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# MONITORING WELL INSTALLATION PLAN FOR FORMER HERBICIDE ORANGE SITE A

NCBC GULFPORT MS

8/1/1997

ABB ENVIRONMENTAL

# MONITORING WELL INSTALLATION PLAN
# FORMER HERBICIDE ORANGE SITE A

## NAVAL CONSTRUCTION BATTALION CENTER
## GULFPORT, MISSISSIPPI

## UNIT IDENTIFICATION CODE: N62604
## CONTRACT NO. N62467-89-D-0317/092

## AUGUST 1997

SOUTHERN DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
NORTH CHARLESTON, SOUTH CAROLINA
29419-9010

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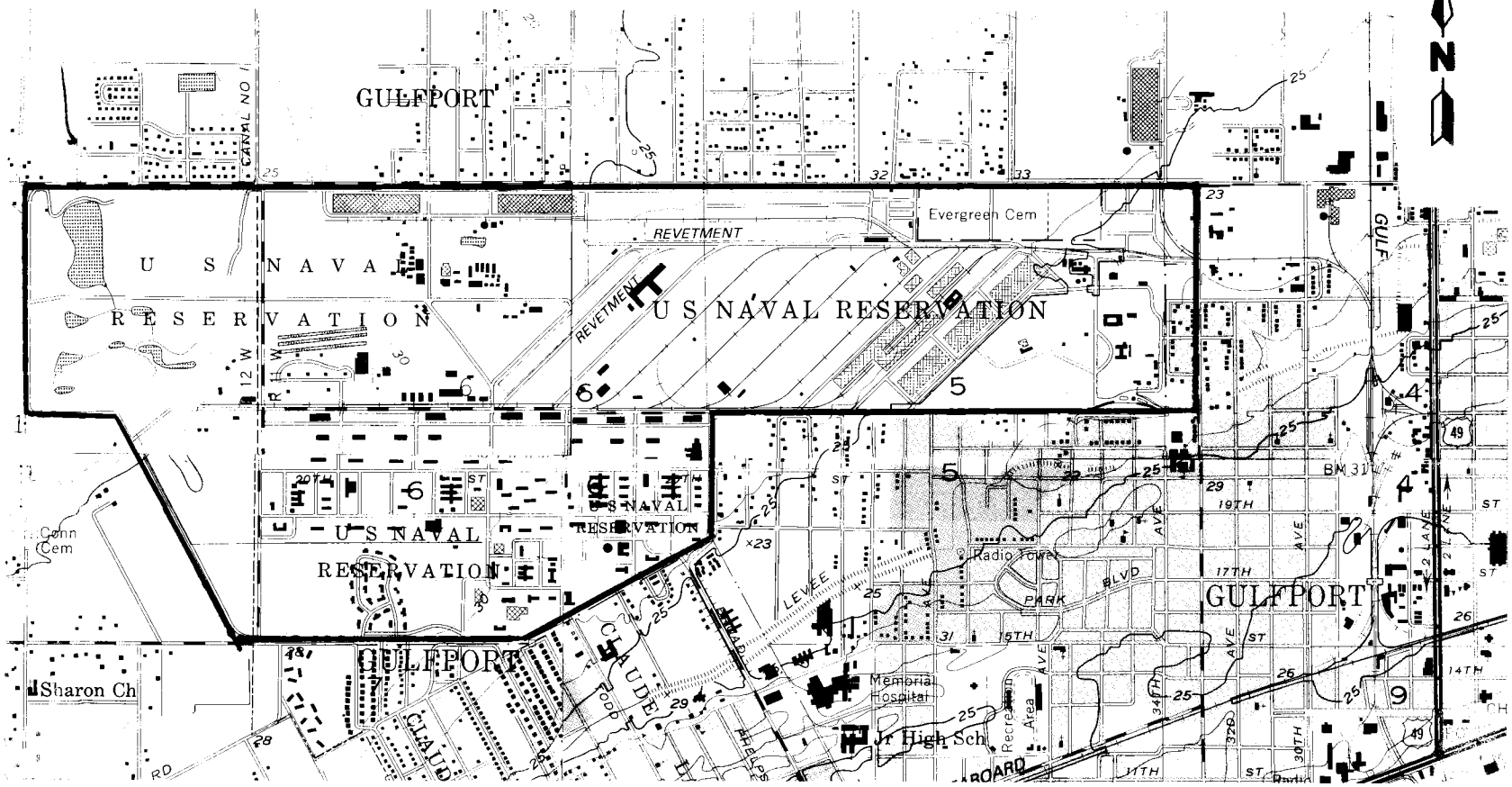


SOURCE: USGS 7.5 MINUTE TOPOGRAPHIC QUADRANGLES GULFPORT NW, GULFPORT NORTH, PASS CHRISTIAN, GULFPORT SOUTH MISSISSIPPI QUADS.

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**FIGURE 1-2**
**TOPOGRAPHIC MAP OF SITE VICINITY**

**MONITORING WELL INSTALLATION PLAN**

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C:\GULFPORT\WIP\FIG1-2/11-3-93

# NAVAL CONSTRUCTION BATTALION CENTER
# GULFPORT, MISSISSIPPI

# MONITORING WELL INSTALLATION PLAN
# FORMER HERBICIDE ORANGE SITE A

## CTO NO. 092

Contract No. N62467-89-D-0317

Prepared by:

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August 1997

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**Naval Construction Battalion Center**
**Gulfport, Mississippi**


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**Former Herbicide Orange Site A**
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## GLOSSARY

| | |
|---|---|
| ABB-ES | ABB Environmental Services, Inc. |
| CLP | Contract Laboratory Program |
| CLP-RAS | Contract Laboratory Program-Routine Analytical Services |
| DQO | data quality objective |
| GC | gas chromatograph |
| GMPP | Groundwater Monitoring Program Plan |
| HO | herbicide orange |
| ID | inside diameter |
| MS | mass spectroscopy |
| MSDEQ | Mississippi Department of Environmental Quality |
| A | Monitoring Well Installation Plan |
| NCBC | Naval Construction Battalion Center |
| NEESA | Naval Energy and Environmental Support Activity |
| OD | outside diameter |
| PAH | polynuclear aromatic hydrocarbons |
| PARCC | precision, accuracy, representativeness, completeness, and comparability |
| ppb | part per billion |
| ppt | part per trillion |
| QA/QC | quality assurance/quality control |
| RCRA | Resource Conservation and Recovery Act |
| RD&D | research, development, and demonstration |
| RI/FS | remedial investigation/feasibility study |
| SOP | standard operating procedure |
| SOUTHNAV-FACENGCOM | Southern Division, Naval Facilities Engineering Command |
| TCDD | 2,3,7,8-tetrachlorodibenzo-*p*-dioxin |
| TOC | total organic carbon |
| USAF | U.S. Air Force |
| USEPA | U.S. Environmental Protection Agency |

# 1.0 INTRODUCTION

1.1 PURPOSE. ABB Environmental Services, Inc., (ABB-ES) under contract to Southern Division, Naval Facilities Engineering Command (SOUTHNAVFACENGCOM), has prepared this Monitoring Well Installation Plan (MWIP) for the area where incinerator ash is stored on the former Herbicide Orange (HO) Site A at the Naval Construction Battalion Center (NCBC) in Gulfport, Mississippi. SOUTHNAVFACENGCOM requested the development of this MWIP to facilitate site groundwater characterization and supplement the on-going delisting process at a portion of HO Site A.

This MWIP supplements the Versar Sampling and Analysis Plan (SAP)(Versar, 1991) and responds to U.S. Environmental Protection Agency (USEPA) comments on the SAP (USEPA, 1992). This plan presents the technical approach to monitoring well placement and installation. A section presenting the analytical program is included as an extension of the objectives of monitoring well installation.

## 1.2 FACILITY INFORMATION.

1.2.1 Location and Description NCBC is located in the western part of Gulfport, Mississippi, in the southeastern part of the State in Harrison County and approximately two miles north of the Gulf of Mexico (Figure 1-1). NCBC occupies approximately 1,100 acres and has an elevation averaging approximately 30 feet above sea level (Figure 1-2). Surface soils are primarily sand to sandy loam with minor clays. The water table at the former HO storage area ranges from 3 to 10 feet below land surface (Dames and Moore, 1990).

The former HO storage areas A, B, and C, where approximately 850,000 gallons of HO were stored, cover approximately 32 acres of flat land at NCBC (Figure 1-3). Storage Area A, covering approximately 12 acres, shall be referred to as Site A for the purpose of this report. Site A contains numerous ash piles produced during the incineration of soils contaminated with 2,3,7,8-Tetrachlorodibenzo-*p*-dioxin (TCDD). The storage Site C surface was stabilized with a soil/Portland cement mixture approximately 30 years ago to provide a hardened surface for heavy equipment operation and storage.

1.2.2 Site History In 1980, the Air Force Surgeon General issued a protocol to return HO-contaminated sites to full use. During 1984, the former storage area (Site A, Site B, and Site C) was initially characterized for contamination of TCDD. In 1986, additional contamination within the storage areas was discovered and characterized. This characterization entailed subdividing all areas where HO was known to have been stored on the Base into 20-foot by 20-foot grids and collecting composite samples from each grid. Several investigations of the former storage area indicated that an area of approximately 2 to 4 acres was contaminated with HO and TCDD and that nearly all soil samples collected in the storage area during previous sampling programs had TCDD levels in excess of 1 part per billion (ppb) (HAZWRAP, 1991).

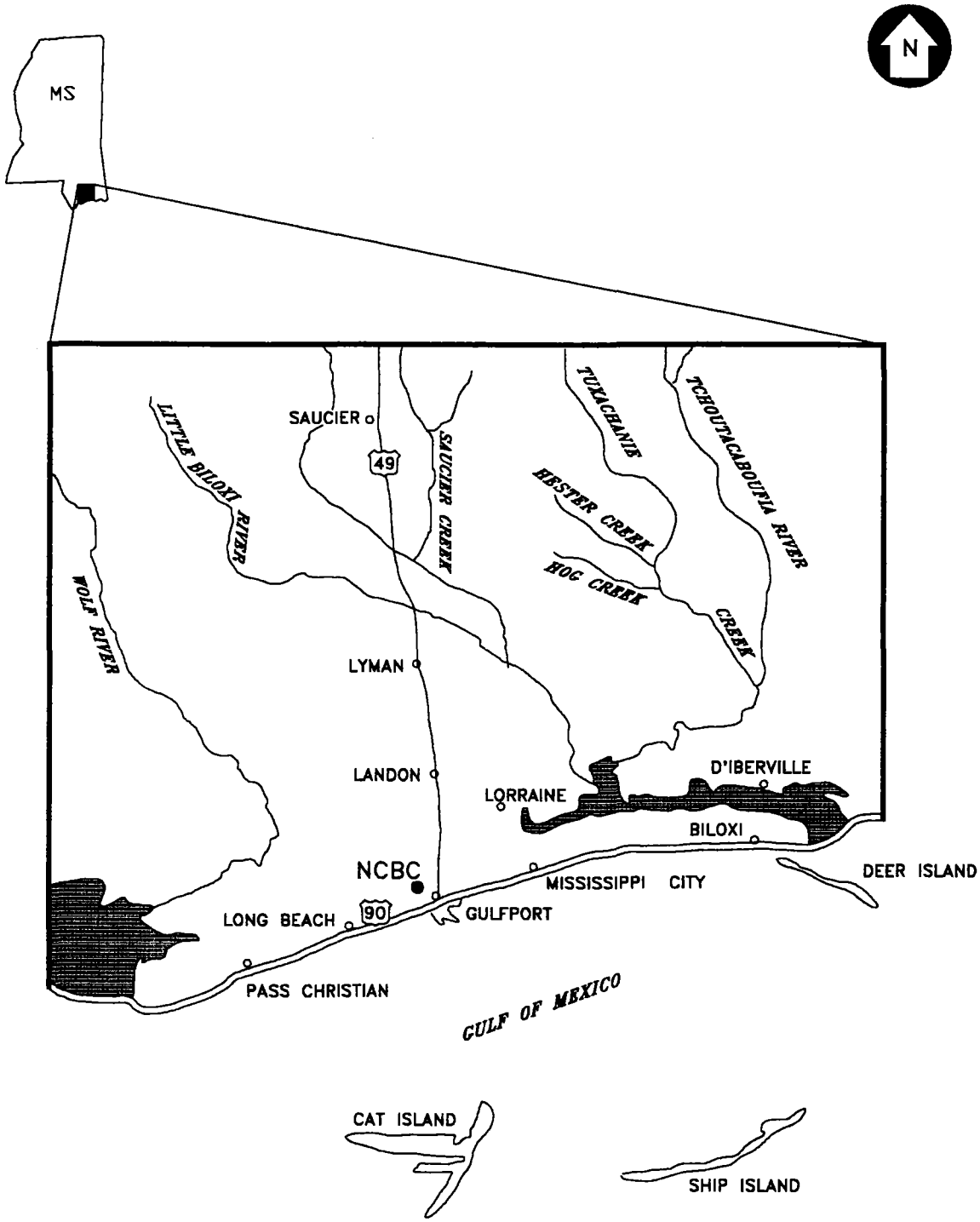


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**FIGURE 1-1**

**FACILITY LOCATION**

**MONITORING WELL INSTALLATION PLAN**

**NCBC GULFPORT**
**GULFPORT, MISSISSIPPI**

C:\GULFPORT\WIP\FIG1-1/11-3-93

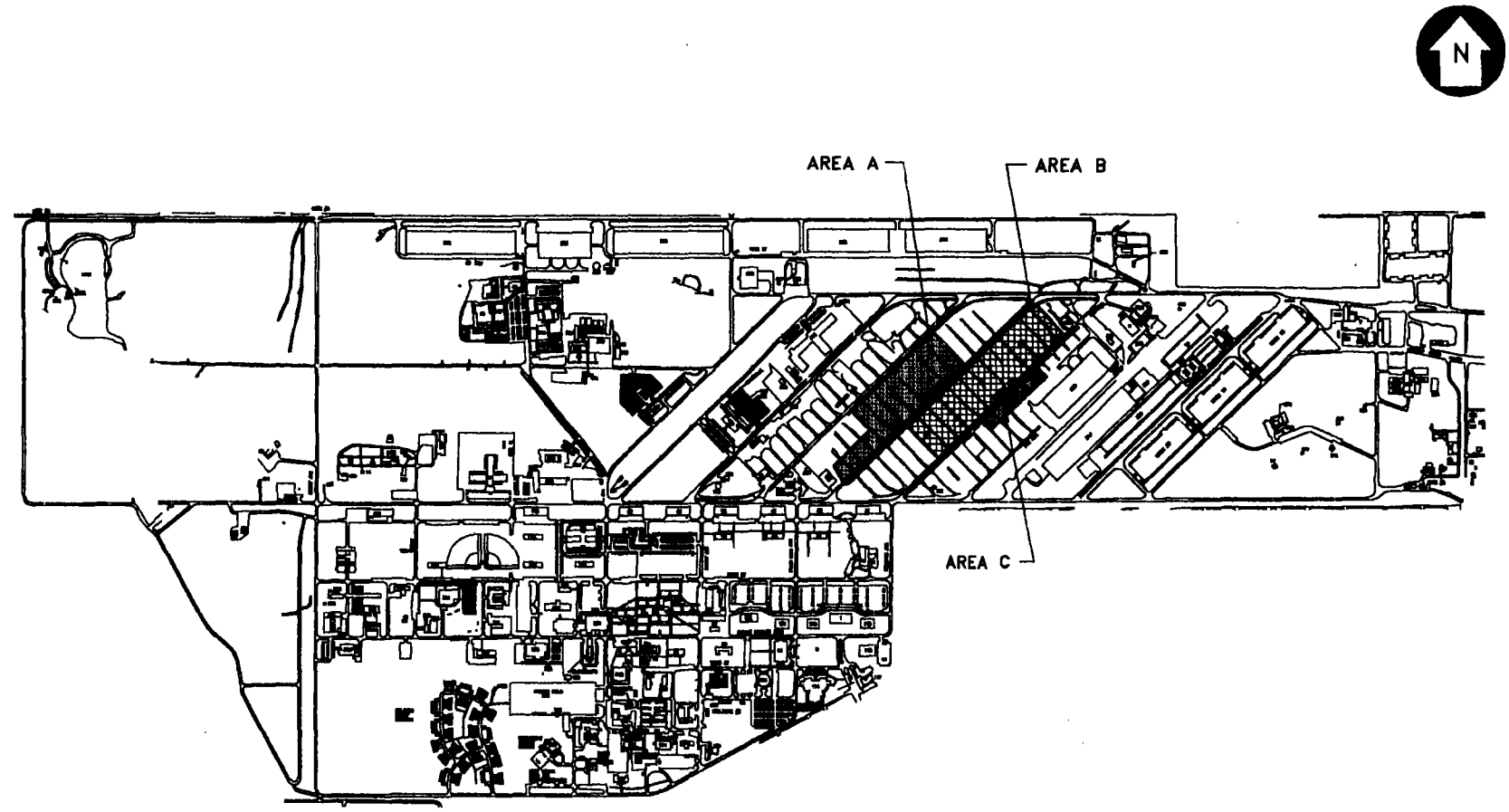


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**FIGURE 1-3**
**LOCATION OF FORMER HO STORAGE AREAS**

**MONITORING WELL INSTALLATION PLAN**

**NCBC GULFPORT**
**GULFPORT, MISSISSIPPI**

C:\GULFPORT\WIP\FIG1-3/1-14-94

The United States Air Force (USAF) obtained a Research, Development, and Demonstration (RD&D) permit from U.S. Environmental Protection Agency (USEPA) Region IV in July 1986 to operate an incinerator at the Base to incinerate the TCDD-contaminated soils. Following a successful Verification Burn in 1986 and continuing through 1988, full-scale incineration of approximately 30,000 cubic yards of soil contaminated with TCDD was performed. Analytical tests performed on the resulting ash showed that the TCDD concentrations were below 0.449 part per trillion (ppt). The test results were submitted in a petition for final exclusion of the incinerator residues in November 1988. Based on the ash test results, the Air Force determined and the permit application stated that the treated soils could be returned to selected areas within Site A (Versar, 1990). The contaminated soils were originally classified as F027 Contaminated Soils. Incinerating the soil changed the classification to F028 Residues.

The ash currently exists at Site A in numerous small piles (Figure 1-4). No liners, covers, or protective barriers have been placed beneath the ash. In the late 1970s, the USAF Occupational and Environmental Health Laboratory conducted studies that determined that dioxin was slowly migrating off site in sediment particles via drainage ditches (EG&G, 1991). A groundwater monitoring plan for Site A was developed by Versar in 1990, but it has not been implemented (Versar, 1990). In order to return the site to active use, the Air Force must demonstrate that the site is not contaminated. The objectives of this investigation are to sample the residual ash at Site A and to determine whether the groundwater has been affected. This MWIP outlines the technical approach to assess possible groundwater contamination. Results will be incorporated into an Addendum Report for submittal to USEPA and the Mississippi Department of Environmental Quality (MSDEQ) to support delisting the ash at Site A, former HO Storage Area.

1.3 OVERVIEW OF MONITORING WELL INSTALLATION PLAN. This monitoring well installation plan (MWIP) presents the technical approach to monitoring well installation at Site A. A section pertaining to the groundwater analytical program is presented only to further explain the objectives of the MWIP. The results of the groundwater analytical program will be used to assess if there is any groundwater contaminated with TCDD.

The work will be implemented in accordance with the USEPA Region IV, MSDEQ requirements, and the provisions of SOUTHNAVFACENGCOM Contract No. N62467-89-D-0317 including all referenced Federal Acquisition Regulations and Defense Federal Acquisition Regulations.

The field program will consist of the installation of six (6) shallow stainless-steel monitoring wells and a quarterly sampling program that will commence thirty (30) days following well completion and development.

The technical approach to monitoring well installation is discussed in Section 2.0. Section 3.0 presents the objectives of the groundwater sampling effort, the analytical program, and a note on the fate of TCDD in soil and groundwater.

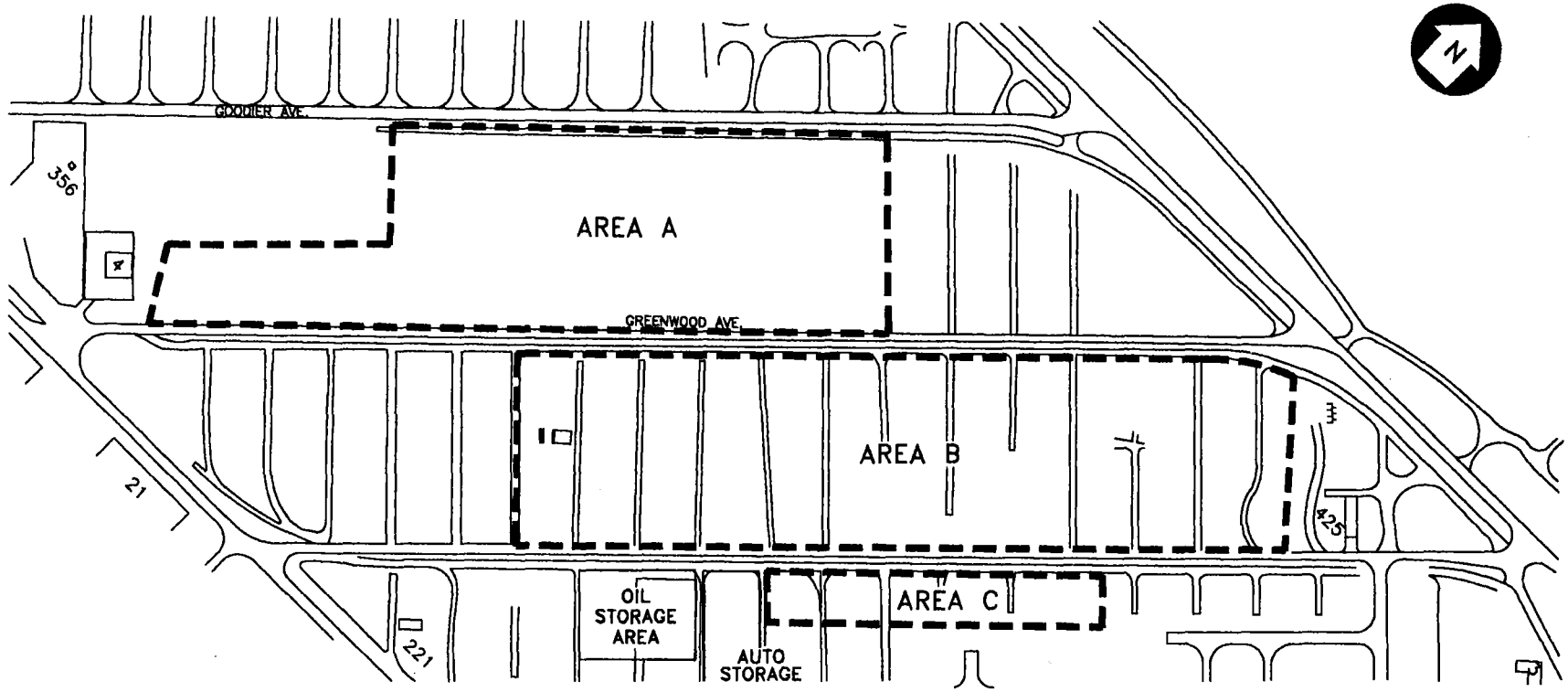


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**FIGURE 1-4**

**SITE MAP**

**MONITORING WELL INSTALLATION PLAN**

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**GULFPORT, MISSISSIPPI**

C:\GULFPORT\WIP\FIG1-4/1-14-94

## 2.0 TECHNICAL APPROACH TO MONITORING WELL INSTALLATION

2.1 OBJECTIVES OF MONITORING WELL INSTALLATION. The objectives of the monitoring well installation plan are as follows:

- determine the groundwater flow direction in the surficial aquifer and establish a hydraulic gradient across the site,
- establish downgradient water quality for the site in the surficial aquifer,
- establish upgradient water quality for the site in the surficial aquifer, and
- provide for the quarterly monitoring of the surficial aquifer beneath Site A and the potential for long-term monitoring, should it become necessary.

Regional groundwater flow is to the south-southeast toward the Gulf of Mexico. However, localized groundwater flow at other areas of the Base has been found to vary significantly (ABB-ES, 1993). Since the localized flow at Site A is unknown, the general approach to determine flow direction is to install the wells around the perimeter of the site. An interim well top elevation survey and round of water level measurements will be performed on the first three wells installed to evaluate local groundwater flow and optimize placement of the remaining monitoring wells. The approximate locations of wells planned to achieve these objectives is presented in Figure 2-1. As shown in this figure, two wells each will be installed north and south of the site, and one well will be placed on either end of the site.

2.2 MONITORING WELL DESIGN. The design of the monitoring wells includes the use of 2-inch ID stainless steel casing and 2-inch ID wire-wrapped screen 10-foot in length (Figure 2-2). The screened portion of the monitoring wells will intersect the water table to enable sampling of the surficial aquifer.

The wells will be completed above grade with locking stainless-steel protective casing and four bumper posts where traffic is not a concern. Should traffic be a consideration, flush-mounted wells with locking well vaults and traffic-bearing vault covers will be installed. All above-grade wells will have identification tags on the steel protective casing and inserted into the concrete pad. For flush-mounted grade wells, the identification tags will be on the inside of the well vault casing and inserted into the concrete pad. The information necessary for a completed identification tag includes (SOUTHNAVFACENGCOM, 1989):

- well identification number,
- project number and name,
- date of installation,
- name of drilling company (including license number),
- depth to bottom of well,
- inside diameter of well casing,

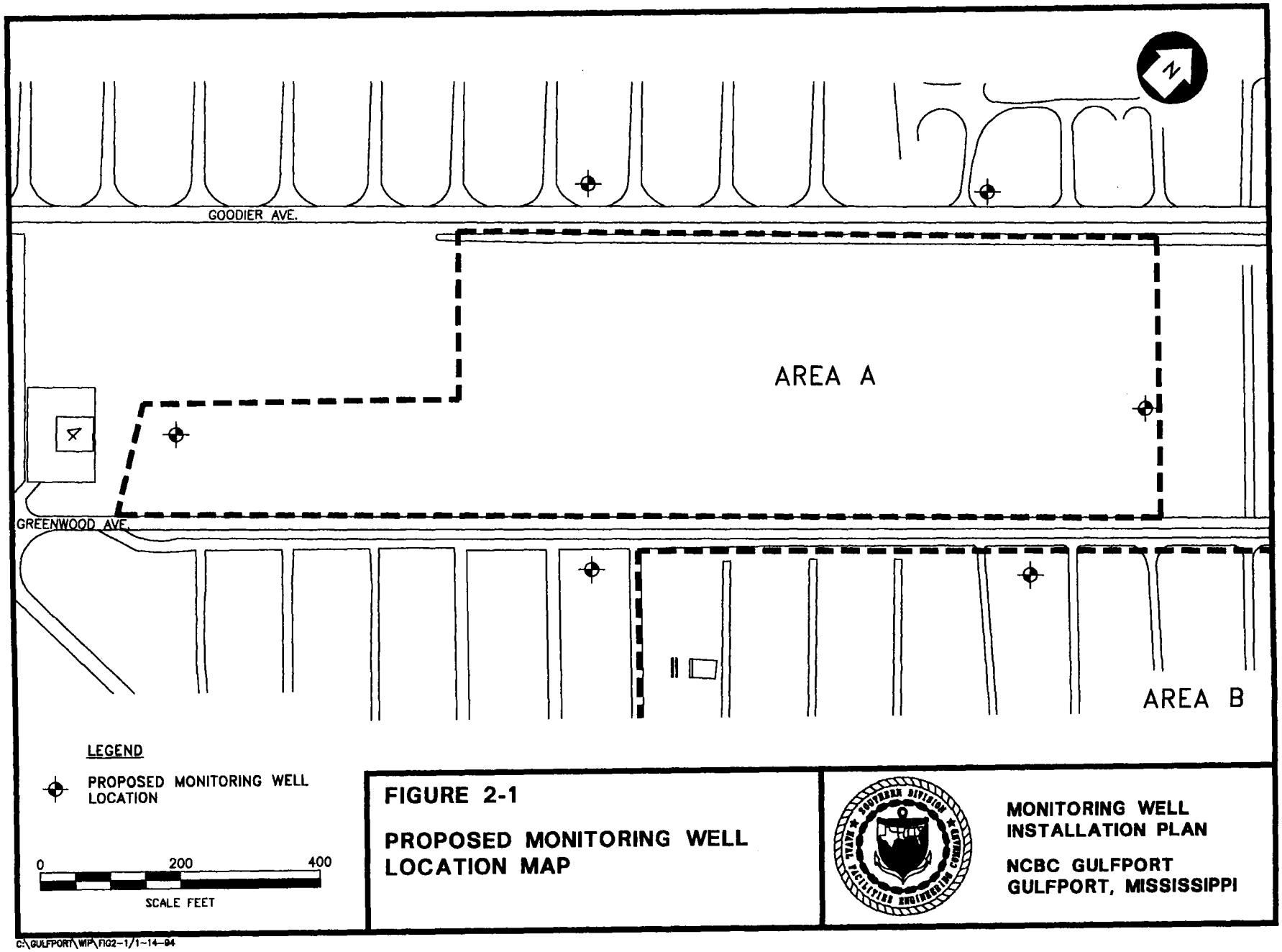



**FIGURE 2-1**

**PROPOSED MONITORING WELL LOCATION MAP**

C:\GULFPORT\WIP\FIG2-1/1-14-94

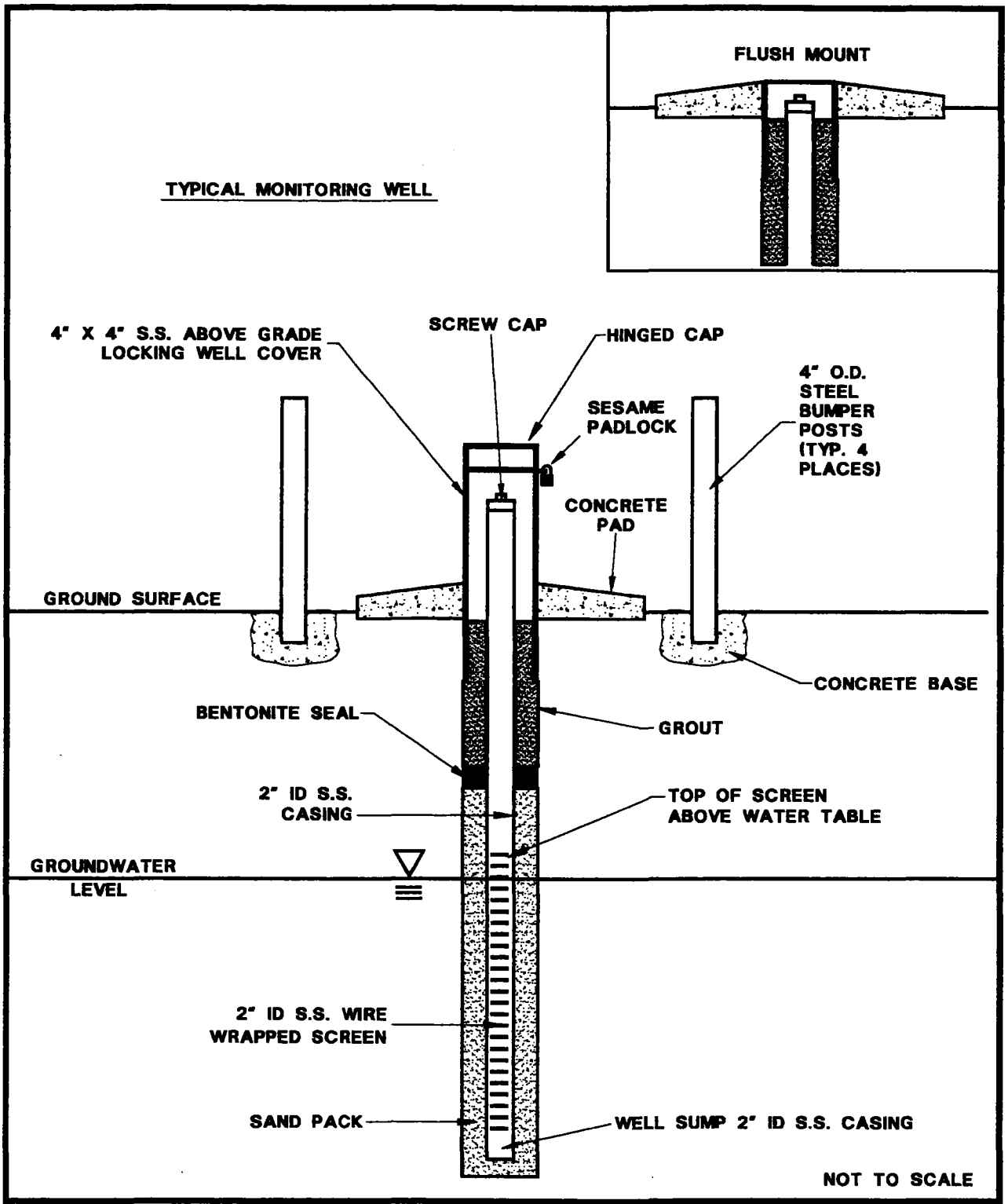



**FIGURE 2-2**

**TYPICAL MONITORING WELL ILLUSTRATION**

**MONITORING WELL INSTALLATION PLAN**

**NCBC GULFPORT GULFPORT, MISSISSIPPI**

C:\GULFPORT\MWP\FIG2-2/11-3-93

- length of sump,
- length of screen,
- length of riser casing, and
- top of casing and/or ground elevation (if known).

2.3 MONITORING WELL INSTALLATION PROCEDURES. The unconsolidated zone will be drilled by a 8.25-inch outside diameter (OD) hollow-stem augers, and 2-inch inner diameter (ID) stainless steel wells will be installed. Since no deep well installations are included in this effort, surface casings will not be required. Continuous split-spoon samples will be collected for descriptive purposes only. Two shelby tube samples will be collected near the water table in two wells and sent to a geotechnical laboratory for grain-size analysis and total organic carbon (TOC).

Drilling, lithologic description, and monitoring well construction will be supervised by a geologist or hydrogeologist. Decisions on exact well locations, depths, screened intervals, and all other construction details will be made by the geologist as drilling progresses. The monitoring wells will be screened across the water table. The screen will extend one to two feet above the water table to accommodate seasonal fluctuations. The remainder of the 10-foot screen will extend below the water table.

Monitoring well casing will be constructed of flush-threaded, 2-inch ID Schedule 5, stainless steel (Type 304). The well screen will be 2-inch ID, stainless steel (Type 304), with 0.010-inch slots (10-slot) and will be 10 feet long. The monitoring wells will be completed in the surficial aquifer above the first clay confining unit. The surficial aquifer extends to approximately 24 feet below land surface (Versar, 1990).

Casing will be lowered into each well bore prior to the removal of the augers in order to minimize caving and flowing of the formation. The augers will be removed in conjunction with the installation of the filter pack to ensure an effective placement in the annular space around the wells. The filter pack will consist of organic-free, precleaned quartz sand. The filter pack will extend a minimum of one foot above and below the screen. A one-foot bentonite seal will be placed above the filter pack and allowed to hydrate sufficiently to prevent grout invasion of the filter pack before the remaining annular space is grouted to the surface.

The well casing will extend approximately 2.5 feet above ground level. A locking protective casing made of stainless steel will provide protection for the well riser. Corrosion resistant, keyed-alike locks shall be used because of the highly corrosive atmosphere associated with the Gulf of Mexico.

The monitoring wells will be developed prior to sampling (after the grout has set for a minimum of 24 hours) to remove fine-grained sediments, improve the hydraulic connection with natural soils, and to obtain a representative groundwater sample. The wells will be developed using a pneumatic surge pump or a gasoline-powered diaphragm pump, or both.

2.4 MONITORING WELL INSTALLATION DOCUMENTATION. When drilling in soil or unconsolidated deposits, a geologic log will be kept on a standard field boring

log form (Figure 2-3). When a well is completed, well installation and construction forms (Figure 2-4 and 2-5) will be completed. All well details will be documented as specified in the SOUTHNAVFACENGCOM guidelines for groundwater monitoring well installation (SOUTHNAVFACENGCOM, 1989).

2.5 FIELD DECONTAMINATION. Decontamination of equipment and personnel will follow USEPA's Standard Operating Procedures (SOPs) (USEPA, 1991a). A decontamination area will be set up adjacent to the Support Zone for personnel exiting the site area, and a decontamination pad will be constructed near the Support Zone for drilling equipment. The rig and all tools will be decontaminated on the pad between each well completion. The rig will be steamcleaned while the tools will be decontaminated following the decontamination procedure for the sampling equipment.

In general, all reusable sampling equipment will be decontaminated before and between use as follows:

- non-phosphate detergent wash
- tap water rinse
- laboratory-pure water rinse
- solvent rinse (pesticide-grade isopropanol), twice
- organic-free water rinse

After air drying, sampling equipment will be wrapped in aluminum foil, shiny side out, for storage.

2.6 MANAGEMENT OF INVESTIGATION DERIVED WASTES. The field activities associated with this investigation will produce waste that will require special handling and disposal. The waste will include drilling spoils, development water, and decontamination fluids. Approximately six drums of soil and 28 drums of fluid are expected to be produced during the drilling and sampling events. Possible disposal scenarios and waste characterization are discussed in the "Addendum to Versar Sampling and Analysis Plan."

Figure 2-3 Field Boring Log Form

| FIELD BORING LOG | | | | BORING NO.: | |
|---|---|---|---|---|---|
| PROJECT NO.: | | PROJECT NAME: | | | PAGE OF |
| DRILLING CONTRACTOR: | | DRILLER: | | DATE STARTED: | COMPLETED: |
| METHOD: | CASING SIZE: | TIP eV: | | PROTECTION LEVEL: | |
| GROUND ELEV.: | SOIL DRILLED: | WATER LEVEL: | | TOTAL DEPTH: | |
| LOGGED BY: | CHECKED BY: | | | DATE: | |

| SAMPLE NO. | DEPTH IN FEET | BLOWS PER 6-INCHES | PEN. / REC. | DESCRIPTION | LAB | FIELD SCREENING | | MONITORING | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | GC | UV\IR | FID | LEL |
| | | | | | | | | | |

Figure 2-4 Monitoring Well Construction Log Form

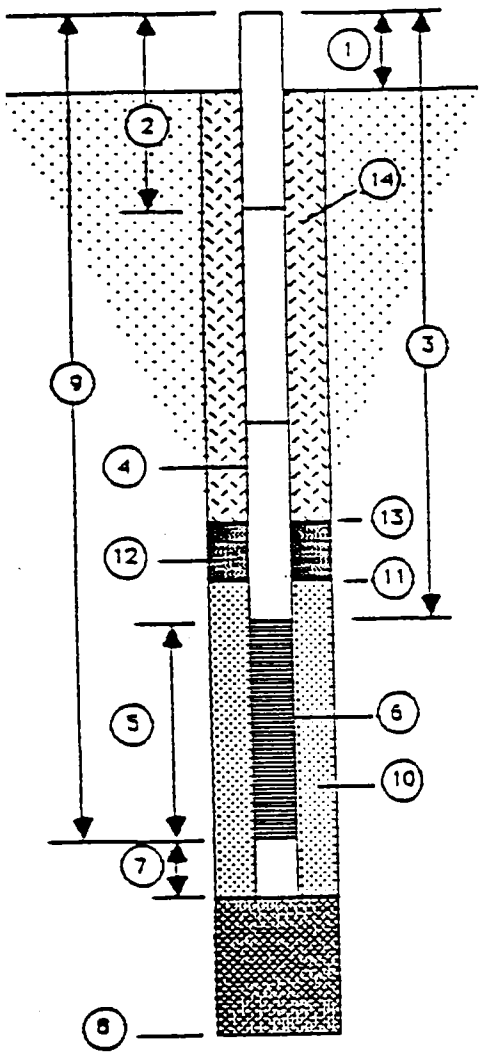
| | | | |
|---|---|---|---|
| TITLE: SAMPLE | | LOG of WELL: | BORING NO. |
| CLIENT: | | | PROJECT NO: 7583-52 |
| CONTRACTOR: Ground Water Protection | | DATE STARTED: 08/14/93 | COMPLTD: 08/14/93 |
| METHOD: HSA | CASE SIZE: 2" | BORING DIA.: 8.75" | PROTECTION LEVEL: D |
| TOC ELEV.: NA FT. | MONITOR INST.: OVA | TOT DPTH: 12.0FT. | DPTH TO ∇ 2.58 FT. |
| LOGGED BY: R. Fisher | WELL DEVELOPMENT DATE: 8/21/93 | | SITE: BUILDING 864 RIB 2 |

| DEPTH FT. | LABORATORY SAMPLE ID | SAMPLE | RECOVERY | HEADSPACE (ppm) | SOIL/ROCK DESCRIPTION AND COMMENTS | LITHOLOGIC SYMBOL | SOIL CLASS | |
|---|---|---|---|---|---|---|---|---|
| | | | | 0 | Silty sand, dark brown | | SM | |
| | | | | | Silty sand, light brown | | | |
| | | | | 0 | | | | |
| 5 | | | 12" | 0 | Silty sand, gray with red weathered zones | | | 5,9,8,10 |
| 10 | | | 10" | 0 | Silty clay, gray | | CL | 4,5,9,9 |
| | | | | | total depth = 12.0 ft. | | | |
| 15 | | | | | | | | |
| 20 | | | | | | | | |

PAGE 1 of 864-03 ABB ENVIRONMENTAL SERVICES, INC.

Figure 2-5 Well Construction Detail Form - SOUTHNAVFACENGCOM Guidelines for Monitoring Well Installation

DEPARTMENT OF THE NAVY
SOUTHERN DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
2155 EAGLE DRIVE, P. O. Box 190010
NORTH CHARLESTON, S.C. 29419-9010




**WELL CONSTRUCTION DETAILS**

**WELL NUMBER** _____

**DATE OF INSTALLATION** _____

1. **Height of Casing Above Ground** _____
2. **Depth to first Coupling** _____

   **Coupling Interval Depths** _____

   _____
3. **Total Length of Blank Pipe** _____
4. **Type of Blank Pipe** _____
5. **Length of Screen** _____
6. **Type of Screen** _____
7. **Length of Sump** _____
8. **Total Depth of Boring** _____ **Hole Diameter** _____
9. **Depth to Bottom of Screen** _____
10. **Type of Screen Filter** _____

    **Quantity Used** _____ **Size** _____ **U/C** _____
11. **Depth to Top of Filter** _____
12. **Type of Seal** _____

    **Quantity Used** _____
13. **Depth to Top of Seal** _____
14. **Type of Grout** _____

    **Grout Mixture** _____

    **Method of Placement** _____

**COMMENTS ON INSTALLATION:**

## 3.0 SAMPLING OF MONITORING WELLS

3.1 OBJECTIVES OF GROUNDWATER SAMPLING. In general, the mechanics of groundwater sampling will be executed as directed in the Versar "Work Plan." Sampling will occur at quarterly intervals for the duration of one year. The overall objectives of the "Groundwater Monitoring Program Plan" (GMPP) outlined in the Versar "Work Plan" (Versar, 1990) include:

- assess the possibility that contaminated groundwater may be discharging from the site by establishing downgradient water quality for the site in the surficial aquifer,
- establish upgradient water quality for the site in the surficial aquifer, and
- provide for the quarterly monitoring of the surficial aquifer and the potential for long-term monitoring, should it become necessary.

The following sections are provided to clarify quality control issues that were omitted from the Versar plan.

3.2 ANALYTICAL PROGRAM. Thirty days after the installation and development of the monitoring wells, the first of four quarterly sampling events will commence. Each sample will be analyzed for RCRA Appendix IX parameters, polynuclear aromatic hydrocarbons (PAHs), and low level dioxins and furans (Method 8290). Table 3-1 is a summary of the groundwater sampling and analysis program.

**Table 3-1**
**Sample Containers, Sample Size and Preservation Methods for Water Samples**

Monitoring Well Installation Plan
Former Herbicide Orange Site A
Naval Construction Battalion Center
Gulfport, Mississippi

| Parameter | Container | Sample Size[1] | Preservation |
|---|---|---|---|
| Dioxins and furans | Glass | 2 1-liter | Cool ≤4°C |
| Polynuclear aromatic hydrocarbons | Glass | 1 1-liter | Cool ≤4°C |
| Herbicides | Glass | 1 1-liter | Cool ≤4°C |
| Volatile organic compounds | Glass | 2 40-ml | Cool ≤4°C |
| Semivolatile organic compounds | Glass | 2 1-liter | Cool ≤4°C |
| Pesticides/polychlorinated biphenyls | Glass | 2 1-liter | Cool ≤4°C |
| Total metals | Plastic | 1 1-liter | pH ≤2.0 $HNO_3$<br>Cool ≤4°C |

[1]The actual sample size may vary, depending on the laboratory's requirements.

Note: $HNO_3$ = nitric acid.

3.2.1 Quality Assurance/Quality Control Proper sampling and collection protocols as well as Quality Assurance/Quality Control (QA/QC) samples will be collected in accordance with USEPA Region IV SOPs (USEPA, 1991a). Rinsates and field blanks will be collected daily. One duplicate and one matrix spike/matrix spike duplicate will be collected during each sampling event. A more extensive description of the groundwater sampling program is contained in the GMPP (Versar, 1990).

3.2.2 Data Quality Objectives Data quality objectives (DQOs) refer to the standards for analytical precision, accuracy, representativeness, completeness, and comparability (PARCC). Five DQO levels have been defined by the USEPA: Level 1, Field Screening; Level II, Field Analysis; Level III, Laboratory Analysis; Level IV, Contract Laboratory Program-Routine Analytical Services (CLP-RAS); and Level V, Nonconventional Parameter Analysis (USEPA, 1987).

The Naval Energy and Environmental Support Activity (NEESA) has adopted three of these levels as QA requirements, Levels C, D, and E, that correspond with USEPA Levels III, IV, and V (NEESA, 1988). The following gives a brief description of all five USEPA DQO levels.

Level I, Field Screening Field screening provides rapid real-time results that can be used to determine optimal placement of sampling locations and for health and safety support. Data that are generated will provide information concerning the presence or absence of certain constituents or groups of constituents. The data are generally qualitative rather than quantitative.

Level I sampling requirements include the use of equipment and sampling containers that are clean (soap and tap water), visibly free of contamination, and free of analytes detectable by the screening method employed (USEPA, 1987).

Level II, Field Analysis Field analysis includes the use of more sophisticated analytical instruments in the field, including on-site gas chromatographs (GCs) and mobile laboratories. The data that are generated may be both qualitative and quantitative, but the degree of QA/QC achievable may be more variable than with laboratory analysis.

Level II sampling and equipment requirements include the use of sampling equipment that is constructed of material that is compatible with the parameters being analyzed and field-cleaning procedures that include a potable water and soap scrub followed by a potable water rinse (or steam cleaning or high pressure washing). A minimum of 5 percent of samples collected for DQO Level II analysis should be split for DQO Level IV analysis. Level IV DQOs may not be attainable for analyses other than those performed using USEPA CLP methods. These samples must be representative of all samples that are analyzed in the field (USEPA, 1991a).

Level III, Laboratory Analysis Laboratory analytical data are generated using USEPA-approved methods to achieve a level of confidence set by specified QA/QC protocols. Level III DQOs are appropriate for data collected for most activities including site characterization (i.e., qualitative and quantitative identification of contaminants and contaminant source[s] and extent of migration) and treatability studies. This level corresponds to NEESA Level C.

Level III field methods, decontamination procedures, and sampling equipment construction materials are specified in the *USEPA Standard Operating Procedures and Quality Assurance Manual* (USEPA Standard Operating Procedures [USEPA, 1991a]). Cleaning of down-hole drilling or excavation equipment must be performed as with Level IV requirements with the exclusion of the deionized water rinse, the double rinse with pesticide-grade isopropanol, and the rinse with organic-free water. All other cleaning and decontamination guidance must be followed.

When wells are constructed using materials that are not inert with respect to the contaminants being analyzed, data that are collected from those wells are DQO Level III or lower for those incompatible analytes, even if DQO Level IV analytical procedures are used.

A minimum of 5 percent of samples that are collected for DQO Level III analysis using CLP methods should be split for DQO Level IV analysis. These samples must be representative of all samples submitted for Level III analysis (USEPA, 1991a). Level IV DQOs may not be achievable for analyses that are other than CLP.

Level IV, Contract Laboratory Program (CLP) Level IV DQOs are the most stringent and are defined as data that are collected in accordance with USEPA SOPs (USEPA, 1991a) and analyzed in accordance with the USEPA CLP (USEPA, 1991b; 1991c). Data that are collected for characterization and confirmation during an Remedial Investigation/Feasibility Study (RI/FS), during remedial action, for compliance monitoring, or for enforcement often require Level IV for DQOs. This level corresponds to NEESA Level D.

Level V, Nonconventional Parameter Analysis Individual site or remedial design characteristics may require the analysis of contaminants or conditions for which USEPA-approved methods do not exist; these fall into the category of nonconventional parameter analyses. The Level V DQOs that are associated with these types of analyses must, by definition, be defined on an individual basis. The DQOs that are identified will be dependent on the specific collection method, decontamination procedures, and analyses to be used. This level corresponds with NEESA Level E.

Laboratory Data Validation Laboratory data must be validated and assessed to determine the validity of the data and to ensure that DQOs are met. Sample results are validated through comparison to analytical requirements and QA/QC data to assure that analytical results fall within acceptable accuracy and precision confidence limits and to eliminate, correct, or flag matrix and other interference effects. Validated data are summarized and organized into formats that facilitate evaluation. Data evaluation includes site characterization and analysis of contaminants, contaminant distribution, and transport, fate, and risk assessment.

Upon receipt, analytical data are systematically validated in conformance with USEPA *Functional Guidelines for Evaluating Organic Analyses* (USEPA, 1991d) and *Functional Guidelines for Evaluating Inorganic Analyses* (USEPA, 1991e). These guidelines provide a systematic procedure for evaluating laboratory QA/QC measures such as holding times, blank analyses, surrogate recoveries, matrix spike results, GC/mass spectrometry (MS) tuning, instrument calibration, compound identification, and method performance.

Validated data will be prepared in three initial formats: raw laboratory data, data marked with validation qualifiers or annotations, and corrected or validated data. The validated data can then be used for site contaminant characterization and assessment.

3.3 CALCULATION OF PRECISION, ACCURACY, REPRESENTATIVENESS, COMPLETENESS, AND COMPARABILITY (PARCC) PARAMETERS. PARCC parameters will be evaluated during validation of laboratory analytical results.

The acceptance criteria for PARCC parameters for Level III and Level IV DQOs are defined by the CLP guidelines and by the laboratory analytical methods chosen. CLP contract required quantitation limits (CRQLs) will be requested for laboratory analyses.

Precision Laboratory analytical precision is a quantitative measurement of reproducibility. Precision is the variability of a group of measurements compared to their average value, monitored, and evaluated for this project through comparison of duplicate samples (including matrix spike duplicates).

Precision and reproducibility can be affected by both sample collection and laboratory analytical techniques. For example, VOA samples may exhibit variability due to improper collection (airspace in the sample) or to variability in purging on injection times. Duplicate samples, when taken from a homogenized sample, are primarily affected by analytical precision. Precision is a parameter evaluated during the data validation process. Precision will be calculated as Relative Percent Difference (%RPD) using the formula:

$$\%RPD = \frac{D_1 - D_2}{(D_1 + D_2)/2} \times 100 \qquad \textbf{(1)}$$

where

%RFD = relative percent difference,
$D_1$ = first sample value, and
$D_2$ = duplicate sample value.

Duplicate samples and the comparison between matrix spike and matrix spike duplicate samples, calculated as %RPD, will be used to measure analytical precision. Matrix spike and matrix spike duplicates are also used to measure analytical recovery, or accuracy.

Accuracy Accuracy is the quantitative measurement of the bias of a system, relating a reported sample concentration to its actual value. Analytical accuracy is quantified by calculation of "spike" recovery. In the laboratory an aliquot of either a surrogate or a specific target compound(s) (i.e., spike), at known concentrations, is added to the sample. The concentration of the recovered spike is compared to the original concentration added and expressed as a percent recovery (%R). This measurement provides an estimate of the percent loss of a given compound during analysis (e.g., loss due to sorption to glassware, volatilization, degradation, etc.). The percent recovery is calculated by the formula:

where

SSR = spike sample results,

$$Matrix\ spike\ \%\ recovery = \frac{SSR - SR}{SA} \times 100 \qquad (2)$$

SR = sample results, and
SA = spike added from spiking mix.

The comparison of matrix spike and matrix spike duplicate samples to the original sample, as well as calculation of surrogate recoveries in original samples, will be used to measure accuracy.

Completeness Percent completeness (%C) is the number of valid measurements collected compared to the number of samples collected for analysis. Valid measurements refer to data validated in conformance with USEPA guidelines (USEPA, 1988a; 1988b). It is calculated by the formula:

$$\%C = \frac{N_A}{N_1} \times 100 \qquad (3)$$

where
$N_A$ = actual number of valid measurements and
$N_1$ = number of samples collected.

CLP requirements for completeness are 80 to 85 percent. The program goal of 80 percent is consistent with these requirements.

Comparability Comparability is qualitatively measured through an evaluation of the consistency of sample collection, handling, analysis, validation, and reporting. Sample collection through reporting will be conducted consistent with the DQO requirements outlined in USEPA Region IV SOPs (USEPA, 1991a), USEPA CLP requirements and USEPA data validation requirements (USEPA, 1991b,c, 1988a,b).

**3.4 DIOXINS**. Dioxins form as trace impurities during the manufacture of chlorinated pesticides and the burning of chlorinated wastes. The dioxin TCDD is an impurity formed in the manufacture of 2,4,5-trichlorophenoxyacetic acid, also known as Herbicide Orange. TCDD is a colorless solid at room temperature and one of the most toxic substances known to man.

TCDD has a very low aqueous solubility and is not likely to be dissolved in water at concentrations greater than approximately 20 ppt. It is not a volatile solid, and inhalation of vapor is not a serious threat to safety. However, TCDD is soluble in oils, fats, and organic solvents, and these should be handled with care around TCDD contamination.

TCDD has a very high affinity for adsorption to soils and organic material in soils. Therefore, mud, soil, and dust particles which become airborne might present a safety hazard. Field investigation personnel will avoid creating dust and wear appropriate breathing protection to prevent ingestion through the nose and mouth. Hand-to-mouth contact in the work area will be avoided, and soiled clothing will be laundered immediately after work.

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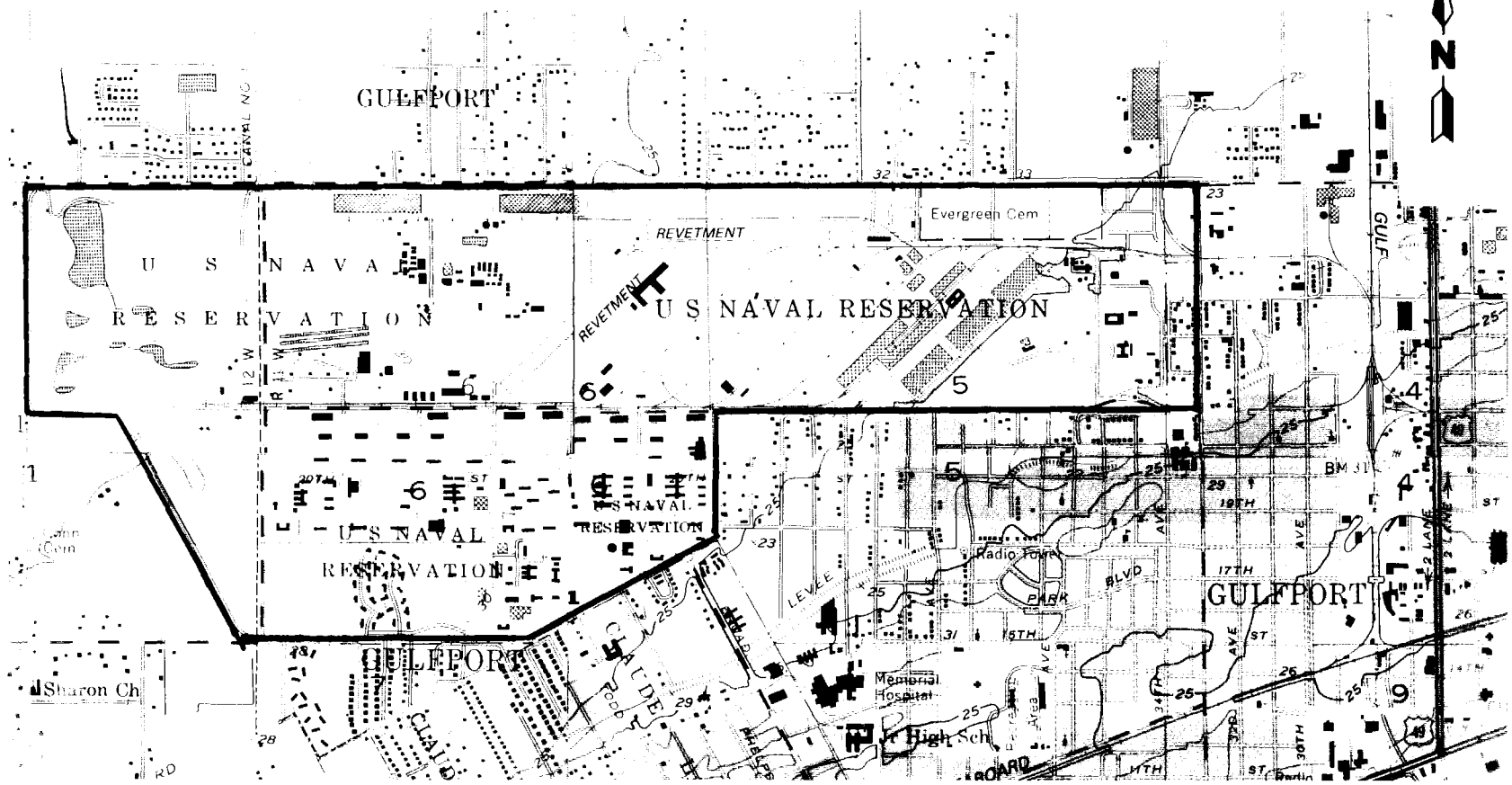



SOURCE: USGS 7.5 MINUTE TOPOGRAPHIC QUADRANGLES GULFPORT NW, GULFPORT NORTH, PASS CHRISTIAN, GULFPORT SOUTH MISSISSIPPI QUADS.

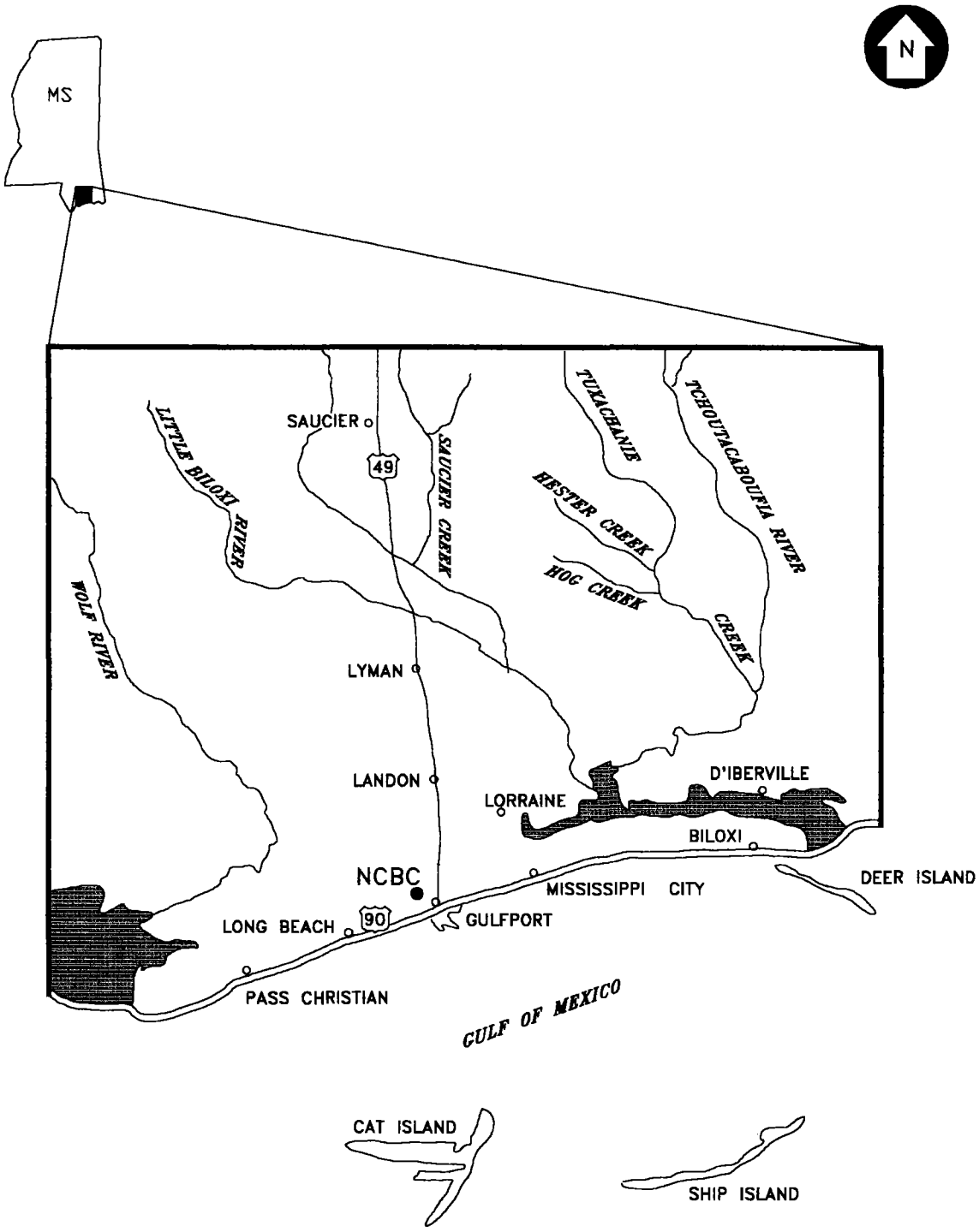
0 2000 4000
SCALE FEET

**FIGURE 1-2**
**TOPOGRAPHIC MAP OF SITE VICINITY**

**MONITORING WELL INSTALLATION PLAN**

**NCBC GULFPORT**
**GULFPORT, MISSISSIPPI**

C:\GULFPORT\WIP\FIG1-2/11-3-93




NOT TO SCALE

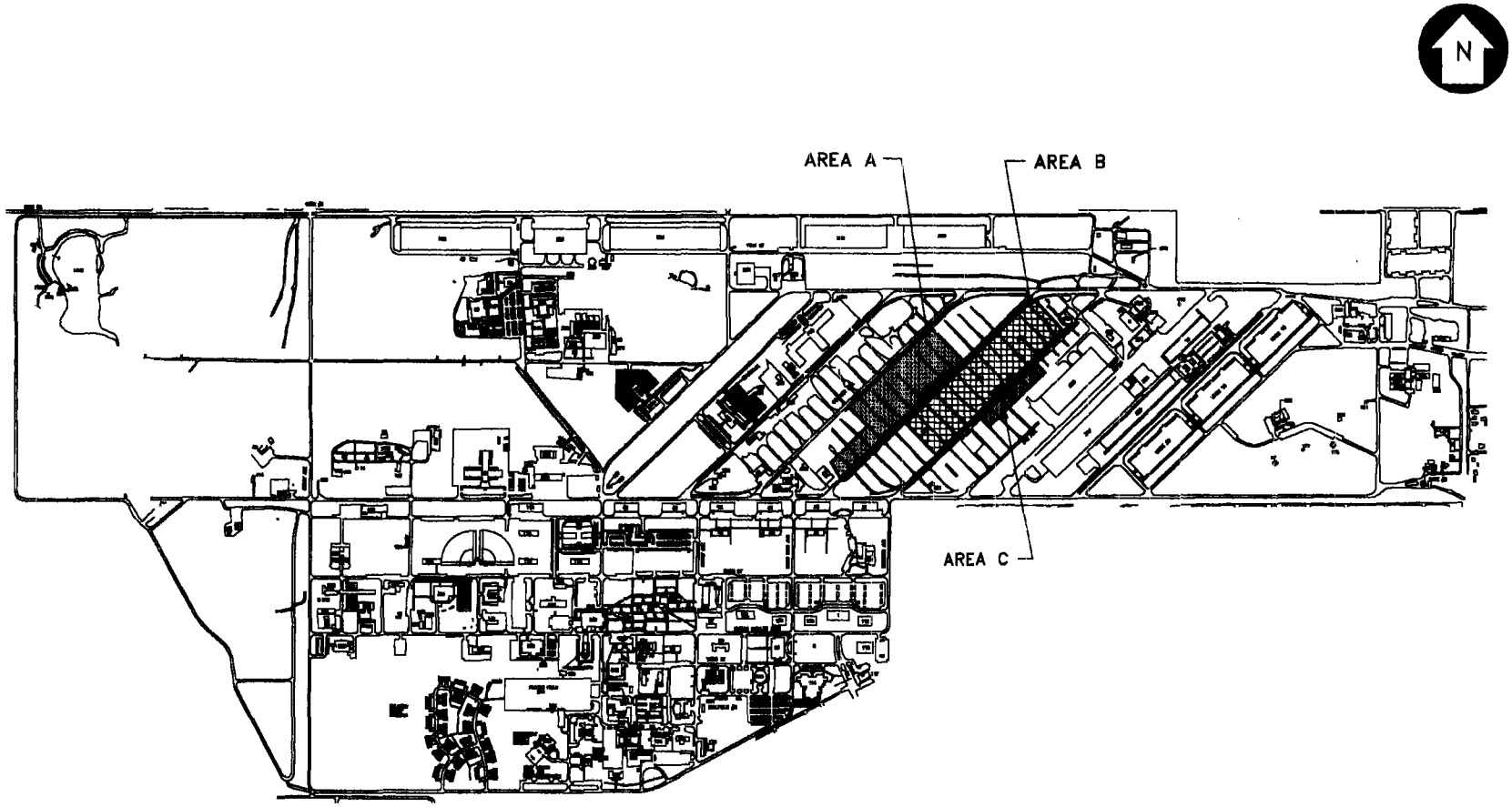
**FIGURE 1-1**

**FACILITY LOCATION**

**MONITORING WELL INSTALLATION PLAN**

**NCBC GULFPORT**
**GULFPORT, MISSISSIPPI**

C:\GULFPORT\WIP\FIG1-1/11-3-93




0 1600 3200

SCALE FEET

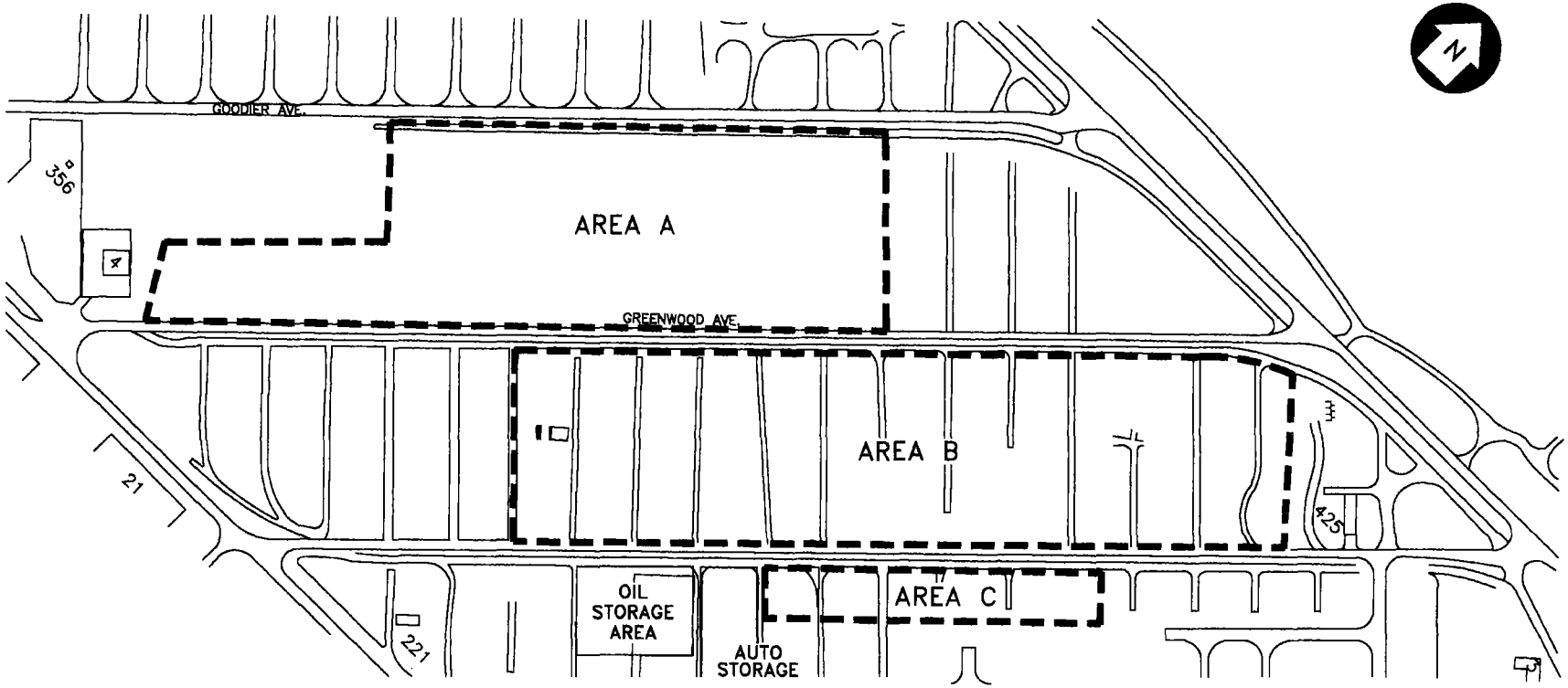
**FIGURE 1-3**

**LOCATION OF FORMER HO STORAGE AREAS**

**MONITORING WELL INSTALLATION PLAN**

**NCBC GULFPORT**
**GULFPORT, MISSISSIPPI**

C:\GULFPORT\WIP\FIG1-3/1-14-94




0 350 700

SCALE FEET

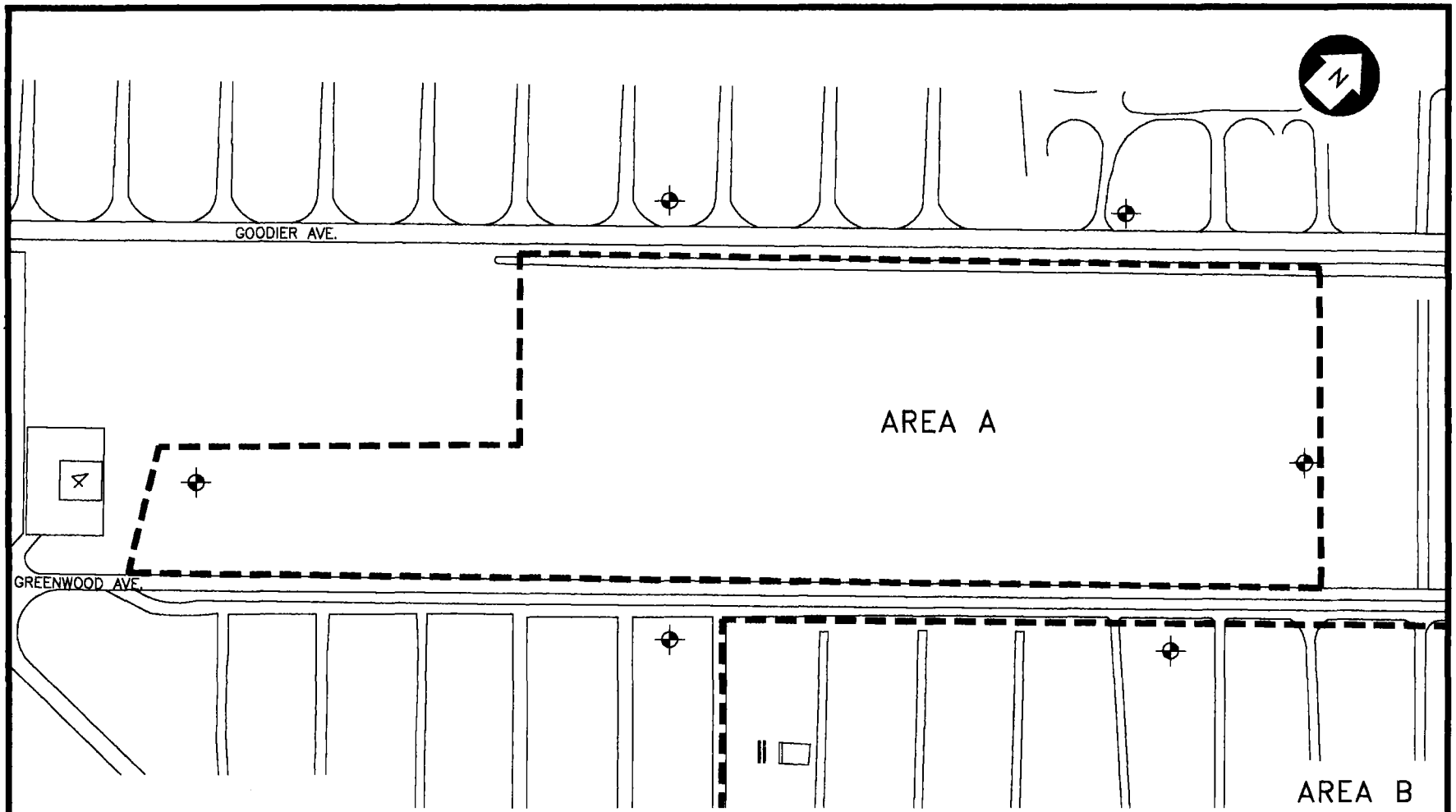
**FIGURE 1-4**

**SITE MAP**

**MONITORING WELL INSTALLATION PLAN**

**NCBC GULFPORT**
**GULFPORT, MISSISSIPPI**

C:\GULFPORT\WIP\FIG1-4/1-14-94




LEGEND

PROPOSED MONITORING WELL LOCATION

0 200 400

SCALE FEET

**FIGURE 2-1**

**PROPOSED MONITORING WELL LOCATION MAP**

**MONITORING WELL INSTALLATION PLAN**

**NCBC GULFPORT GULFPORT, MISSISSIPPI**

C:\GULFPORT\WIP\FIG2-1/1-14-94

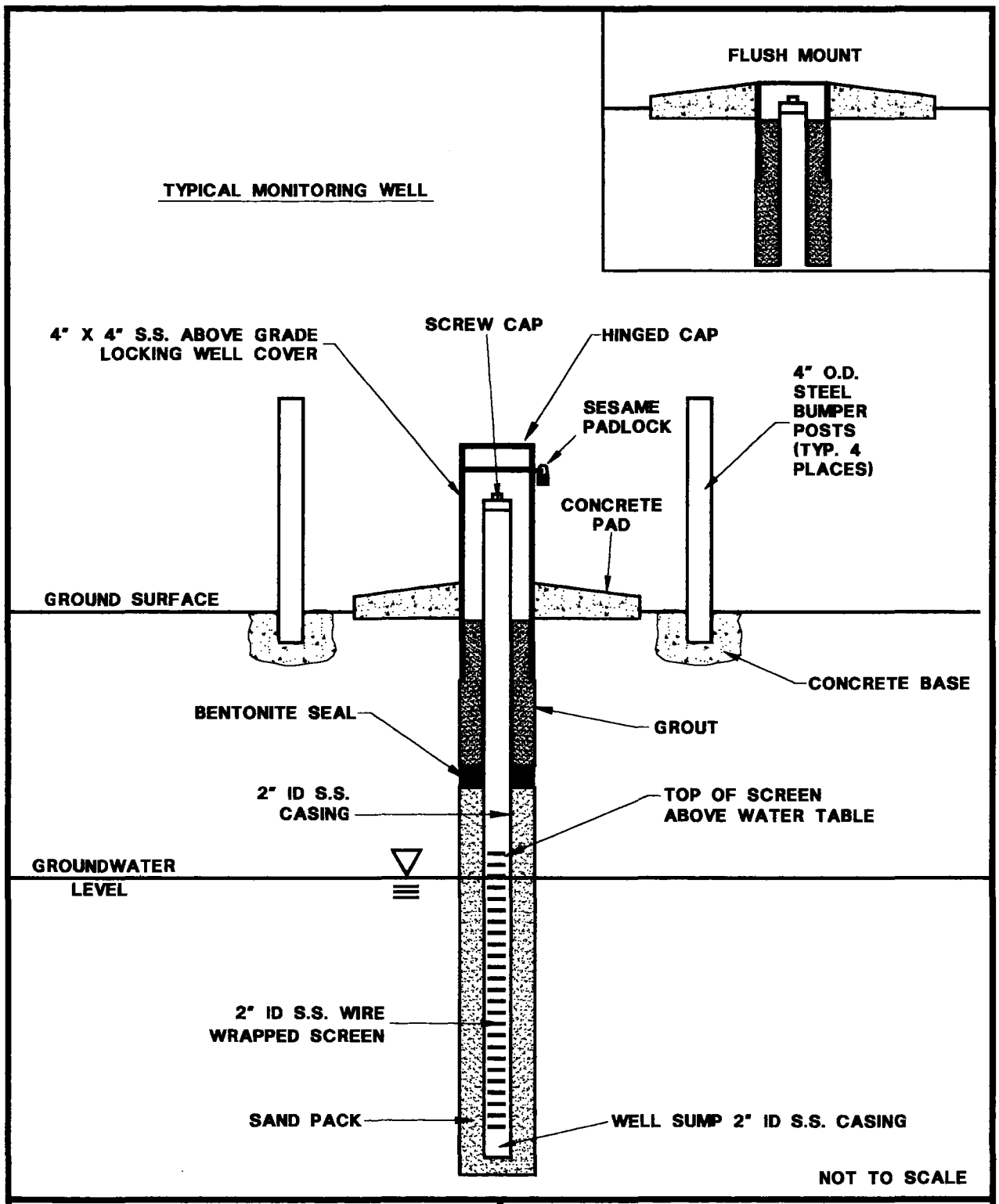



FIGURE 2-2

TYPICAL MONITORING WELL ILLUSTRATION

MONITORING WELL INSTALLATION PLAN

NCBC GULFPORT
GULFPORT, MISSISSIPPI

C:\GULFPORT\WIP\FIG2-2/11-3-93

Figure 2-3 Field Boring Log Form

| FIELD BORING LOG | | | BORING NO.: |
|---|---|---|---|
| PROJECT NO.: | PROJECT NAME: | | PAGE OF |
| DRILLING CONTRACTOR: | DRILLER: | DATE STARTED: | COMPLETED: |
| METHOD: | CASING SIZE: | TIP eV: | PROTECTION LEVEL: |
| GROUND ELEV.: | SOIL DRILLED: | WATER LEVEL: | TOTAL DEPTH: |
| LOGGED BY: | CHECKED BY: | DATE: | |

| SAMPLE NO. | DEPTH IN FEET | BLOWS PER 6-INCHES | PEN. / REC. | DESCRIPTION | LAB | FIELD SCREENING | | MONITORING | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | GC | UV\IR | FID | LEL |
| | | | | | | | | | |

Figure 2-4 Monitoring Well Construction Log Form

| | | | |
|---|---|---|---|
| TITLE: SAMPLE | | LOG of WELL: | BORING NO. |
| CLIENT: | | | PROJECT NO: 7583-52 |
| CONTRACTOR: Ground Water Protection | | DATE STARTED: 08/14/93 | COMPLTD: 08/14/93 |
| METHOD: HSA | CASE SIZE: 2" | BORING DIA.: 8.75" | PROTECTION LEVEL: D |
| TOC ELEV.: NA FT. | MONITOR INST.: OVA | TOT DPTH: 12.0FT. | DPTH TO ▽ 2.58 FT. |
| LOGGED BY: R. Fisher | WELL DEVELOPMENT DATE: 8/21/93 | | SITE: BUILDING 884 RIB 2 |

| DEPTH FT. | LABORATORY SAMPLE ID | SAMPLE | RECOVERY | HEADSPACE (ppm) | SOIL/ROCK DESCRIPTION AND COMMENTS | LITHOLOGIC SYMBOL | SOIL CLASS | |
|---|---|---|---|---|---|---|---|---|
| | | | | 0 | Silty sand, dark brown | | SM | |
| | | | | | Silty sand, light brown | | | |
| | | | | 0 | | | | |
| 5 | | | 12" | 0 | Silty sand, gray with red weathered zones | | | 5,9,8,10 |
| 10 | | | 10" | 0 | Silty clay, gray | | CL | 4,5,9,9 |
| | | | | | total depth = 12.0 ft. | | | |
| 15 | | | | | | | | |
| 20 | | | | | | | | |

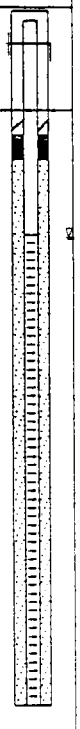


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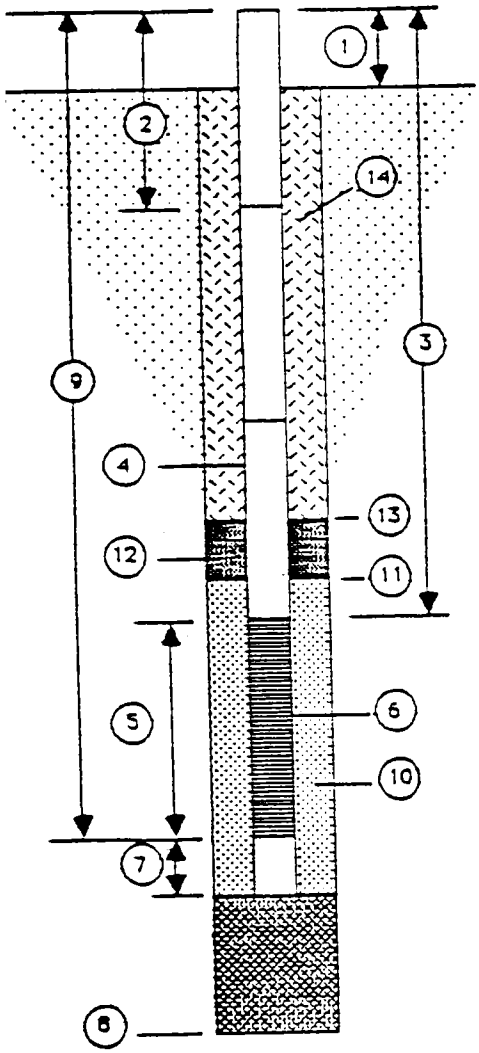
Figure 2-5 Well Construction Detail Form - SOUTHNAVFACENGCOM Guidelines for Monitoring Well Installation

DEPARTMENT OF THE NAVY
SOUTHERN DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
2155 EAGLE DRIVE, P. O. Box 190010
NORTH CHARLESTON, S.C. 29419-9010




## WELL CONSTRUCTION DETAILS

**WELL NUMBER** _____

**DATE OF INSTALLATION** _____

1. **Height of Casing Above Ground** _____
2. **Depth to first Coupling** _____

   **Coupling Interval Depths** _____

   _____
3. **Total Length of Blank Pipe** _____
4. **Type of Blank Pipe** _____
5. **Length of Screen** _____
6. **Type of Screen** _____
7. **Length of Sump** _____
8. **Total Depth of Boring** _____ **Hole Diameter** _____
9. **Depth to Bottom of Screen** _____
10. **Type of Screen Filter** _____

    **Quantity Used** _____ **Size** _____ **U/C** _____
11. **Depth to Top of Filter** _____
12. **Type of Seal** _____

    **Quantity Used** _____
13. **Depth to Top of Seal** _____
14. **Type of Grout** _____

    **Grout Mixture** _____

    **Method of Placement** _____

**COMMENTS ON INSTALLATION:**