOR COLLECTION: [X] GRAVITY CORER [X] J.S. SPLIT SPOON <u>APB 10-30-96</u> [] JDREDGE [] JHAND SPOON [] J.S. BOWL [] J.S. BUCKET [] _____ _____ _____ TYPE OF SAMPLE COLLECTED: [X] DISCRETE [] COMPOSITE	DECONTAMINATION FLUIDS USED: [X] ISOPROPYL ALCOHOL [X] DEIONIZED WATER [X] ALCONOX [] HNO ₃ SOLUTION [X] POTABLE WATER [] NONE SEDIMENT TYPE: [] CLAY [] SILT [] SAND [] ORGANIC [] GRAVEL COMMENTS: _____ _____ _____
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SAMPLES COLLECTED						
SURFACE WATER	SEDIMENT	PRESERVATIVE	VOLUME REQUIRED	SAMPLE BOTTLE ID'S	COMMENTS:	
[X]	[]	ICE		U4W02601		
[]	[X]	ICE		U4D02601		
[]	[X]	ICE		U4D02601D	DUPLICATE	
[]	[]					
[]	[]					
[]	[]					

NOTES/SKETCH

SURFACE WATER AND SEDIMENT SAMPLE FIELD DATA RECORD

Project: NTC ORLANDO OUA IRA
 Project Number: 08519.70
 Sample Location ID: U4W02701 / U4D02701
 Time: Start: 10:53 End: 11:30

Site: OUA LAKE DEWID
 Date: 5-12-96
 Signature of Sampler: [Signature]

SURFACE WATER INFORMATION WATER DEPTH: <u>NA</u> (FT) SAMPLE DEPTH: <u>0-0.5'</u> (FT BELOW SURFACE) VELOCITY MEASUREMENT OBTAINED [] YES, SEE RECORD [X] NO TEMPERATURE: <u>79.0 °F</u> pH: <u>7.80</u> SPECIFIC CONDUCTIVITY: <u>210 µmhos</u> DISSOLVED O ₂ : <u>7.0 mg/L</u> REDUCTION/OXIDATION POTENTIAL: <u>279.0 mV</u> OTHER: _____ _____ _____	TYPE OF SURFACE WATER: [] STREAM [] RIVER [X] POND/LAKE [] SEEP	DECONTAMINATION FLUIDS USED: [X] ISOPROPYL ALCOHOL [X] DEIONIZED WATER [X] ALCONOX [] HNO ₃ SOLUTION [X] POTABLE WATER [] NONE
EQUIPMENT USED FOR SAMPLING: [X] NONE, GRAB INTO BOTTLE [] BOMB SAMPLER [] PUMP TYPE: _____ _____ _____		

SEDIMENT INFORMATION DEPTH OF SEDIMENT SAMPLE: <u>0 - 1.5' BLS</u> QA SAMPLES COLLECTED AT THIS LOCATION? [] YES [X] NO TYPE: _____ SAMPLE OBSERVATIONS: [] ODOR _____ [] COLOR _____ OTHER: _____ _____	EQUIPMENT USED FOR COLLECTION: [X] GRAVITY CORER [] S.S. SPLIT SPOON [] DREDGE [] HAND SPOON [] S.S. BOWL [] S.S. BUCKET [] _____ _____ _____	DECONTAMINATION FLUIDS USED: [X] ISOPROPYL ALCOHOL [X] DEIONIZED WATER [X] ALCONOX [] HNO ₃ SOLUTION [X] POTABLE WATER [] NONE SEDIMENT TYPE: [] CLAY [] SILT [] SAND [] ORGANIC [] GRAVEL COMMENTS: _____ _____
TYPE OF SAMPLE COLLECTED: [X] DISCRETE [] COMPOSITE		

SAMPLES COLLECTED						
SURFACE WATER	SEDIMENT	PRESERVATIVE	VOLUME REQUIRED	SAMPLE BOTTLE ID'S	COMMENTS:	
[X]		ICE		U4W02701		
	[X]	ICE		U4D02701		

NOTES/SKETCH

SURFACE WATER AND SEDIMENT SAMPLE FIELD DATA RECORD

Project: NTC ORLANDO OUA IRA
 Project Number: 08519.70
 Sample Location ID: U4W02801/U4D02801
 Time: Start: 11:51 End: 12:05

Site: OUA LAKE DRUID
 Date: 5-12-96
 Signature of Sampler: [Signature]

SURFACE WATER INFORMATION

TYPE OF SURFACE WATER:
 STREAM RIVER
 POND/LAKE SEEP

DECONTAMINATION FLUIDS USED:
 ISOPROPYL ALCOHOL
 DEIONIZED WATER
 ALCONOX
 HNO3 SOLUTION
 POTABLE WATER
 NONE

WATER DEPTH: NA (FT)
 SAMPLE DEPTH: 0-0.5 (FT BELOW SURFACE)
 VELOCITY MEASUREMENT OBTAINED YES, SEE RECORD NO
 TEMPERATURE: 82°F pH: 5.69
 SPECIFIC CONDUCTIVITY: 190 μ mhos
 DISSOLVED O₂: 5.2 mg/L
 REDUCTION/OXIDATION POTENTIAL: 257.9 mV
 OTHER: _____

EQUIPMENT USED FOR SAMPLING:
 NONE, GRAB INTO BOTTLE
 BOMB SAMPLER
 PUMP TYPE: _____

SEDIMENT INFORMATION

DEPTH OF SEDIMENT SAMPLE:
0-1.5' BLS
 QA SAMPLES COLLECTED
 AT THIS LOCATION? YES NO
 TYPE: _____
 SAMPLE OBSERVATIONS:
 ODOR _____
 COLOR _____
 OTHER: _____

EQUIPMENT USED FOR COLLECTION:
 GRAVITY CORER
 S.S. SPLIT SPOON
 DREDGE
 HAND SPOON
 S.S. BOWL
 S.S. BUCKET

DECONTAMINATION FLUIDS USED:
 ISOPROPYL ALCOHOL
 DEIONIZED WATER
 ALCONOX
 HNO3 SOLUTION
 POTABLE WATER
 NONE

TYPE OF SAMPLE COLLECTED:
 DISCRETE
 COMPOSITE

SEDIMENT TYPE:
 CLAY COMMENTS: _____
 SILT _____
 SAND _____
 ORGANIC _____
 GRAVEL _____

SAMPLES COLLECTED

SURFACE WATER	SEDIMENT	PRESERVATIVE	VOLUME REQUIRED	SAMPLE BOTTLE ID'S	COMMENTS:
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<u>ICE</u>		<u>U4W02801</u>	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<u>ICE</u>		<u>U4D02801</u>	
<input type="checkbox"/>	<input type="checkbox"/>				
<input type="checkbox"/>	<input type="checkbox"/>				
<input type="checkbox"/>	<input type="checkbox"/>				
<input type="checkbox"/>	<input type="checkbox"/>				

NOTES/SKETCH

SURFACE WATER AND SEDIMENT SAMPLE FIELD DATA RECORD

Project: NTC ORLANDO OUA TRA
 Project Number: 08519.70
 Sample Location ID: U4W02901/U4D02901
 Time: Start: 15:03 End: 15:10

Site: OUA LAKE DRUID
 Date: 5-12-96
 Signature of Sampler: *Robert J. [Signature]*

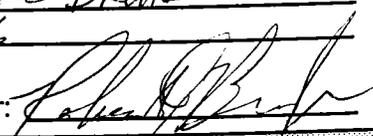
SURFACE WATER INFORMATION WATER DEPTH: <u>NR</u> (FT) SAMPLE DEPTH: <u>0-0.5</u> (FT BELOW SURFACE) VELOCITY MEASUREMENT OBTAINED [] YES, SEE RECORD [X] NO TEMPERATURE: <u>82 °F</u> pH: <u>6.35</u> SPECIFIC CONDUCTIVITY: <u>183 µmhos</u> DISSOLVED O ₂ : <u>5.6 mg/L</u> REDUCTION/OXIDATION POTENTIAL: <u>213.8</u> OTHER: _____ _____ _____	TYPE OF SURFACE WATER: [] STREAM [] RIVER [X] POND/LAKE [] SEEP	DECONTAMINATION FLUIDS USED: [X] ISOPROPYL ALCOHOL [X] DEIONIZED WATER [X] ALCONOX [] HNO ₃ SOLUTION [X] POTABLE WATER [] NONE
EQUIPMENT USED FOR SAMPLING: [X] NONE, GRAB INTO BOTTLE [] BOMB SAMPLER [] PUMP TYPE: _____ _____ _____		

SEDIMENT INFORMATION DEPTH OF SEDIMENT SAMPLE: <u>0-1.5' BLS</u> QA SAMPLES COLLECTED AT THIS LOCATION? [] YES [X] NO TYPE: _____ SAMPLE OBSERVATIONS: [] ODOR _____ [] COLOR _____ OTHER: _____ _____ _____	EQUIPMENT USED FOR COLLECTION: [X] GRAVITY CORER [] S.S. SPLIT SPOON [] DREDGE [] HAND SPOON [] S.S. BOWL [] S.S. BUCKET [] _____ _____ TYPE OF SAMPLE COLLECTED: [X] DISCRETE [] COMPOSITE	DECONTAMINATION FLUIDS USED: [X] ISOPROPYL ALCOHOL [X] DEIONIZED WATER [X] ALCONOX [] HNO ₃ SOLUTION [X] POTABLE WATER [] NONE SEDIMENT TYPE: [] CLAY [] SILT [] SAND [] ORGANIC [] GRAVEL COMMENTS: _____ _____
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SAMPLES COLLECTED						
SURFACE WATER	SEDIMENT	PRESERVATIVE	VOLUME REQUIRED	SAMPLE BOTTLE ID'S	COMMENTS:	
[X]	[]	ICE		U4W02901		
[]	[X]	ICE		U4D02901		
[]	[]					
[]	[]					
[]	[]					

NOTES/SKETCH

SURFACE WATER AND SEDIMENT SAMPLE FIELD DATA RECORD

Project: NTC ORLANDO OUA IRA Site: OUA LAKE DRUID
 Project Number: 08519.70 Date: 5-12-96
 Sample Location ID: U4W0300/U4D03001
 Time: Start: _____ End: _____ Signature of Sampler: 

SURFACE WATER INFORMATION WATER DEPTH: <u>NA</u> (FT) SAMPLE DEPTH: <u>0-0.5</u> (FT BELOW SURFACE) VELOCITY MEASUREMENT OBTAINED <input type="checkbox"/> YES, SEE RECORD <input checked="" type="checkbox"/> NO TEMPERATURE: <u>82 °F</u> pH: <u>7.06</u> SPECIFIC CONDUCTIVITY: <u>183 µmhos</u> DISSOLVED O ₂ : <u>5.6 mg/L</u> REDUCTION/OXIDATION POTENTIAL: <u>195</u> OTHER: _____ _____ _____	TYPE OF SURFACE WATER: <input type="checkbox"/> STREAM <input type="checkbox"/> RIVER <input checked="" type="checkbox"/> POND/LAKE <input type="checkbox"/> SEEP	DECONTAMINATION FLUIDS USED: <input checked="" type="checkbox"/> ISOPROPYL ALCOHOL <input checked="" type="checkbox"/> DEIONIZED WATER <input checked="" type="checkbox"/> ALCONOX <input type="checkbox"/> HNO ₃ SOLUTION <input checked="" type="checkbox"/> POTABLE WATER <input type="checkbox"/> NONE
EQUIPMENT USED FOR SAMPLING: <input checked="" type="checkbox"/> NONE, GRAB INTO BOTTLE <input type="checkbox"/> BOMB SAMPLER <input type="checkbox"/> PUMP TYPE: _____ _____ _____		

SEDIMENT INFORMATION DEPTH OF SEDIMENT SAMPLE: <u>0-1.5' BLS</u> QA SAMPLES COLLECTED AT THIS LOCATION? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO TYPE: <u>MS, MSD</u> SAMPLE OBSERVATIONS: <input type="checkbox"/> ODOR _____ <input type="checkbox"/> COLOR _____ OTHER: _____ _____ _____	EQUIPMENT USED FOR COLLECTION: <input checked="" type="checkbox"/> GRAVITY CORER <input type="checkbox"/> S.S. SPLIT SPOON <input type="checkbox"/> DREDGE <input type="checkbox"/> HAND SPOON <input type="checkbox"/> S.S. BOWL <input type="checkbox"/> S.S. BUCKET <input type="checkbox"/> _____ _____ TYPE OF SAMPLE COLLECTED: <input checked="" type="checkbox"/> DISCRETE <input type="checkbox"/> COMPOSITE	DECONTAMINATION FLUIDS USED: <input checked="" type="checkbox"/> ISOPROPYL ALCOHOL <input checked="" type="checkbox"/> DEIONIZED WATER <input checked="" type="checkbox"/> ALCONOX <input type="checkbox"/> HNO ₃ SOLUTION <input checked="" type="checkbox"/> POTABLE WATER <input type="checkbox"/> NONE SEDIMENT TYPE: <input type="checkbox"/> CLAY <input type="checkbox"/> SILT <input type="checkbox"/> SAND <input type="checkbox"/> ORGANIC <input type="checkbox"/> GRAVEL COMMENTS: _____ _____
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SAMPLES COLLECTED

SURFACE WATER	SEDIMENT	PRESERVATIVE	VOLUME REQUIRED	SAMPLE BOTTLE ID'S	COMMENTS:
<input type="checkbox"/>	<input type="checkbox"/>	ICE		U4W03001	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	ICE		U4W03001 MS	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	ICE		U4W03001 MSD	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	ICE		U4D03001	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	ICE		U4D03001 MS	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	ICE		U4D03001 MSD	

NOTES/SKETCH

SURFACE WATER AND SEDIMENT SAMPLE FIELD DATA RECORD

Project: NTC ORLANDO OUA TRA
 Project Number: 08519.70
 Sample Location ID: U4W03101/U4D03101
 Time: Start: 10:38 End: 11:31

Site: OUA LAKE TRND
 Date: 5-13-96
 Signature of Sampler: [Signature]

SURFACE WATER INFORMATION WATER DEPTH: <u>NA</u> (FT) SAMPLE DEPTH: <u>0-0.5</u> (FT BELOW SURFACE) VELOCITY MEASUREMENT OBTAINED <input type="checkbox"/> YES, SEE RECORD <input type="checkbox"/> NO TEMPERATURE: <u>85°F</u> pH: <u>6.60</u> SPECIFIC CONDUCTIVITY: <u>187 umhos</u> DISSOLVED O ₂ : <u>5.8 mg/L</u> REDUCTION/OXIDATION POTENTIAL: <u>216.3</u> OTHER: _____ _____ _____	TYPE OF SURFACE WATER: <input type="checkbox"/> STREAM <input type="checkbox"/> RIVER <input checked="" type="checkbox"/> POND/LAKE <input type="checkbox"/> SEEP	DECONTAMINATION FLUIDS USED: <input checked="" type="checkbox"/> ISOPROPYL ALCOHOL <input checked="" type="checkbox"/> DEIONIZED WATER <input checked="" type="checkbox"/> ALCONOX <input type="checkbox"/> HNO ₃ SOLUTION <input checked="" type="checkbox"/> POTABLE WATER <input type="checkbox"/> NONE
EQUIPMENT USED FOR SAMPLING: <input checked="" type="checkbox"/> NONE, GRAB INTO BOTTLE <input type="checkbox"/> BOMB SAMPLER <input type="checkbox"/> PUMP TYPE: _____ _____ _____		

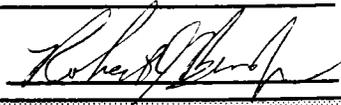
SEDIMENT INFORMATION DEPTH OF SEDIMENT SAMPLE: <u>0-1.5' BLS</u> QA SAMPLES COLLECTED AT THIS LOCATION? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO TYPE: _____ SAMPLE OBSERVATIONS: <input type="checkbox"/> ODOR _____ <input type="checkbox"/> COLOR _____ OTHER: _____ _____	EQUIPMENT USED FOR COLLECTION: <input checked="" type="checkbox"/> GRAVITY CORER <input type="checkbox"/> S.S. SPLIT SPOON <input type="checkbox"/> DREDGE <input type="checkbox"/> HAND SPOON <input type="checkbox"/> S.S. BOWL <input type="checkbox"/> S.S. BUCKET <input type="checkbox"/> _____ _____ TYPE OF SAMPLE COLLECTED: <input checked="" type="checkbox"/> DISCRETE <input type="checkbox"/> COMPOSITE	DECONTAMINATION FLUIDS USED: <input checked="" type="checkbox"/> ISOPROPYL ALCOHOL <input checked="" type="checkbox"/> DEIONIZED WATER <input checked="" type="checkbox"/> ALCONOX <input type="checkbox"/> HNO ₃ SOLUTION <input checked="" type="checkbox"/> POTABLE WATER <input type="checkbox"/> NONE SEDIMENT TYPE: <input type="checkbox"/> CLAY <input type="checkbox"/> SILT <input type="checkbox"/> SAND <input type="checkbox"/> ORGANIC <input type="checkbox"/> GRAVEL COMMENTS: _____ _____
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SAMPLES COLLECTED						
SURFACE WATER	SEDIMENT	PRESERVATIVE	VOLUME REQUIRED	SAMPLE BOTTLE ID'S	COMMENTS:	
<input checked="" type="checkbox"/>		ICE		U4W03101		
	<input checked="" type="checkbox"/>	ICE		U4D03101		

NOTES/SKETCH

SURFACE WATER AND SEDIMENT SAMPLE FIELD DATA RECORD

Project: NTC ORLANDO OUA IFA
 Project Number: 08519.70
 Sample Location ID: U4W03201/U4D03201
 Time: Start: 12:17 End: 12:55

Site: OUI4 LAKE DRUID
 Date: 5-13-96
 Signature of Sampler: 

SURFACE WATER INFORMATION WATER DEPTH: <u>NR</u> (FT) SAMPLE DEPTH: <u>0-0.5</u> (FT BELOW SURFACE) VELOCITY MEASUREMENT OBTAINED [] YES, SEE RECORD [X] NO TEMPERATURE: <u>89 °F</u> pH: <u>5.99</u> SPECIFIC CONDUCTIVITY: <u>212 µmhos</u> DISSOLVED O ₂ : <u>2.8 mg/L</u> REDUCTION/OXIDATION POTENTIAL: <u>151.2 mV</u> OTHER: _____ _____ _____	TYPE OF SURFACE WATER: [] STREAM [] RIVER [X] POND/LAKE [] SEEP	DECONTAMINATION FLUIDS USED: [X] ISOPROPYL ALCOHOL [X] DEIONIZED WATER [X] ALCONOX [] HNO ₃ SOLUTION [X] POTABLE WATER [] NONE
EQUIPMENT USED FOR SAMPLING: [X] NONE, GRAB INTO BOTTLE [] BOMB SAMPLER [] PUMP TYPE: _____ _____ _____		

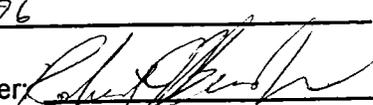
SEDIMENT INFORMATION DEPTH OF SEDIMENT SAMPLE: <u>0-1.5' BLS</u> QA SAMPLES COLLECTED AT THIS LOCATION? [] YES [X] NO TYPE: _____ SAMPLE OBSERVATIONS: [] ODOR _____ [] COLOR _____ OTHER: _____	EQUIPMENT USED FOR COLLECTION: [X] GRAVITY CORER [] S.S. SPLIT SPOON [] DREDGE [] HAND SPOON [] S.S. BOWL [] S.S. BUCKET [] _____ _____ TYPE OF SAMPLE COLLECTED: [X] DISCRETE [] COMPOSITE	DECONTAMINATION FLUIDS USED: [X] ISOPROPYL ALCOHOL [X] DEIONIZED WATER [X] ALCONOX [] HNO ₃ SOLUTION [X] POTABLE WATER [] NONE SEDIMENT TYPE: [] CLAY [] SILT [] SAND [] ORGANIC [] GRAVEL COMMENTS: _____ _____
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SAMPLES COLLECTED						
SURFACE WATER	SEDIMENT	PRESERVATIVE	VOLUME REQUIRED	SAMPLE BOTTLE ID'S	COMMENTS:	
[X]	[]	ICE		U4W03201		
[]	[X]	ICE		U4D03201		
[]	[]					
[]	[]					
[]	[]					
[]	[]					

NOTES/SKETCH

SURFACE WATER AND SEDIMENT SAMPLE FIELD DATA RECORD

Project: NTE ORLANDO OUA IFA
 Project Number: 08519.70
 Sample Location ID: U4W03301/U4D03301
 Time: Start: 11:07 End: 11:51

Site: OUA LAKE DRUID
 Date: 5-15-96
 Signature of Sampler: 

SURFACE WATER INFORMATION

TYPE OF SURFACE WATER:
 STREAM RIVER
 POND/LAKE SEEP

DECONTAMINATION FLUIDS USED:

ISOPROPYL ALCOHOL
 DEIONIZED WATER
 ALCONOX
 HNO₃ SOLUTION
 POTABLE WATER
 NONE

WATER DEPTH: NA (FT)
 SAMPLE DEPTH: 0-0.5 (FT BELOW SURFACE)
 VELOCITY MEASUREMENT OBTAINED YES, SEE RECORD NO
 TEMPERATURE: 30 °C PH: 6.56
 SPECIFIC CONDUCTIVITY: 168
 DISSOLVED O₂: 6.4 mg/L
 REDUCTION/OXIDATION POTENTIAL: 171.6
 OTHER: _____

EQUIPMENT USED FOR SAMPLING:

NONE, GRAB INTO BOTTLE
 BOMB SAMPLER
 PUMP TYPE: _____

SEDIMENT INFORMATION

DEPTH OF SEDIMENT SAMPLE:
0-1.5' BLS
 QA SAMPLES COLLECTED
 AT THIS LOCATION? YES NO
 TYPE: _____
 SAMPLE OBSERVATIONS:
 ODOR _____
 COLOR _____
 OTHER: _____

EQUIPMENT USED FOR COLLECTION:

GRAVITY CORER
 S.S. SPLIT SPOON
 DREDGE
 HAND SPOON
 S.S. BOWL
 S.S. BUCKET

DECONTAMINATION FLUIDS USED:

ISOPROPYL ALCOHOL
 DEIONIZED WATER
 ALCONOX
 HNO₃ SOLUTION
 POTABLE WATER
 NONE

SEDIMENT TYPE:

CLAY COMMENTS: _____
 SILT _____
 SAND _____
 ORGANIC _____
 GRAVEL _____

TYPE OF SAMPLE COLLECTED:

DISCRETE
 COMPOSITE

SAMPLES COLLECTED

SURFACE WATER	SEDIMENT	PRESERVATIVE	VOLUME REQUIRED	SAMPLE BOTTLE ID'S	COMMENTS:
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	ICE		U4W03301	
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	ICE		U4W03301 D	DUPLICATE
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	ICE		U4D03301	
<input type="checkbox"/>	<input type="checkbox"/>				
<input type="checkbox"/>	<input type="checkbox"/>				

NOTES/SKETCH

SURFACE WATER AND SEDIMENT SAMPLE FIELD DATA RECORD

Project: NTC ORLANDO OUA IRA
 Project Number: 08519.70
 Sample Location ID: U4W03401/U4D03401
 Time: Start: 12:21 End: 13:13

Site: OUA LAKE DRUID
 Date: 5-15-96
 Signature of Sampler: [Signature]

SURFACE WATER INFORMATION WATER DEPTH: <u>NA</u> (FT) SAMPLE DEPTH: <u>0-0.5</u> (FT BELOW SURFACE) VELOCITY MEASUREMENT OBTAINED <input type="checkbox"/> YES, SEE RECORD <input checked="" type="checkbox"/> NO TEMPERATURE: <u>33 °C</u> pH: <u>6.99</u> SPECIFIC CONDUCTIVITY: <u>172</u> DISSOLVED O ₂ : <u>7.2</u> REDUCTION/OXIDATION POTENTIAL: <u>176.7</u> OTHER: _____ _____ _____	TYPE OF SURFACE WATER: <input type="checkbox"/> STREAM <input type="checkbox"/> RIVER <input checked="" type="checkbox"/> POND/LAKE <input type="checkbox"/> SEEP	DECONTAMINATION FLUIDS USED: <input checked="" type="checkbox"/> ISOPROPYL ALCOHOL <input checked="" type="checkbox"/> DEIONIZED WATER <input checked="" type="checkbox"/> ALCONOX <input type="checkbox"/> HNO ₃ SOLUTION <input checked="" type="checkbox"/> POTABLE WATER <input type="checkbox"/> NONE
EQUIPMENT USED FOR SAMPLING: <input checked="" type="checkbox"/> NONE, GRAB INTO BOTTLE <input type="checkbox"/> BOMB SAMPLER <input type="checkbox"/> PUMP TYPE: _____ _____ _____		

SEDIMENT INFORMATION DEPTH OF SEDIMENT SAMPLE: <u>0-1.5' BLS</u> QA SAMPLES COLLECTED AT THIS LOCATION? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO TYPE: _____ SAMPLE OBSERVATIONS: <input type="checkbox"/> ODOR _____ <input type="checkbox"/> COLOR _____ OTHER: _____ _____ _____	EQUIPMENT USED FOR COLLECTION: <input checked="" type="checkbox"/> GRAVITY CORER <input type="checkbox"/> S.S. SPLIT SPOON <input type="checkbox"/> DRUDGE <input type="checkbox"/> HAND SPOON <input type="checkbox"/> S.S. BOWL <input type="checkbox"/> S.S. BUCKET <input type="checkbox"/> _____ _____ TYPE OF SAMPLE COLLECTED: <input checked="" type="checkbox"/> DISCRETE <input type="checkbox"/> COMPOSITE	DECONTAMINATION FLUIDS USED: <input checked="" type="checkbox"/> ISOPROPYL ALCOHOL <input checked="" type="checkbox"/> DEIONIZED WATER <input checked="" type="checkbox"/> ALCONOX <input type="checkbox"/> HNO ₃ SOLUTION <input checked="" type="checkbox"/> POTABLE WATER <input type="checkbox"/> NONE SEDIMENT TYPE: <input type="checkbox"/> CLAY COMMENTS: <input type="checkbox"/> SILT _____ <input type="checkbox"/> SAND _____ <input type="checkbox"/> ORGANIC _____ <input type="checkbox"/> GRAVEL _____
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SAMPLES COLLECTED						
SURFACE WATER	SEDIMENT	PRESERVATIVE	VOLUME REQUIRED	SAMPLE BOTTLE ID'S	COMMENTS:	
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<u>ICE</u>		<u>U4W03401</u>		
<input type="checkbox"/>	<input type="checkbox"/>	<u>ICE</u>		<u>U4D03401</u>		
<input type="checkbox"/>	<input type="checkbox"/>					
<input type="checkbox"/>	<input type="checkbox"/>					
<input type="checkbox"/>	<input type="checkbox"/>					

NOTES/SKETCH

SURFACE WATER AND SEDIMENT SAMPLE FIELD DATA RECORD

Project: NTC ORLANDO OUL4 IRA
 Project Number: 08519.70
 Sample Location ID: 114W03501/114D03501
 Time: Start: 15:10 End: 16:16

Site: OUL4 LAKE DRUID
 Date: 5-15-96
 Signature of Sampler: 

SURFACE WATER INFORMATION WATER DEPTH: <u>NA</u> (FT) SAMPLE DEPTH: <u>0-0.5</u> (FT BELOW SURFACE) VELOCITY MEASUREMENT OBTAINED <input type="checkbox"/> YES, SEE RECORD <input checked="" type="checkbox"/> NO TEMPERATURE: <u>31 °C</u> pH: <u>6.59</u> SPECIFIC CONDUCTIVITY: <u>163 µmhos</u> DISSOLVED O ₂ : <u>7.4 mg/L</u> REDUCTION/OXIDATION POTENTIAL: <u>175.3 mV</u> OTHER: _____ _____ _____	TYPE OF SURFACE WATER: <input type="checkbox"/> STREAM <input type="checkbox"/> RIVER <input checked="" type="checkbox"/> POND/LAKE <input type="checkbox"/> SEEP	DECONTAMINATION FLUIDS USED: <input checked="" type="checkbox"/> ISOPROPYL ALCOHOL <input checked="" type="checkbox"/> DEIONIZED WATER <input checked="" type="checkbox"/> ALCONOX <input type="checkbox"/> HNO ₃ SOLUTION <input checked="" type="checkbox"/> POTABLE WATER <input type="checkbox"/> NONE
EQUIPMENT USED FOR SAMPLING: <input checked="" type="checkbox"/> NONE, GRAB INTO BOTTLE <input type="checkbox"/> BOMB SAMPLER <input type="checkbox"/> PUMP TYPE: _____ _____ _____		

SEDIMENT INFORMATION DEPTH OF SEDIMENT SAMPLE: <u>0-1.5' BLS</u> QA SAMPLES COLLECTED AT THIS LOCATION? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO TYPE: _____ SAMPLE OBSERVATIONS: <input type="checkbox"/> ODOR _____ <input type="checkbox"/> COLOR _____ OTHER: _____ _____ _____	EQUIPMENT USED FOR COLLECTION: <input checked="" type="checkbox"/> GRAVITY CORER <input type="checkbox"/> S.S. SPLIT SPOON <input type="checkbox"/> DREDGE <input type="checkbox"/> HAND SPOON <input type="checkbox"/> S.S. BOWL <input type="checkbox"/> S.S. BUCKET <input type="checkbox"/> _____ _____ _____ TYPE OF SAMPLE COLLECTED: <input checked="" type="checkbox"/> DISCRETE <input type="checkbox"/> COMPOSITE	DECONTAMINATION FLUIDS USED: <input checked="" type="checkbox"/> ISOPROPYL ALCOHOL <input checked="" type="checkbox"/> DEIONIZED WATER <input type="checkbox"/> ALCONOX <input type="checkbox"/> HNO ₃ SOLUTION <input checked="" type="checkbox"/> POTABLE WATER <input type="checkbox"/> NONE SEDIMENT TYPE: <input type="checkbox"/> CLAY COMMENTS: <input type="checkbox"/> SILT _____ <input type="checkbox"/> SAND _____ <input type="checkbox"/> ORGANIC _____ <input type="checkbox"/> GRAVEL _____
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SAMPLES COLLECTED						
SURFACE WATER	SEDIMENT	PRESERVATIVE	VOLUME REQUIRED	SAMPLE BOTTLE ID'S	COMMENTS:	
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<u>ICE</u>		<u>114W03501</u>		
<input type="checkbox"/>	<input type="checkbox"/>	<u>ICE</u>		<u>114D03501</u>		
<input type="checkbox"/>	<input type="checkbox"/>					
<input type="checkbox"/>	<input type="checkbox"/>					
<input type="checkbox"/>	<input type="checkbox"/>					

NOTES/SKETCH

SURFACE WATER AND SEDIMENT SAMPLE FIELD DATA RECORD

Project: NTC ORLANDO OUA IRA
 Project Number: 08519.70
 Sample Location ID: U4W03601/U4D03601
 Time: Start: 16:32 End: 17:28

Site: OU4 LAKE DRUID
 Date: 5-15-96
 Signature of Sampler: [Signature]

SURFACE WATER INFORMATION WATER DEPTH: <u>NA</u> (FT) SAMPLE DEPTH: <u>0 to 0.5</u> (FT BELOW SURFACE), <u>3.5</u> ' VELOCITY MEASUREMENT OBTAINED [] YES, SEE RECORD [X] NO TEMPERATURE: <u>31.5 °C</u> pH: <u>6.89</u> SPECIFIC CONDUCTIVITY: <u>179 umhos</u> DISSOLVED O ₂ : <u>7.8 mg/L</u> REDUCTION/OXIDATION POTENTIAL: <u>188.0 mV</u> OTHER: _____ _____ _____	TYPE OF SURFACE WATER: [] STREAM [] RIVER <input checked="" type="checkbox"/> POND/LAKE [] SEEP	DECONTAMINATION FLUIDS USED: <input checked="" type="checkbox"/> ISOPROPYL ALCOHOL <input checked="" type="checkbox"/> DEIONIZED WATER <input checked="" type="checkbox"/> ALCONOX [] HNO ₃ SOLUTION <input checked="" type="checkbox"/> POTABLE WATER [] NONE
EQUIPMENT USED FOR SAMPLING: <input checked="" type="checkbox"/> NONE, GRAB INTO BOTTLE <input checked="" type="checkbox"/> BOMB SAMPLER [] PUMP TYPE: _____ _____ _____		

SEDIMENT INFORMATION DEPTH OF SEDIMENT SAMPLE: <u>0 - 1.5' BLS</u> QA SAMPLES COLLECTED AT THIS LOCATION? [] YES [X] NO TYPE: _____ SAMPLE OBSERVATIONS: [] ODOR _____ [] COLOR _____ OTHER: _____ _____ _____	EQUIPMENT USED FOR COLLECTION: <input checked="" type="checkbox"/> GRAVITY CORER [] S.S. SPLIT SPOON [] DREDGE [] HAND SPOON [] S.S. BOWL [] S.S. BUCKET [] _____ _____ _____ TYPE OF SAMPLE COLLECTED: <input checked="" type="checkbox"/> DISCRETE [] COMPOSITE	DECONTAMINATION FLUIDS USED: <input checked="" type="checkbox"/> ISOPROPYL ALCOHOL <input checked="" type="checkbox"/> DEIONIZED WATER <input checked="" type="checkbox"/> ALCONOX [] HNO ₃ SOLUTION <input checked="" type="checkbox"/> POTABLE WATER [] NONE SEDIMENT TYPE: [] CLAY [] SILT [] SAND [] ORGANIC [] GRAVEL COMMENTS: _____ _____ _____
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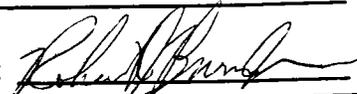
SAMPLES COLLECTED

SURFACE WATER	SEDIMENT	PRESERVATIVE	VOLUME REQUIRED	SAMPLE BOTTLE ID'S	COMMENTS:
[X]	[]	ICE		U4W03601	
[X]	[]	ICE		U4W03602	1' UP FROM BOTTOM
[]	[X]	ICE		U4D03601	
[]	[]				
[]	[]				

NOTES/SKETCH

SURFACE WATER AND SEDIMENT SAMPLE FIELD DATA RECORD

Project: NTC ORLANDO OWA IRA
 Project Number: 08519.70
 Sample Location ID: U4W03701 / U4D03701
 Time: Start: 17:41 End: 18:13

Site: 0114 LAKE DAVID
 Date: 5-15-96
 Signature of Sampler: 

SURFACE WATER INFORMATION WATER DEPTH: <u>NA</u> (FT) SAMPLE DEPTH: <u>0.0.5</u> (FT BELOW SURFACE), <u>1' ABOVE BOTTOM</u> VELOCITY MEASUREMENT OBTAINED <input type="checkbox"/> YES, SEE RECORD <input checked="" type="checkbox"/> NO TEMPERATURE: <u>30 °E</u> pH: <u>7.19</u> SPECIFIC CONDUCTIVITY: <u>160</u> μhos DISSOLVED O ₂ : <u>7.8</u> mg/L REDUCTION/OXIDATION POTENTIAL: <u>200.4</u> mV OTHER: _____ _____ _____	TYPE OF SURFACE WATER: <input type="checkbox"/> STREAM <input type="checkbox"/> RIVER <input checked="" type="checkbox"/> POND/LAKE <input type="checkbox"/> SEEP	DECONTAMINATION FLUIDS USED: <input checked="" type="checkbox"/> ISOPROPYL ALCOHOL <input checked="" type="checkbox"/> DEIONIZED WATER <input checked="" type="checkbox"/> ALCONOX <input type="checkbox"/> HNO ₃ SOLUTION <input checked="" type="checkbox"/> POTABLE WATER <input type="checkbox"/> NONE
EQUIPMENT USED FOR SAMPLING: <input checked="" type="checkbox"/> NONE, GRAB INTO BOTTLE <input checked="" type="checkbox"/> BOMB SAMPLER <input type="checkbox"/> PUMP TYPE: _____ _____ _____		

SEDIMENT INFORMATION DEPTH OF SEDIMENT SAMPLE: <u>0-1.5' BLS</u> QA SAMPLES COLLECTED AT THIS LOCATION? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO TYPE: _____ SAMPLE OBSERVATIONS: <input type="checkbox"/> ODOR _____ <input type="checkbox"/> COLOR _____ OTHER: _____ _____ _____	EQUIPMENT USED FOR COLLECTION: <input checked="" type="checkbox"/> GRAVITY CORER <input type="checkbox"/> S.S. SPLIT SPOON <input type="checkbox"/> DREDGE <input type="checkbox"/> HAND SPOON <input type="checkbox"/> S.S. BOWL <input type="checkbox"/> S.S. BUCKET <input type="checkbox"/> _____ _____ _____ TYPE OF SAMPLE COLLECTED: <input checked="" type="checkbox"/> DISCRETE <input type="checkbox"/> COMPOSITE	DECONTAMINATION FLUIDS USED: <input checked="" type="checkbox"/> ISOPROPYL ALCOHOL <input checked="" type="checkbox"/> DEIONIZED WATER <input checked="" type="checkbox"/> ALCONOX <input type="checkbox"/> HNO ₃ SOLUTION <input checked="" type="checkbox"/> POTABLE WATER <input type="checkbox"/> NONE SEDIMENT TYPE: <input type="checkbox"/> CLAY <input type="checkbox"/> SILT <input type="checkbox"/> SAND <input type="checkbox"/> ORGANIC <input type="checkbox"/> GRAVEL COMMENTS: _____ _____ _____
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SAMPLES COLLECTED

SURFACE WATER	SEDIMENT	PRESERVATIVE	VOLUME REQUIRED	SAMPLE BOTTLE ID'S	COMMENTS:
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<u>ICE</u>		<u>U4W03701</u>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<u>ICE</u>		<u>U4W03702</u>	<u>1' ABOVE BOTTOM</u>
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<u>ICE</u>		<u>U4D03701</u>	
<input type="checkbox"/>	<input type="checkbox"/>				
<input type="checkbox"/>	<input type="checkbox"/>				

NOTES/SKETCH

SURFACE WATER AND SEDIMENT SAMPLE FIELD DATA RECORD

Project: NTE ORLANDO OUA TRA
 Project Number: 0851970
 Sample Location ID: U4W03801/U4D03801
 Time: Start: 10:31 End: 11:00

Site: OUA LAKE DRUID
 Date: 5-16-96
 Signature of Sampler: [Signature]

SURFACE WATER INFORMATION WATER DEPTH: <u>NA</u> (FT) SAMPLE DEPTH: <u>0-0.5</u> (FT BELOW SURFACE), <u>2' ABOVE BOTTOM</u> VELOCITY MEASUREMENT OBTAINED [] YES, SEE RECORD [X] NO TEMPERATURE: <u>83°F</u> pH: <u>6.75</u> SPECIFIC CONDUCTIVITY: <u>165 µmhos</u> DISSOLVED O ₂ : <u>6.2 mg/L</u> REDUCTION/OXIDATION POTENTIAL: <u>209.2 mV</u> OTHER: _____ _____ _____	TYPE OF SURFACE WATER: [] STREAM [] RIVER [X] POND/LAKE [] SEEP	DECONTAMINATION FLUIDS USED: [] ISOPROPYL ALCOHOL [X] DEIONIZED WATER [X] ALCONOX [] HNO ₃ SOLUTION [X] POTABLE WATER [] NONE
EQUIPMENT USED FOR SAMPLING: [X] NONE, GRAB INTO BOTTLE [X] BOMB SAMPLER [] PUMP TYPE: _____ _____ _____		

SEDIMENT INFORMATION DEPTH OF SEDIMENT SAMPLE: <u>0-1.5' BLS</u> QA SAMPLES COLLECTED AT THIS LOCATION? [] YES [X] NO TYPE: _____ SAMPLE OBSERVATIONS: [] ODOR _____ [] COLOR _____ OTHER: _____ _____ _____	EQUIPMENT USED FOR COLLECTION: [X] GRAVITY CORER [] S.S. SPLIT SPOON [] DREDGE [] HAND SPOON [] S.S. BOWL [] S.S. BUCKET [] _____ _____ TYPE OF SAMPLE COLLECTED: [X] DISCRETE [] COMPOSITE	DECONTAMINATION FLUIDS USED: [] ISOPROPYL ALCOHOL [X] DEIONIZED WATER [X] ALCONOX [] HNO ₃ SOLUTION [X] POTABLE WATER [] NONE SEDIMENT TYPE: [] CLAY [] SILT [] SAND [] ORGANIC [] GRAVEL COMMENTS: _____ _____
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SAMPLES COLLECTED

SURFACE WATER	SEDIMENT	PRESERVATIVE	VOLUME REQUIRED	SAMPLE BOTTLE ID'S	COMMENTS:
[X]	[]	U4W03801		→	
[X]	[]	U4W03802			
[]	[X]	U4D03801			
[]	[]	ICE			
[]	[]	ICE			
[]	[]	ICE			

NOTES/SKETCH

SURFACE WATER AND SEDIMENT SAMPLE FIELD DATA RECORD

Project: NTE ORLANDO OWA TRA
 Project Number: 08519.70
 Sample Location ID: UAW03901/U4D03901
 Time: Start: 11:54 End: 12:40

Site: OWA - LAKE DRUID
 Date: 5-16-96
 Signature of Sampler: [Signature]

SURFACE WATER INFORMATION WATER DEPTH: <u>NA</u> (FT) SAMPLE DEPTH: <u>0-0.5</u> (FT BELOW SURFACE) / <u>2' ABOVE BOTTOM</u> VELOCITY MEASUREMENT OBTAINED [] YES, SEE RECORD [] NO TEMPERATURE: <u>85° F / 27° C</u> PH: <u>7.16 / 6.89</u> SPECIFIC CONDUCTIVITY: <u>170 μmhos / 110 μmhos</u> DISSOLVED O ₂ : <u>7.4 mg/L / 5.4 mg/L</u> REDUCTION/OXIDATION POTENTIAL: <u>212.7 mV / 172.1 mV</u> OTHER: _____ _____ _____	TYPE OF SURFACE WATER: [] STREAM [] RIVER <input checked="" type="checkbox"/> POND/LAKE [] SEEP	DECONTAMINATION FLUIDS USED: <input checked="" type="checkbox"/> ISOPROPYL ALCOHOL <input checked="" type="checkbox"/> DEIONIZED WATER <input checked="" type="checkbox"/> ALCONOX [] HNO ₃ SOLUTION <input checked="" type="checkbox"/> POTABLE WATER [] NONE
EQUIPMENT USED FOR SAMPLING: <input checked="" type="checkbox"/> NONE, GRAB INTO BOTTLE <input checked="" type="checkbox"/> BOMB SAMPLER [] PUMP TYPE: _____ _____ _____		

SEDIMENT INFORMATION DEPTH OF SEDIMENT SAMPLE: <u>0-1.5' BLS</u> QA SAMPLES COLLECTED AT THIS LOCATION? [] YES <input checked="" type="checkbox"/> NO TYPE: _____ SAMPLE OBSERVATIONS: [] ODOR _____ [] COLOR _____ OTHER: _____ _____ _____	EQUIPMENT USED FOR COLLECTION: <input checked="" type="checkbox"/> GRAVITY CORER [] S.S. SPLIT SPOON [] DREDGE [] HAND SPOON [] S.S. BOWL [] S.S. BUCKET [] _____ _____ TYPE OF SAMPLE COLLECTED: <input checked="" type="checkbox"/> DISCRETE [] COMPOSITE	DECONTAMINATION FLUIDS USED: <input checked="" type="checkbox"/> ISOPROPYL ALCOHOL <input checked="" type="checkbox"/> DEIONIZED WATER <input checked="" type="checkbox"/> ALCONOX [] HNO ₃ SOLUTION <input checked="" type="checkbox"/> POTABLE WATER [] NONE SEDIMENT TYPE: [] CLAY [] SILT [] SAND [] ORGANIC [] GRAVEL COMMENTS: _____ _____ _____
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SAMPLES COLLECTED

SURFACE WATER	SEDIMENT	PRESERVATIVE	VOLUME REQUIRED	SAMPLE BOTTLE ID'S	COMMENTS:
<input checked="" type="checkbox"/>	<input type="checkbox"/>	ICE		UAW03901	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	ICE		UAW03902	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	ICE		U4D03901	
<input type="checkbox"/>	<input type="checkbox"/>				
<input type="checkbox"/>	<input type="checkbox"/>				

NOTES/SKETCH

SURFACE WATER AND SEDIMENT SAMPLE FIELD DATA RECORD

Project: NTC ORLANDO OUA IRA
 Project Number: 08519.70
 Sample Location ID: U4W04001/U4D04001
 Time: Start: 10:45 End: 11:38

Site: OUA LAKE DRUID
 Date: 5-21-96
 Signature of Sampler: [Signature]

SURFACE WATER INFORMATION WATER DEPTH: <u>0-0.5 (FT) / 2' ABOVE BOTTOM</u> SAMPLE DEPTH: <u>(FT BELOW SURFACE) 10-30-96</u> VELOCITY MEASUREMENT OBTAINED <input type="checkbox"/> YES, SEE RECORD <input checked="" type="checkbox"/> NO TEMPERATURE: <u>81 / 81 °F</u> pH: <u>7.14 / 6.89</u> SPECIFIC CONDUCTIVITY: <u>120 / 110 umhos</u> DISSOLVED O ₂ : <u>6.8 / 5.4 mg/L</u> REDUCTION/OXIDATION POTENTIAL: <u>172.6 / 172.1 mV</u> OTHER: _____ _____ _____	TYPE OF SURFACE WATER: <input type="checkbox"/> STREAM <input type="checkbox"/> RIVER <input checked="" type="checkbox"/> POND/LAKE <input type="checkbox"/> SEEP	DECONTAMINATION FLUIDS USED: <input type="checkbox"/> ISOPROPYL ALCOHOL <input checked="" type="checkbox"/> DEIONIZED WATER <input checked="" type="checkbox"/> ALCONOX <input type="checkbox"/> HNO ₃ SOLUTION <input checked="" type="checkbox"/> POTABLE WATER <input type="checkbox"/> NONE
EQUIPMENT USED FOR SAMPLING: <input checked="" type="checkbox"/> NONE, GRAB INTO BOTTLE <input checked="" type="checkbox"/> BOMB SAMPLER <input type="checkbox"/> PUMP TYPE: _____ _____ _____		

SEDIMENT INFORMATION DEPTH OF SEDIMENT SAMPLE: <u>0-1.5' BLS</u> QA SAMPLES COLLECTED AT THIS LOCATION? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO TYPE: _____ SAMPLE OBSERVATIONS: <input type="checkbox"/> ODOR _____ <input type="checkbox"/> COLOR _____ OTHER: _____ _____ _____	EQUIPMENT USED FOR COLLECTION: <input checked="" type="checkbox"/> GRAVITY CORER <input type="checkbox"/> S.S. SPLIT SPOON <input type="checkbox"/> DREDGE <input type="checkbox"/> HAND SPOON <input type="checkbox"/> S.S. BOWL <input type="checkbox"/> S.S. BUCKET <input type="checkbox"/> _____ _____ _____ TYPE OF SAMPLE COLLECTED: <input checked="" type="checkbox"/> DISCRETE <input type="checkbox"/> COMPOSITE	DECONTAMINATION FLUIDS USED: <input checked="" type="checkbox"/> ISOPROPYL ALCOHOL <input checked="" type="checkbox"/> DEIONIZED WATER <input checked="" type="checkbox"/> ALCONOX <input type="checkbox"/> HNO ₃ SOLUTION <input checked="" type="checkbox"/> POTABLE WATER <input type="checkbox"/> NONE SEDIMENT TYPE: <input type="checkbox"/> CLAY COMMENTS: <input type="checkbox"/> SILT _____ <input type="checkbox"/> SAND _____ <input type="checkbox"/> ORGANIC _____ <input type="checkbox"/> GRAVEL _____
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SAMPLES COLLECTED

SURFACE WATER	SEDIMENT	PRESERVATIVE	VOLUME REQUIRED	SAMPLE BOTTLE ID'S	COMMENTS:
<input checked="" type="checkbox"/>	<input type="checkbox"/>	ICE		U4W04001	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	ICE		U4W04002	2' ABOVE BOTTOM
<input type="checkbox"/>	<input checked="" type="checkbox"/>	ICE		U4D04001	
<input type="checkbox"/>	<input type="checkbox"/>				
<input type="checkbox"/>	<input type="checkbox"/>				

NOTES/SKETCH

SURFACE WATER AND SEDIMENT SAMPLE FIELD DATA RECORD

Project: NTC ORLANDO OWA TPA
 Project Number: 08519.70
 Sample Location ID: U4W04101/U4D04101
 Time: Start: 12:55 End: 13:18

Site: OWA LAKE DRUID
 Date: 5-21-96
 Signature of Sampler: [Signature]

SURFACE WATER INFORMATION WATER DEPTH: <u>NA</u> (FT) SAMPLE DEPTH: <u>0-0.5 (FT BELOW SURFACE) / 2' ABOVE BOTTOM</u> VELOCITY MEASUREMENT OBTAINED [] YES, SEE RECORD [] NO TEMPERATURE: <u>NA/25°C</u> PH: <u>NA/5.06</u> SPECIFIC CONDUCTIVITY: <u>NA/197 µmhos</u> DISSOLVED O ₂ : <u>NA/6.2 mg/L</u> REDUCTION/OXIDATION POTENTIAL: <u>NA/181.8</u> OTHER: _____	TYPE OF SURFACE WATER: [] STREAM [] RIVER <input checked="" type="checkbox"/> POND/LAKE [] SEEP	DECONTAMINATION FLUIDS USED: <input checked="" type="checkbox"/> ISOPROPYL ALCOHOL <input checked="" type="checkbox"/> DEIONIZED WATER <input checked="" type="checkbox"/> ALCONOX [] HNO ₃ SOLUTION <input checked="" type="checkbox"/> POTABLE WATER [] NONE
EQUIPMENT USED FOR SAMPLING: <input checked="" type="checkbox"/> NONE, GRAB INTO BOTTLE <input checked="" type="checkbox"/> BOMB SAMPLER [] PUMP TYPE: _____		

SEDIMENT INFORMATION DEPTH OF SEDIMENT SAMPLE: <u>0-1.5' BLS</u> QA SAMPLES COLLECTED AT THIS LOCATION? [] YES <input checked="" type="checkbox"/> NO TYPE: _____ SAMPLE OBSERVATIONS: [] ODOR _____ [] COLOR _____ OTHER: _____	EQUIPMENT USED FOR COLLECTION: <input checked="" type="checkbox"/> GRAVITY CORER [] S.S. SPLIT SPOON [] DRUDGE [] HAND SPOON [] S.S. BOWL [] S.S. BUCKET [] _____ TYPE OF SAMPLE COLLECTED: <input checked="" type="checkbox"/> DISCRETE [] COMPOSITE	DECONTAMINATION FLUIDS USED: <input checked="" type="checkbox"/> ISOPROPYL ALCOHOL <input checked="" type="checkbox"/> DEIONIZED WATER <input checked="" type="checkbox"/> ALCONOX [] HNO ₃ SOLUTION <input checked="" type="checkbox"/> POTABLE WATER [] NONE SEDIMENT TYPE: [] CLAY [] SILT [] SAND [] ORGANIC [] GRAVEL COMMENTS: _____
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SAMPLES COLLECTED						
SURFACE WATER	SEDIMENT	PRESERVATIVE	VOLUME REQUIRED	SAMPLE BOTTLE ID'S	COMMENTS:	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<u>ICE</u>		<u>U4W04101</u>		
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<u>ICE</u>		<u>U4W04102</u>	<u>2' ABOVE BOTTOM</u>	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<u>ICE</u>		<u>U4D04101</u>		
<input type="checkbox"/>	<input type="checkbox"/>					
<input type="checkbox"/>	<input type="checkbox"/>					

NOTES/SKETCH

SURFACE WATER AND SEDIMENT SAMPLE FIELD DATA RECORD

Project: NTC ORLANDO OWA FRA
 Project Number: 08519.70
 Sample Location ID: U4W04201/U4D04201
 Time: Start: 13:44 End: 14:16

Site: OWA LAKE DRUID
 Date: 5-21-96
 Signature of Sampler: Robert J. Brunk

SURFACE WATER INFORMATION WATER DEPTH: <u>NA</u> (FT) SAMPLE DEPTH: <u>0-0.5</u> (FT BELOW SURFACE) / <u>2' ABOVE BOTTOM</u> VELOCITY MEASUREMENT OBTAINED <input type="checkbox"/> YES, SEE RECORD <input checked="" type="checkbox"/> NO TEMPERATURE: <u>28°C / NA</u> pH: <u>6.56 / NA</u> SPECIFIC CONDUCTIVITY: <u>150 µmhos / NA</u> DISSOLVED O ₂ : <u>4.6 mg/L / NA</u> REDUCTION/OXIDATION POTENTIAL: <u>173.2 mV / NA</u> OTHER: _____ _____ _____	TYPE OF SURFACE WATER: <input type="checkbox"/> STREAM <input type="checkbox"/> RIVER <input checked="" type="checkbox"/> POND/LAKE <input type="checkbox"/> SEEP	DECONTAMINATION FLUIDS USED: <input checked="" type="checkbox"/> ISOPROPYL ALCOHOL <input checked="" type="checkbox"/> DEIONIZED WATER <input checked="" type="checkbox"/> ALCONOX <input type="checkbox"/> HNO ₃ SOLUTION <input checked="" type="checkbox"/> POTABLE WATER <input type="checkbox"/> NONE
EQUIPMENT USED FOR SAMPLING: <input checked="" type="checkbox"/> NONE, GRAB INTO BOTTLE <input checked="" type="checkbox"/> BOMB SAMPLER <input type="checkbox"/> PUMP TYPE: _____ _____ _____		

SEDIMENT INFORMATION DEPTH OF SEDIMENT SAMPLE: <u>0-1.5' BLS</u> QA SAMPLES COLLECTED AT THIS LOCATION? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO TYPE: <u>MS, MSD</u> SAMPLE OBSERVATIONS: <input type="checkbox"/> ODOR _____ <input type="checkbox"/> COLOR _____ OTHER: _____ _____ _____	EQUIPMENT USED FOR COLLECTION: <input checked="" type="checkbox"/> GRAVITY CORER <input type="checkbox"/> S.S. SPLIT SPOON <input type="checkbox"/> DREDGE <input type="checkbox"/> HAND SPOON <input type="checkbox"/> S.S. BOWL <input type="checkbox"/> S.S. BUCKET <input type="checkbox"/> _____ _____ _____ TYPE OF SAMPLE COLLECTED: <input checked="" type="checkbox"/> DISCRETE <input type="checkbox"/> COMPOSITE	DECONTAMINATION FLUIDS USED: <input checked="" type="checkbox"/> ISOPROPYL ALCOHOL <input checked="" type="checkbox"/> DEIONIZED WATER <input checked="" type="checkbox"/> ALCONOX <input type="checkbox"/> HNO ₃ SOLUTION <input checked="" type="checkbox"/> POTABLE WATER <input type="checkbox"/> NONE SEDIMENT TYPE: <input type="checkbox"/> CLAY <input type="checkbox"/> SILT <input type="checkbox"/> SAND <input type="checkbox"/> ORGANIC <input type="checkbox"/> GRAVEL COMMENTS: _____ _____ _____
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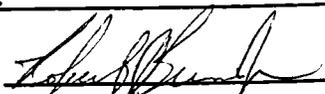
SAMPLES COLLECTED

SURFACE WATER	SEDIMENT	PRESERVATIVE	VOLUME REQUIRED	SAMPLE BOTTLE ID'S	COMMENTS:
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<u>ICE</u>		<u>U4W04201</u>	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	"		<u>U4D04201</u>	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	"		<u>U4D04201 MS</u>	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	"		<u>U4D04201 MSD</u>	
<input type="checkbox"/>	<input type="checkbox"/>				

NOTES/SKETCH

SURFACE WATER AND SEDIMENT SAMPLE FIELD DATA RECORD

Project: NTC ORLANDO OUA IRA
 Project Number: 08519.70
 Sample Location ID: U4W04301/U4D04301
 Time: Start: 14:38 End: 15:35

Site: OUA LAKE DRUID
 Date: 5-21-96
 Signature of Sampler: 

SURFACE WATER INFORMATION WATER DEPTH: <u>16'</u> (FT) SAMPLE DEPTH: <u>0-0.5</u> (FT BELOW SURFACE) / <u>2' ABOVE BOTTOM</u> VELOCITY MEASUREMENT OBTAINED [] YES, SEE RECORD [X] NO TEMPERATURE: <u>NA</u> pH: <u>NA</u> SPECIFIC CONDUCTIVITY: <u>NA</u> DISSOLVED O ₂ : <u>NA</u> REDUCTION/OXIDATION POTENTIAL: <u>NA</u> OTHER: _____ _____ _____	TYPE OF SURFACE WATER: [] STREAM [] RIVER [X] POND/LAKE [] SEEP	DECONTAMINATION FLUIDS USED: [X] ISOPROPYL ALCOHOL [X] DEIONIZED WATER [X] ALCONOX [] HNO ₃ SOLUTION [X] POTABLE WATER [] NONE
EQUIPMENT USED FOR SAMPLING: [X] NONE, GRAB INTO BOTTLE [X] BOMB SAMPLER [] PUMP TYPE: _____ _____ _____		

SEDIMENT INFORMATION DEPTH OF SEDIMENT SAMPLE: <u>0-1.5' BLS</u> QA SAMPLES COLLECTED AT THIS LOCATION? [] YES [X] NO TYPE: _____ SAMPLE OBSERVATIONS: [] ODOR _____ [] COLOR _____ OTHER: _____	EQUIPMENT USED FOR COLLECTION: [X] GRAVITY CORER [] S.S. SPLIT SPOON [] DREDGE [] HAND SPOON [] S.S. BOWL [] S.S. BUCKET [] _____ _____ _____ TYPE OF SAMPLE COLLECTED: [X] DISCRETE [] COMPOSITE	DECONTAMINATION FLUIDS USED: [X] ISOPROPYL ALCOHOL [X] DEIONIZED WATER [X] ALCONOX [] HNO ₃ SOLUTION [X] POTABLE WATER [] NONE SEDIMENT TYPE: [] CLAY [] SILT [] SAND [] ORGANIC [] GRAVEL COMMENTS: _____ _____
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SAMPLES COLLECTED						
SURFACE WATER	SEDIMENT	PRESERVATIVE	VOLUME REQUIRED	SAMPLE BOTTLE ID'S	COMMENTS:	
[X]	[]	ICE		U4W04301		
[X]	[]	"		U4W04302		
[]	[X]	"		U4D04301		
[]	[]					
[]	[]					

NOTES/SKETCH

SURFACE WATER AND SEDIMENT SAMPLE FIELD DATA RECORD

Project: NTC ORLANDO O&A IRA
 Project Number: 08519.70
 Sample Location ID: U4W04401/U4D04401
 Time: Start: 11:44 End: 12:34

Site: OUI4 LAKE DRUID
 Date: 5-22-96
 Signature of Sampler: *Robert [Signature]*

SURFACE WATER INFORMATION

TYPE OF SURFACE WATER:
 STREAM RIVER
 POND/LAKE SEEP

DECONTAMINATION FLUIDS USED:

ISOPROPYL ALCOHOL
 DEIONIZED WATER
 ALCONOX
 HNO3 SOLUTION
 POTABLE WATER
 NONE

WATER DEPTH: NA (FT)
 SAMPLE DEPTH: 0-0.5 (FT BELOW SURFACE) / 2' ABOVE BOTTOM
 VELOCITY MEASUREMENT OBTAINED YES, SEE RECORD NO
 TEMPERATURE: 32/32 °C, pH: 6.73/6.27
 SPECIFIC CONDUCTIVITY: 173/172 μmhos
 DISSOLVED O₂: 6.8/6.2 mg/L
 REDUCTION/OXIDATION POTENTIAL: 163.8/179.1 mV
 OTHER: _____

EQUIPMENT USED FOR SAMPLING:

NONE, GRAB INTO BOTTLE
 BOMB SAMPLER
 PUMP TYPE: _____

SEDIMENT INFORMATION

DEPTH OF SEDIMENT SAMPLE:
0-1.5' BLS
 QA SAMPLES COLLECTED
 AT THIS LOCATION? YES NO
 TYPE: _____
 SAMPLE OBSERVATIONS:
 ODOR _____
 COLOR _____
 OTHER: _____

EQUIPMENT USED FOR COLLECTION:

GRAVITY CORER
 S.S. SPLIT SPOON
 DREDGE
 HAND SPOON
 S.S. BOWL
 S.S. BUCKET

DECONTAMINATION FLUIDS USED:

ISOPROPYL ALCOHOL
 DEIONIZED WATER
 ALCONOX
 HNO3 SOLUTION
 POTABLE WATER
 NONE

SEDIMENT TYPE:

CLAY COMMENTS: _____
 SILT _____
 SAND _____
 ORGANIC _____
 GRAVEL _____

TYPE OF SAMPLE COLLECTED:

DISCRETE
 COMPOSITE

SAMPLES COLLECTED

SURFACE WATER	SEDIMENT	PRESERVATIVE	VOLUME REQUIRED	SAMPLE BOTTLE ID'S	COMMENTS:
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<u>ICE</u>		<u>U4W04401</u>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<u>"</u>		<u>U4W04402</u>	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<u>"</u>		<u>U4D04401</u>	
<input type="checkbox"/>	<input type="checkbox"/>				
<input type="checkbox"/>	<input type="checkbox"/>				

NOTES/SKETCH

SURFACE WATER AND SEDIMENT SAMPLE FIELD DATA RECORD

Project: NTC ORLANDO OUY IRA
 Project Number: 08519.70
 Sample Location ID: 114W04501/114D04501
 Time: Start: 15:20 End: 16:12

Site: OUY LAKE DRAIN
 Date: 5-22-96
 Signature of Sampler: *[Signature]*

SURFACE WATER INFORMATION

TYPE OF SURFACE WATER:
 STREAM RIVER
 POND/LAKE SEEP

DECONTAMINATION FLUIDS USED:
 ISOPROPYL ALCOHOL
 DEIONIZED WATER
 ALCONOX
 HNO3 SOLUTION
 POTABLE WATER
 NONE

WATER DEPTH: 7.25 (FT)
 SAMPLE DEPTH: 0-0.5 (FT BELOW SURFACE) / 2' ABOVE BOTTOM
 VELOCITY MEASUREMENT OBTAINED YES, SEE RECORD NO
 TEMPERATURE: 32°/32° C PH: 7.25/6.87
 SPECIFIC CONDUCTIVITY: 189/156 μmhos
 DISSOLVED O₂: 6.1/5.95 mg/L
 REDUCTION/OXIDATION POTENTIAL: 154.7/194.1 mV
 OTHER: _____

EQUIPMENT USED FOR SAMPLING:

NONE, GRAB INTO BOTTLE
 BOMB SAMPLER
 PUMP TYPE: _____

SEDIMENT INFORMATION

EQUIPMENT USED FOR COLLECTION:
 GRAVITY CORER
 S.S. SPLIT SPOON
 DREDGE
 HAND SPOON
 S.S. BOWL
 S.S. BUCKET

DECONTAMINATION FLUIDS USED:
 ISOPROPYL ALCOHOL
 DEIONIZED WATER
 ALCONOX
 HNO3 SOLUTION
 POTABLE WATER
 NONE

DEPTH OF SEDIMENT SAMPLE:
0-1.5' BLS
 QA SAMPLES COLLECTED
 AT THIS LOCATION? YES NO
 TYPE: _____
 SAMPLE OBSERVATIONS:
 ODOR _____
 COLOR _____
 OTHER: _____

TYPE OF SAMPLE COLLECTED:
 DISCRETE
 COMPOSITE

SEDIMENT TYPE:
 CLAY COMMENTS: _____
 SILT _____
 SAND _____
 ORGANIC _____
 GRAVEL _____

SAMPLES COLLECTED

SURFACE WATER	SEDIMENT	PRESERVATIVE	VOLUME REQUIRED	SAMPLE BOTTLE ID'S	COMMENTS:
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<u>ICE</u>		<u>114W04501</u>	
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<u>"</u>		<u>114W04502</u>	
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<u>"</u>	<u>10-25</u>	114W04501 <u>114D04501</u>	
<input type="checkbox"/>	<input type="checkbox"/>				
<input type="checkbox"/>	<input type="checkbox"/>				

NOTES/SKETCH

SURFACE WATER AND SEDIMENT SAMPLE FIELD DATA RECORD

Project: NTC ORLANDO OUA TRA
 Project Number: 08519.70
 Sample Location ID: U4W04601/U4D04601
 Time: Start: 17:11 End: 18:01

Site: OUA LAKE TRAIL
 Date: 5-22-96
 Signature of Sampler: *Robert J. [Signature]*

SURFACE WATER INFORMATION WATER DEPTH: <u>NA</u> (FT) SAMPLE DEPTH: <u>0-0.5</u> (FT BELOW SURFACE) / <u>2' ABOVE BOTTOM</u> VELOCITY MEASUREMENT OBTAINED [] YES, SEE RECORD [] NO TEMPERATURE: <u>31°/30° C</u> pH: <u>7.00/5.96</u> SPECIFIC CONDUCTIVITY: <u>156/159</u> μmhos DISSOLVED O ₂ : <u>7.2/6.1</u> mg/L REDUCTION/OXIDATION POTENTIAL: <u>204.2/221.0</u> mV OTHER: _____ _____ _____	TYPE OF SURFACE WATER: [] STREAM [] RIVER <input checked="" type="checkbox"/> POND/LAKE [] SEEP	DECONTAMINATION FLUIDS USED: <input checked="" type="checkbox"/> ISOPROPYL ALCOHOL <input checked="" type="checkbox"/> DEIONIZED WATER <input checked="" type="checkbox"/> ALCONOX [] HNO ₃ SOLUTION <input checked="" type="checkbox"/> POTABLE WATER [] NONE
EQUIPMENT USED FOR SAMPLING: <input checked="" type="checkbox"/> NONE, GRAB INTO BOTTLE <input checked="" type="checkbox"/> BOMB SAMPLER [] PUMP TYPE: _____ _____ _____		

SEDIMENT INFORMATION DEPTH OF SEDIMENT SAMPLE: <u>0-1.5' BLS</u> QA SAMPLES COLLECTED AT THIS LOCATION? [] YES <input checked="" type="checkbox"/> NO TYPE: _____ SAMPLE OBSERVATIONS: [] ODOR _____ [] COLOR _____ OTHER: _____ _____ _____	EQUIPMENT USED FOR COLLECTION: <input checked="" type="checkbox"/> GRAVITY CORER [] S.S. SPLIT SPOON [] DREDGE [] HAND SPOON [] S.S. BOWL [] S.S. BUCKET [] _____ _____ TYPE OF SAMPLE COLLECTED: <input checked="" type="checkbox"/> DISCRETE [] COMPOSITE	DECONTAMINATION FLUIDS USED: <input checked="" type="checkbox"/> ISOPROPYL ALCOHOL <input checked="" type="checkbox"/> DEIONIZED WATER <input checked="" type="checkbox"/> ALCONOX [] HNO ₃ SOLUTION <input checked="" type="checkbox"/> POTABLE WATER [] NONE SEDIMENT TYPE: [] CLAY [] SILT [] SAND [] ORGANIC [] GRAVEL COMMENTS: _____ _____ _____
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SAMPLES COLLECTED

SURFACE WATER	SEDIMENT	PRESERVATIVE	VOLUME REQUIRED	SAMPLE BOTTLE ID'S	COMMENTS:
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<u>ICE</u>		<u>U4W04601</u>	
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	"		<u>U4W04602</u>	
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	"		<u>U4D04601</u>	
<input type="checkbox"/>	<input type="checkbox"/>				
<input type="checkbox"/>	<input type="checkbox"/>				

NOTES/SKETCH

SURFACE WATER AND SEDIMENT SAMPLE FIELD DATA RECORD

Project: NTC ORLANDO OUA IRA
 Project Number: 08519.70
 Sample Location ID: U4W04701/U4D04701
 Time: Start: 13:51 End: 15:18

Site: OUA LAKE DRUID
 Date: 5-23-96
 Signature of Sampler: [Signature]

SURFACE WATER INFORMATION WATER DEPTH: <u>10.5</u> (FT) SAMPLE DEPTH: <u>0-0.5</u> (FT BELOW SURFACE) / <u>2' BELOW</u> ^{20' B-30-96} <u>ABOVE BOTTOM</u> VELOCITY MEASUREMENT OBTAINED [] YES, SEE RECORD [X] NO TEMPERATURE: <u>32° / 32°C</u> pH: <u>7.14 / 6.64</u> SPECIFIC CONDUCTIVITY: <u>195 / 195</u> $\mu\text{mhos/cm}$ DISSOLVED O ₂ : <u>6.20 / 6.05</u> mg/L REDUCTION/OXIDATION POTENTIAL: <u>179.0 / NA</u> mV OTHER: _____ _____ _____	TYPE OF SURFACE WATER: [] STREAM [] RIVER [X] POND/LAKE [] SEEP	DECONTAMINATION FLUIDS USED: [X] ISOPROPYL ALCOHOL [X] DEIONIZED WATER [X] ALCONOX [] HNO ₃ SOLUTION [X] POTABLE WATER [] NONE
EQUIPMENT USED FOR SAMPLING: [X] NONE, GRAB INTO BOTTLE [X] BOMB SAMPLER [] PUMP TYPE: _____		

SEDIMENT INFORMATION DEPTH OF SEDIMENT SAMPLE: <u>0-1.5' BLS</u> QA SAMPLES COLLECTED AT THIS LOCATION? [] YES [X] NO TYPE: _____ SAMPLE OBSERVATIONS: [] ODOR _____ [] COLOR _____ OTHER: _____	EQUIPMENT USED FOR COLLECTION: [X] GRAVITY CORER [] S.S. SPLIT SPOON [] DREDGE [] HAND SPOON [] S.S. BOWL [] S.S. BUCKET [] _____ TYPE OF SAMPLE COLLECTED: [X] DISCRETE [] COMPOSITE	DECONTAMINATION FLUIDS USED: [X] ISOPROPYL ALCOHOL [X] DEIONIZED WATER [X] ALCONOX [] HNO ₃ SOLUTION [X] POTABLE WATER [] NONE SEDIMENT TYPE: [] CLAY [] SILT [] SAND [] ORGANIC [] GRAVEL COMMENTS: _____ _____
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SAMPLES COLLECTED					
SURFACE WATER	SEDIMENT	PRESERVATIVE	VOLUME REQUIRED	SAMPLE BOTTLE ID'S	COMMENTS:
[X]	[X]	ICE		U4W04701	
[]	[]	"		U4W04702	
[]	[]	"		U4D04701	
[]	[]				
[]	[]				

NOTES/SKETCH

SURFACE WATER AND SEDIMENT SAMPLE FIELD DATA RECORD

Project: NTC ORLANDO OUA IRA
 Project Number: 08519.70
 Sample Location ID: U4W04801/U4D04801
 Time: Start: 16:20 End: 17:10

Site: OUA LAKE DRUID
 Date: 5-23-96
 Signature of Sampler: [Signature]

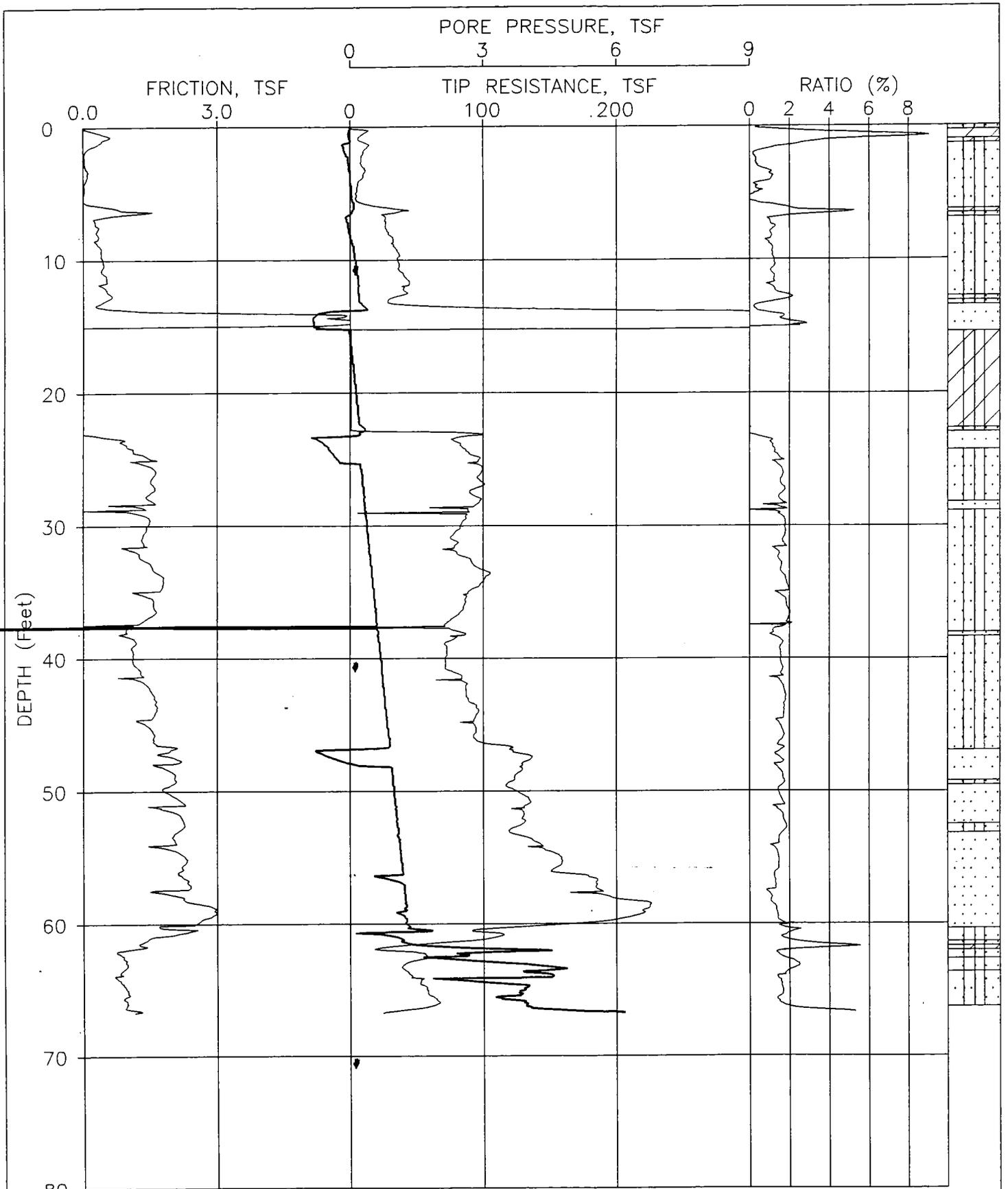
SURFACE WATER INFORMATION WATER DEPTH: <u>NA</u> (FT) SAMPLE DEPTH: <u>0-0.5</u> (FT BELOW SURFACE) / <u>2' ABOVE BOTTOM</u> VELOCITY MEASUREMENT OBTAINED <input type="checkbox"/> YES, SEE RECORD <input checked="" type="checkbox"/> NO TEMPERATURE: <u>31 °C</u> / <u>NA</u> pH: <u>6.90</u> / <u>NA</u> SPECIFIC CONDUCTIVITY: <u>175 µmhos</u> / <u>NA</u> DISSOLVED O ₂ : <u>7.8 mg/L</u> / <u>NA</u> REDUCTION/OXIDATION POTENTIAL: <u>NA</u> / <u>NA</u> OTHER: _____ _____ _____	TYPE OF SURFACE WATER: <input type="checkbox"/> STREAM <input type="checkbox"/> RIVER <input checked="" type="checkbox"/> POND/LAKE <input type="checkbox"/> SEEP	DECONTAMINATION FLUIDS USED: <input checked="" type="checkbox"/> ISOPROPYL ALCOHOL <input checked="" type="checkbox"/> DEIONIZED WATER <input checked="" type="checkbox"/> ALCONOX <input type="checkbox"/> HNO ₃ SOLUTION <input checked="" type="checkbox"/> POTABLE WATER <input type="checkbox"/> NONE
EQUIPMENT USED FOR SAMPLING: <input checked="" type="checkbox"/> NONE, GRAB INTO BOTTLE <input checked="" type="checkbox"/> BOMB SAMPLER <input type="checkbox"/> PUMP TYPE: _____ _____ _____		

SEDIMENT INFORMATION DEPTH OF SEDIMENT SAMPLE: <u>0-1.5' BLS</u> QA SAMPLES COLLECTED AT THIS LOCATION? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO TYPE: _____ SAMPLE OBSERVATIONS: <input type="checkbox"/> ODOR _____ <input type="checkbox"/> COLOR _____ OTHER: _____ _____ _____	EQUIPMENT USED FOR COLLECTION: <input checked="" type="checkbox"/> GRAVITY CORER <input type="checkbox"/> S.S. SPLIT SPOON <input type="checkbox"/> DREDGE <input type="checkbox"/> HAND SPOON <input type="checkbox"/> S.S. BOWL <input type="checkbox"/> S.S. BUCKET <input type="checkbox"/> _____ _____ TYPE OF SAMPLE COLLECTED: <input checked="" type="checkbox"/> DISCRETE <input type="checkbox"/> COMPOSITE	DECONTAMINATION FLUIDS USED: <input checked="" type="checkbox"/> ISOPROPYL ALCOHOL <input checked="" type="checkbox"/> DEIONIZED WATER <input checked="" type="checkbox"/> ALCONOX <input type="checkbox"/> HNO ₃ SOLUTION <input checked="" type="checkbox"/> POTABLE WATER <input type="checkbox"/> NONE SEDIMENT TYPE: <input type="checkbox"/> CLAY <input type="checkbox"/> SILT <input type="checkbox"/> SAND <input type="checkbox"/> ORGANIC <input type="checkbox"/> GRAVEL COMMENTS: _____ _____ _____
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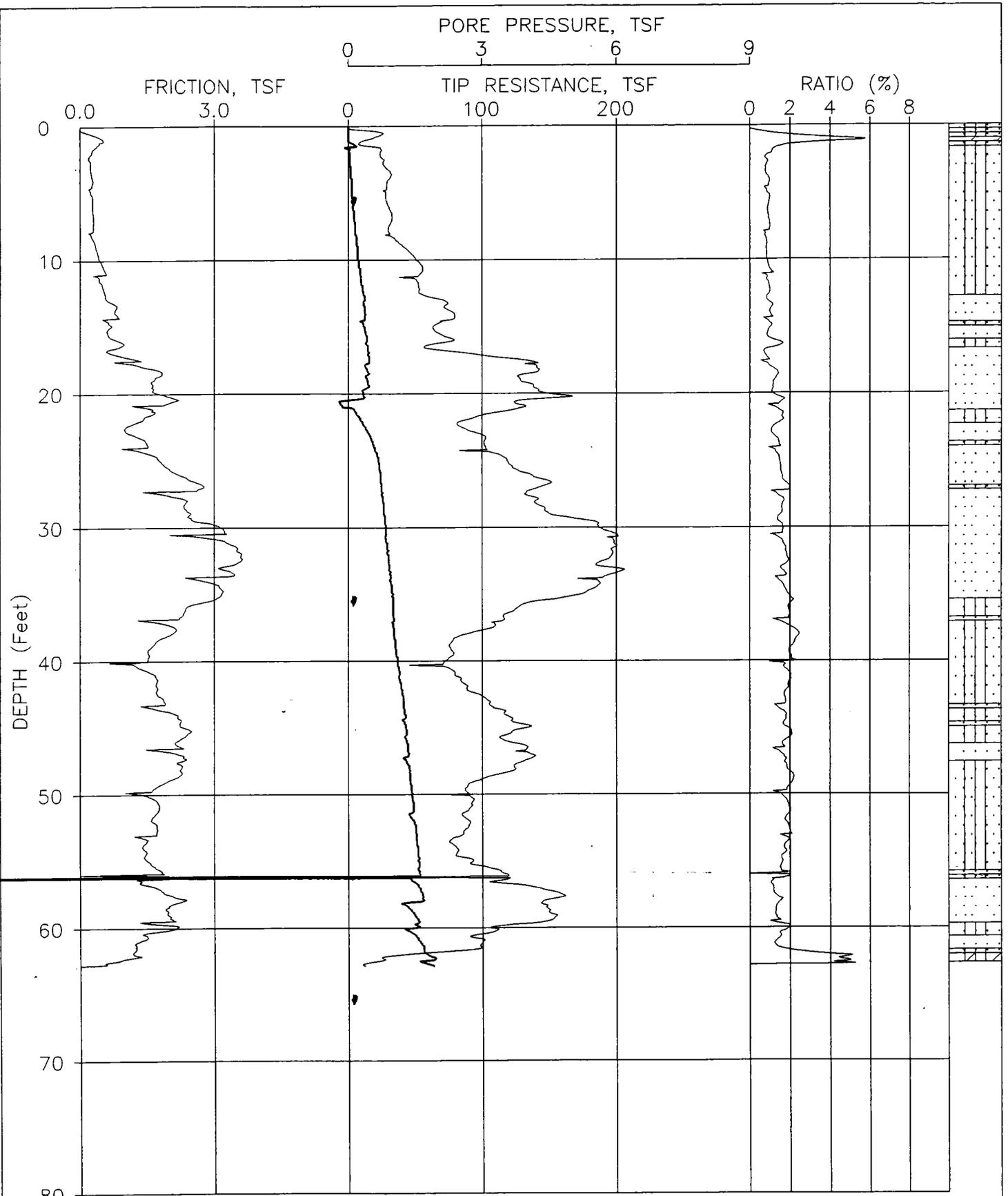
SAMPLES COLLECTED					
SURFACE WATER	SEDIMENT	PRESERVATIVE	VOLUME REQUIRED	SAMPLE BOTTLE ID'S	COMMENTS:
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<u>10-20 °C ICE</u>		<u>U4W04801</u>	
<input type="checkbox"/>	<input type="checkbox"/>	<u>"</u>		<u>U4W04802</u>	
<input type="checkbox"/>	<input type="checkbox"/>	<u>"</u>		<u>U4D04801</u>	
<input type="checkbox"/>	<input type="checkbox"/>				
<input type="checkbox"/>	<input type="checkbox"/>				

NOTES/SKETCH

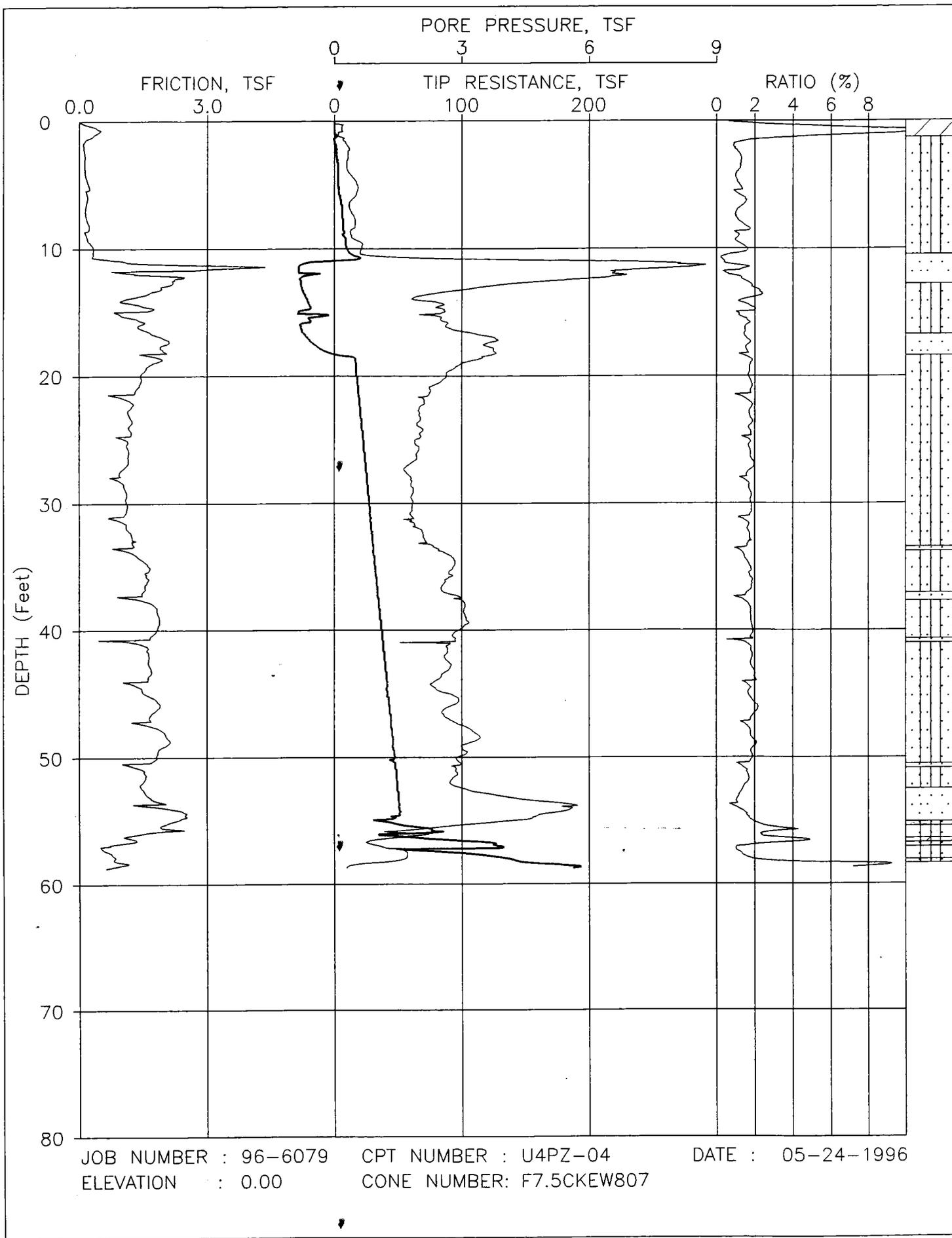
APPENDIX C
PIEZOCONE STRATIGRAPHIC LOGS

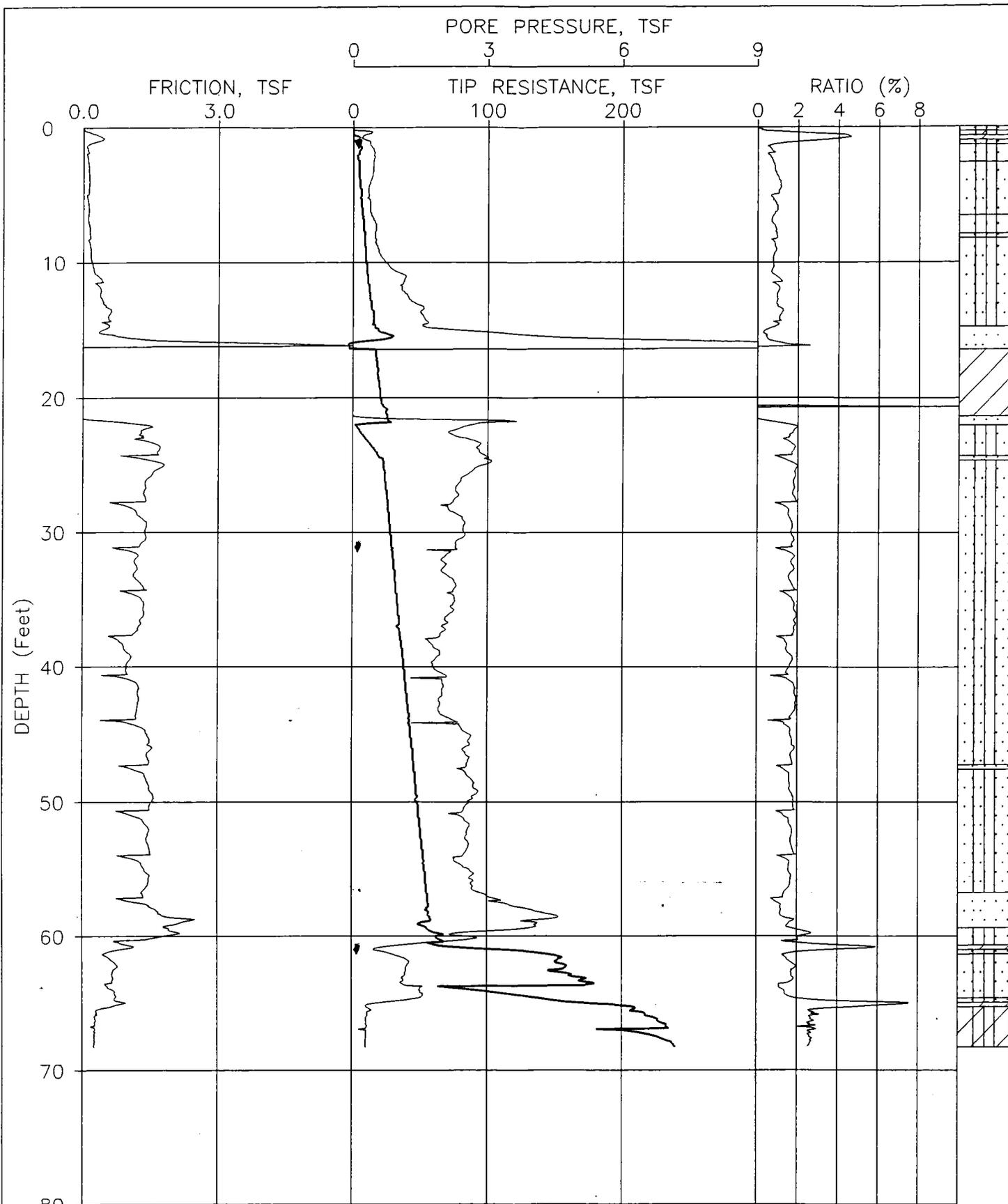


JOB NUMBER : 96-6079 CPT NUMBER : U4PZ-01 DATE : 05-21-1996
 ELEVATION : 0.00 CONE NUMBER: F7.5CKEW807



JOB NUMBER : 96-6087 CPT NUMBER : U4PZ-03 DATE : 05-20-1996
 ELEVATION : 0.00 CONE NUMBER: F7.5CKEW807





JOB NUMBER : 96-6079
 ELEVATION : 0.00

CPT NUMBER : U4PZ-10
 CONE NUMBER: F7.5CKEW807

DATE : 06-01-1996