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CNC CHARLESTON
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SAMPLING AND ANALYSIS PLAN (SAP) DATED 30 JUNE 1997 FOR BUILDING 42 WITH
SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL REVIEW
LETTER CNC CHARLESTON SC
10/14/1997
ENVIRONMENTAL DETACHMENT CHARLESTON



2600 Bull Street
Columbia, SC 29201-1708

Mr. Gabriel L. Magwood
Southern Division NFEC
P.O. Box 190010
2155 Eagle Drive
North Charleston, South Carolina 29419-9010

Re: Sampling and Analysis Plan dated June 30, 1997
Bldg. 42 (Site Identification # 17780)
Charleston Naval Complex/Charleston Naval Base
Charleston, SC
Charleston County

Date: October 14, 1997

Dear Mr. Magwood:

The author has completed technical review of the referenced document. As submitted, the SAP (Sampling and Analysis Plan) provides for investigative endeavors to determine the extent and severity of contamination associated with a suspected release from the referenced vessel. The author recognizes that the Final CSAP (Comprehensive Sampling and Analysis Plan) dated August 30, 1994 will be utilized at the referenced site during the course of the investigation. With this consideration, the facility must ensure that the site specific sampling program is sufficient to identify and quantify all potential CoC's (contaminant of concern) reasonably expected to be associated with the product stored at the referenced site.

Based on the foregoing review, the proposed assessment activities appear appropriate and reasonable and are approved for implementation. In the presence of significant dissolved/free phase contamination (soils and/or groundwater) the facility may employ best professional judgement to install additional sampling points to define the limits (horizontal and vertical) of contamination. It is anticipated that all activities and reporting requirements will be conducted in accordance with the CSAP and as proposed in the referenced SAP. As previously identified, additional assessments and/or sampling may be required as information and data is developed from the proposed investigative activities.

Please find enclosed monitoring well approval for the installation of two (2) temporary groundwater monitoring points. Conversion of temporary sampling points to permanent wells should be proposed in the Assessment Report with appropriate technical justification, as



2600 Bull Street
Columbia, SC 29201-1708

Monitoring Well Installation Approval Form

Date of Issue: October 14, 1997

Approval No: 0040

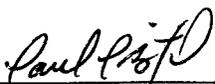
Approval is hereby granted to: Department of the Navy
(on behalf of): Charleston Naval Base
GWPD Site #: 17780
County: Charleston

This approval is for the construction of two (2) temporary monitoring wells designated (to be designated) in accordance with the construction plans and technical specifications submitted to the Department on August 30, 1994 and requested June 30, 1997. The well(s) are to be constructed within the surficial aquifer for the intended purpose of monitoring groundwater quality and/or water level(s) at the referenced facility. Approval is provided with the following conditions:

1. The latitude and longitude, surveyed elevations, boring and/or geologist logs and actual (as built) construction details for each well be submitted to Paul L. Bristol within thirty (30) days of completion (of last well(s) installed). (to be submitted with Assessment Report)
2. Each well shall be labeled with an identification plate constructed of a durable material affixed to the casing or surface pad where it is readily visible. The plate shall provide monitoring well I.D.#, date of construction, static water level, and driller name and state certification #. (as necessary)
3. Well construction and sampling derived waste including, but not necessarily limited to, drill cuttings, drilling fluids, development and purge water should be managed properly and in compliance with applicable requirements. If containerized, each vessel should be clearly labeled with regard to contents, source, and date of activity.
4. A minimum of forty-eight (48) hours prior to initiation of drilling activities, please provide notice to Trident District EQC Office (803-740-1590).
5. Please provide ground-water quality analytical data (chemical analysis and/or water level(s)) associated measurements (i.e., in-situ field measurements) to Paul L. Bristol within thirty (30) days of receipt from laboratory. (to be submitted with Assessment Report)
6. Monitoring wells shall be installed by a well driller certified by the State of South Carolina.

This approval is pursuant to the provisions of Section 44-55-40 of the 1976 South Carolina Code of Laws and the Department of Health and Environmental Control Regulations R.61-71.

Approved by:


Paul L. Bristol, Hydrogeologist, P.G.
Groundwater Quality Section
Bureau of Water

cc: Trident District EQC

Commissioner: Douglas E. Bryant

Board: John H. Burriss, Chairman
William M. Hull, Jr., MD, Vice Chairman
Roger Leaks, Jr., Secretary

Promoting Health, Protecting the Environment

Richard E. Jabbour, DDS
Cyndi C. Mosteller
Brian K. Smith
Rodney L. Grandy

Mr. Gabriel L. Magwood
Southern Division NFEC
P.O. Box 190010
2155 Eagle Drive
North Charleston, South Carolina 29419-9010

Re: Underground Storage Tank Assessment Report dated February 5, 1997
Building B42 (DHEC Site Identification # 17780)
Charleston Naval Complex/Charleston Naval Base
Charleston, SC
Charleston County

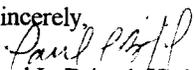
Date: March 21, 1997

Dear Mr. Magwood:

The author has completed technical review of the referenced document. As submitted, the report provides analytical results of environmental sampling conducted to determine if releases have occurred from operation of the referenced underground storage tanks and/or associated piping system. The results presented indicate elevated levels of polynuclear aromatic hydrocarbons (PAH) were detected in soils grab samples obtained from the tank excavation. These results appear to indicate that additional endeavors for remedial actions (soils removal) and contamination characterization are warranted at the referenced site. As provided in the Tank Management Plan dated October 1996, a reasonable sampling and analysis plan for additional assessment activities should be provided to my attention for review and approval, as appropriate, on or before June 30, 1997. Please be reminded that groundwater sampling (if necessary) will require construction of sampling points and will need to be submitted for prior review and approval, as above.

Should you have any questions, please contact me at (803) 734-5328.

Sincerely,


Paul L. Bristol, Hydrogeologist
Groundwater Assessment and Development Section
Bureau of Water

cc: Trident District EQC



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

L: 3.11.97
 LO 32597
 PWH

5090
 Code 1849
 5 Feb 1997

RECEIVED
 FEB 07 1997
 Groundwater Assessment
 and Development Section

Mr. Paul Bristol
 South Carolina Department of Health
 and Environmental Control
 Ground-Water Protection Division
 2600 Bull Street
 Columbia, SC 29201

**UST ASSESSMENT REPORT FOR: UST 641, UST 648, NS 44A, UST B42,
 UST 650 and NH 21 CHARLESTON NAVAL COMPLEX, CHARLESTON, SC**

Dear Mr. Bristol:

Enclosed are the Assessment Reports for
 tanks 641, 648, NS 44A, B42, 650 and NH
 Complex, Charleston, SC.

If you have any questions please contact

*Np4Halene > RBSC
 SCAP*

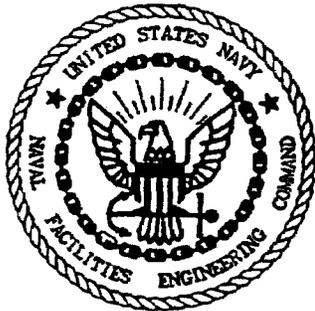
S

NS 44A - 17779
 B42 - 17780
 641 - 17783
 648 - 17784
 650 - 17781
 NH 21 - 17782

G
 P

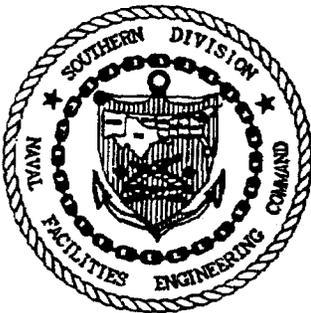
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L 10.13.97

Letter 10.14 ✓



**SAMPLING AND
ANALYSIS PLAN**

**UST B42
(SCDHEC GWPD SITE ID # 17780)
NAVAL BASE CHARLESTON
CHARLESTON SC**



RECEIVED
JUL 03 1997
Groundwater Assessment
and Development Section

Prepared for:

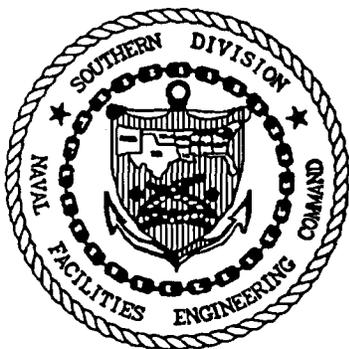
**DEPARTMENT OF THE NAVY
SOUTHERN DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
CHARLESTON SC**



Prepared by:

**Supervisor of Shipbuilding, Conversion and Repair,
USN, (SUPSHIP) Portsmouth Va.,
Environmental Detachment Charleston, S.C.
1899 North Hobson Ave.
North Charleston, SC 29405-2106**

June 25, 1997



FORWARD

Subtitle I of the Hazardous and Solid Waste Amendments (HSWA) of 1984 to the Solid Waste Disposal Act (SWDA) of 1965 established a national regulatory program for managing underground storage tanks (UST) containing hazardous materials, especially petroleum products. Hazardous wastes stored in USTs were already regulated under the Resource Conservation and Recovery Act (RCRA) of 1976, which was also an amendment to the SWDA. Subtitle I requires that the U.S. Environmental Protection Agency (USEPA) promulgate UST regulations. The program was designed to be administered by the individual states, who were allowed to develop more stringent standards, but not less stringent standards. Local governments were permitted to establish regulatory programs and standards that are more stringent, but not less stringent than either State or Federal regulations. The USEPA UST regulations are found in the Code of Federal Regulations, Title 40, Part 280 (40 CFR 280) (*Technical Standards and Corrective Action Requirements for Owners and Operators of Underground Storage Tanks*) and Title 40 CFR 281 (*Approval of State Underground Storage Tank Programs*). Title 40 CFR 281 was revised and published on September 23, 1988, and became effective December 22, 1988.

The Navy's UST program policy is to comply with all Federal, State, and local regulations pertaining to USTs. This plan was prepared to satisfy the requirements of South Carolina R.61-92, Part 280 (*Underground Storage Tank Control Regulations*), Section 280.65 to determine the extent and location of soils contaminated by a release from a UST system.

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ACRONYMS, ABBREVIATIONS AND SYMBOLS

bgs	below the ground surface
BTEX	Benzene, Toluene, Ethylbenzene & Xylene
CFR	Code of Federal Regulations
COC	Chemical of Concern
CSAP	Comprehensive Sampling and Analysis Plan
DET	Environmental Detachment Charleston
ft ² /day	square feet per day
gpm	gallons per minute
HSWA	Hazardous and Solid Waste Amendments
IDW	Investigation Derived Wastes
MSDS	Material Safety Data Sheet
NAVBASE	former Charleston Naval Base
PAH	Polynuclear Aromatic Hydrocarbon
RCRA	Resource Conservation and Recovery Act
RFI	RCRA Facility Investigation
SAP	Sampling and Analysis Plan
SOUTHDIV	Southern Division Naval Facilities Engineering Command
SSHSP	Site-Specific Health and Safety Plan
SSL	Soil Screening Level
SWDA	Solid Waste Disposal Act
USEPA	U.S. Environmental Protection Agency
UST	Underground Storage Tanks

1.0 INTRODUCTION

1.1 GENERAL. UST B42 located adjacent to former Charleston Naval Base Building 42 (refer to Figures 2-1, 2-2 and 2-3) was removed by Environmental Detachment Charleston (DET). Soil samples collected during removal of the UST reflect concentrations of polynuclear aromatic hydrocarbons (PAHs) in excess of RCRA Facility Investigation (RFI) soil screening levels (SSLs). The Sampling and Analysis Plan (SAP) outlines a field investigation and sampling program that will assess the source(s) of soil contamination at the site of the removed tank and evaluate the horizontal and vertical extent of the petroleum contamination detected. The field investigation will also determine whether contamination has entered the groundwater at the tank site. If groundwater has been contaminated, the extent of the contamination will be evaluated. The following report presents the site location and develops the rationale for the proposed field investigation.

1.2 USE OF RFI DATA. The former Charleston Naval Base is the site of an ongoing RFI. UST B42 was formerly located in Zone G of the RFI. Data taken as part of the RFI, including geological information, hydrogeological information, well drilling logs and groundwater sampling data was used in the preparation of this SAP.

2.0 BACKGROUND

2.1 SITE DESCRIPTION. The former Charleston Naval Base (NAVBASE) is in the city of North Charleston, on the west bank of the Cooper River in Charleston County, South Carolina. The developed portion of the NAVBASE occupies the west bank of the Cooper River starting at a boundary 2300 feet upstream of Noisette Creek and ending at Shipyard Creek. The northern section of the NAVBASE (RFI Zones A, B, C and D) contains a mixture of warehouses, offices and former Navy housing areas. The central section of the NAVBASE (RFI Zones E and F) is occupied primarily by what was the controlled industrial area (CIA) of the former Naval shipyard and its associated offices and warehouses. The southern section of the NAVBASE (RFI Zones G, H and I) along the Cooper River is occupied by piers, barracks, training buildings, offices, storehouses and fuel tanks which formerly supported naval vessels homeported at Charleston. The north bank of Shipyard Creek in the southern part of the base is largely undeveloped and consists of recreational areas and a large dredge spoil area.

The removed UST supplied fuel oil to a boiler in Building 42 which is located on the southern end of the northern section of the NAVBASE just southwest of the intersection between Hobson Avenue and Eagle Street. This area of the NAVBASE is not located within the confines of the former CIA.

2.2 SITE HISTORY. UST B42 (GWPD 17780) was a 560 gallon unregulated fuel oil tank installed prior to 1977 and used until an unknown date. The tank was located adjacent to Building 42, former store room/boiler house for NAVBASE green house, on the southeast side of the building. The tank was constructed of steel and was connected to Building 42 by one set of copper supply and return lines. Between 9 August 1996 and 18 September 1996, the UST was removed, drained, cleaned and cut up for recycling as scrap. The supply and return piping associated with this tank was capped and left in place.

On 2 August 1990 approximately 10 gallons of kerosene overflowed from the uncapped fill pipe of the then abandoned UST B42 and spilled onto the asphalt. NAVBASE Public Works personnel cleaned up the spill and pumped the tank dry. No other releases were recorded while this tank was in service. However, during removal of tank B42, the supply and return lines were found disconnected from the tank, stained soils with strong petroleum odors were found under the piping and around three sides of the tank and one hole of approximately 1/4" in diameter was found in one end of the tank.

2.3 GEOLOGY. Charleston South Carolina is located in the southern Atlantic Coastal Plain. The surficial geology of the region consists of the Quaternary-age sands, silts and clays of the Wando Formation. Below the Wando Formation are the Oligocene-age Ashley Formation and the Eocene-age Parkers Ferry and Harleyville Formations, known collectively as the Cooper Group. Below the Cooper Group is the Eocene-age Santee Limestone.

At the NAVBASE, the upper surface of the Ashley Formation is an erosional surface ranging from 35 feet to 77 feet below the ground surface (bgs). Overlaying the Ashley Formation is the Wando Formation which, at the NAVBASE, typically consists of upper and lower sand layers divided by a layer of "marsh clay". The surface contours of the NAVBASE area were extensively changed by fill operations during the base's life, particularly in the lower portion of the NAVBASE, which was originally tidal marsh.

2.4 HYDROGEOLOGY.

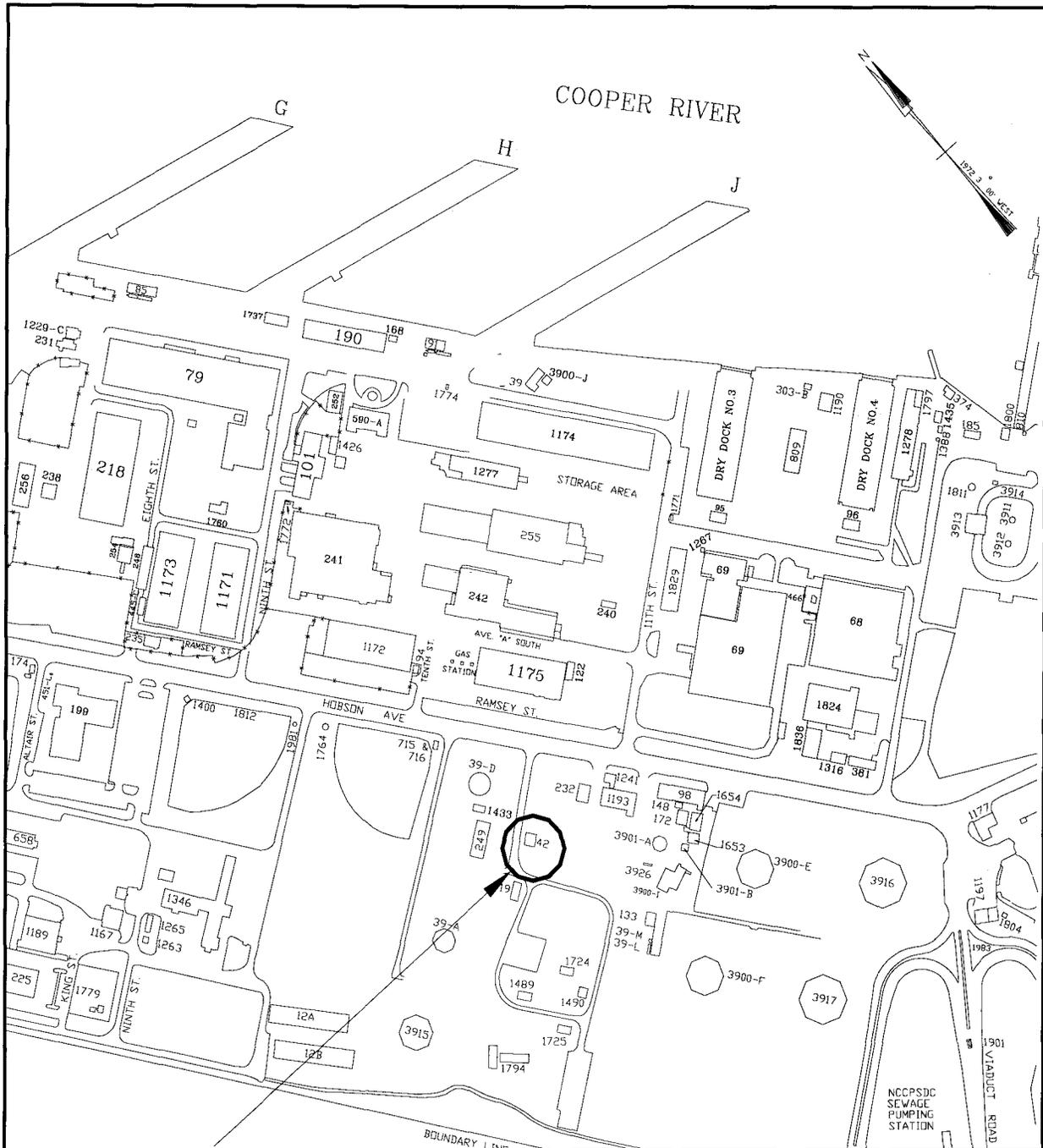
2.4.1 Regional. (Excerpted from Ensafe/Allen & Hoshall, Draft Zone I RCRA Facility Investigation Report NAVBASE Charleston dated January 1996.) Groundwater occurs under poorly confined or water table conditions within the Pleistocene deposits overlying the Ashley Formation. Transmissivities in the Pleistocene aquifer are generally less than 1,000 square feet per day (ft²/day) and well yields are variable, ranging from 0 to 200 gallons per minute (gpm). This groundwater contains high concentrations of iron and is commonly acidic at shallow depth (Park, 1985).

The Cooper Group is hydrogeologically significant mainly because of its low permeability. In most locales, its sandy, finely granular limestones produce little or no water and act as confining material that produces artesian conditions in the underlying Santee Limestone.

2.4.2 Site Specific. Typically, above the Ashley Formation at the entire NAVBASE are two sand layers divided by a clay layer described as "marsh clay" in the RFI Reports. The vertical hydraulic conductivity of the Ashley Formation beneath the NAVBASE is 0.0027 ft/day, based on measurements taken during the Zone H RFI. The vertical hydraulic conductivity of the marsh clay layer is 0.001 ft/day, based on measurements taken during the Zone I RFI. The Ashley Formation acts as a lower confining layer, while the marsh clay functions as an aquitard separating the upper and lower sand layers. At the NAVBASE, rainwater absorbed into the ground will flow downward to the marsh clay and then flow toward a discharge point into a body of surface water.

Parts of the southern portion of NAVBASE are drained by Shipyard Creek while some northern areas are drained by Noisette Creek. The drainage basins of both waterways include areas other than NAVBASE. These waterways are tributaries to the Cooper River. Surface Drainage over the remainder of NAVBASE flows directly into the Cooper River, which discharges into Charleston Harbor.

The former site of UST B42 is located on the southern end of the northern portion of the NAVBASE in Zone G approximately 2000 feet from the Cooper River. Based on hydrogeologic information provided in the Ensafe/Allen & Hoshall Zone G Final RFI Work Plan, it is assumed that groundwater beneath the UST location flows generally northeast toward the Cooper River. Based on information recorded during tank removal, the depth to groundwater at the site is known to be in excess of 5 feet bgs.



Building 42

CHARLESTON NAVAL BASE
CHARLESTON, SC



GRAPHIC SCALE

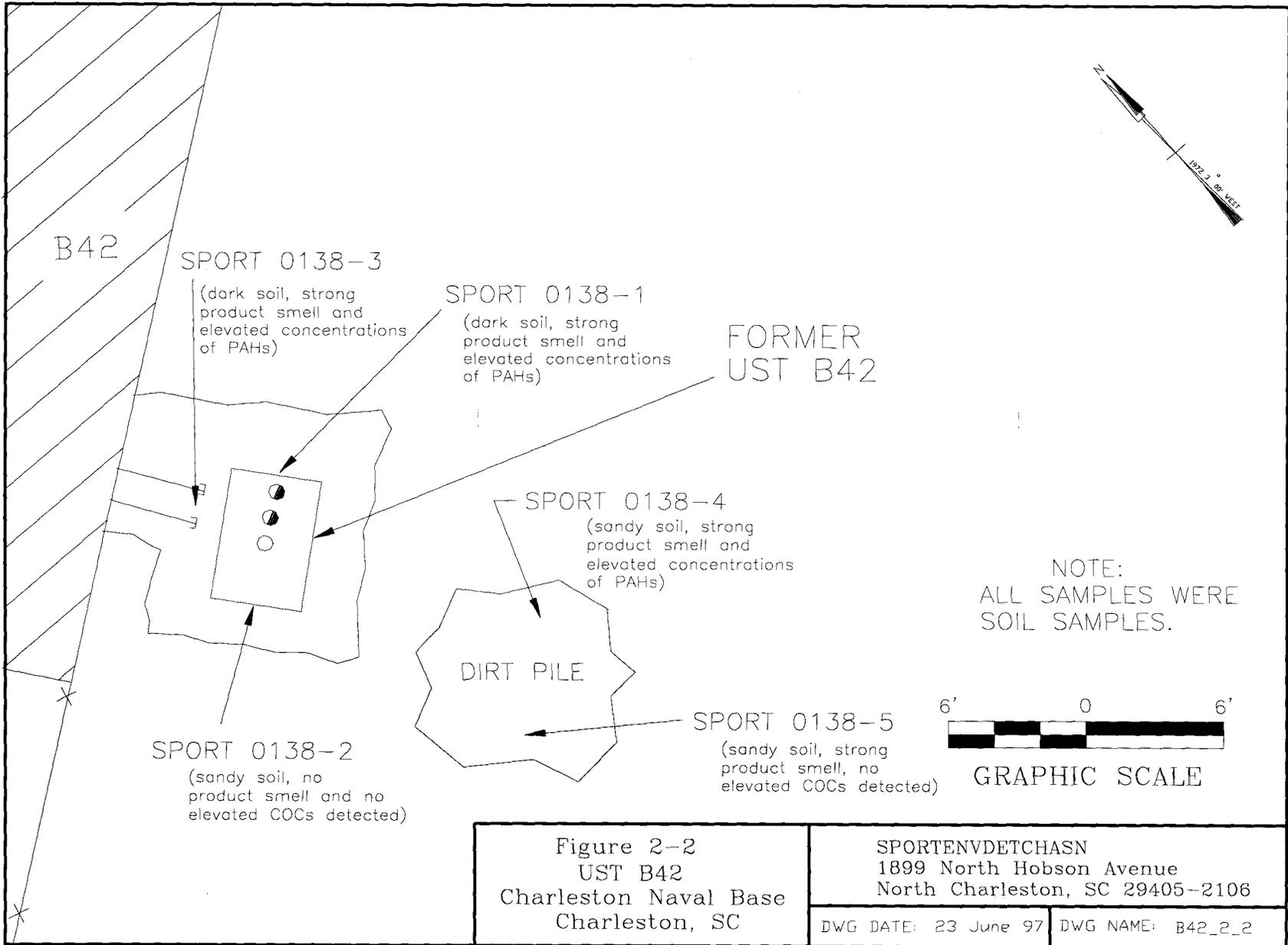
Figure 2-1
UST B42
Charleston Naval Base
Charleston, SC

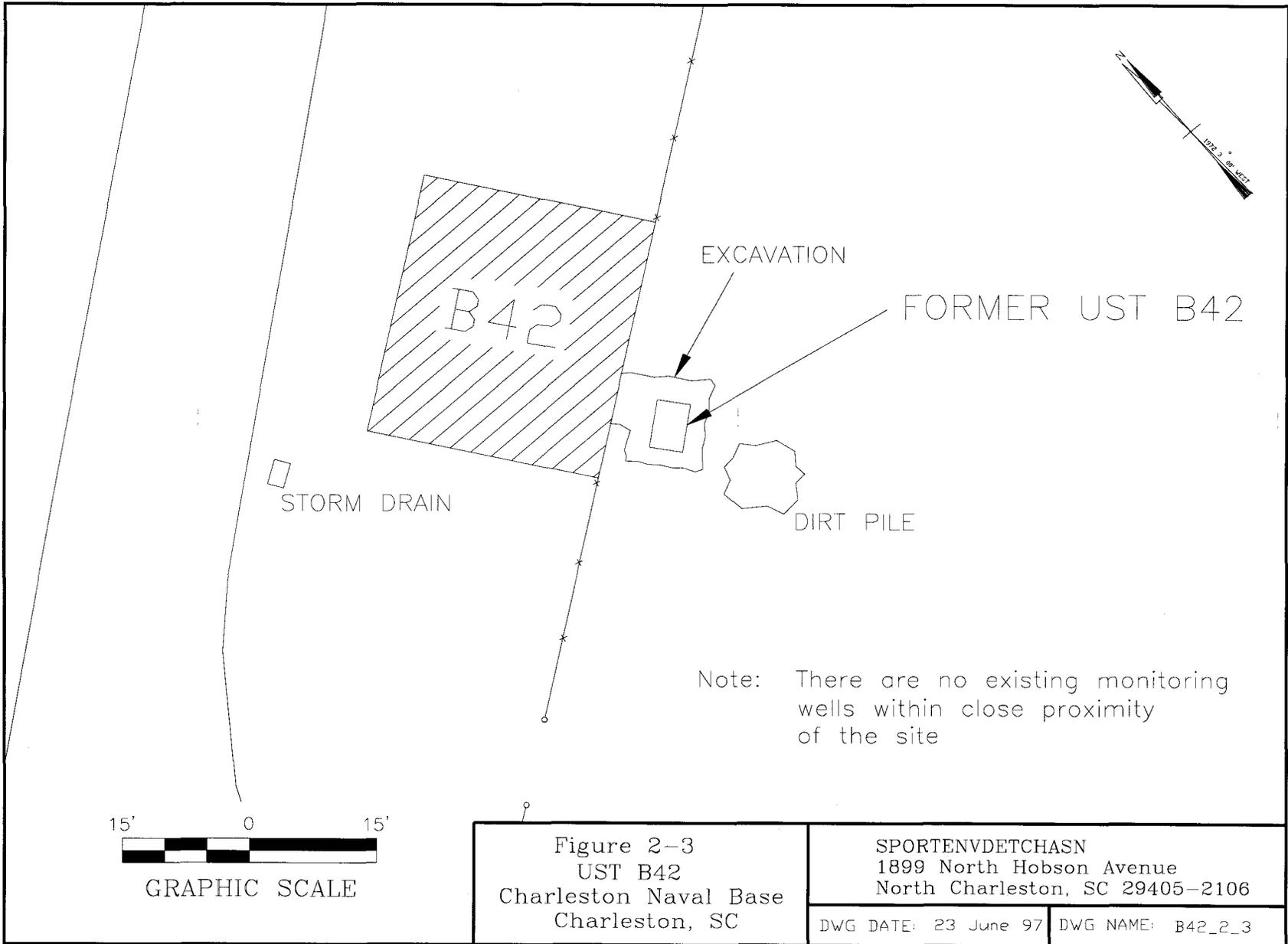
SPORTENVDETHASN
1899 North Hobson Avenue
North Charleston, SC 29405-2106

DWG NAME: B42_2_1

DWG DATE: 23 June 97

2-4





15' 0 15'
GRAPHIC SCALE

Figure 2-3
UST B42
Charleston Naval Base
Charleston, SC

SPORTENVDETHASN
1899 North Hobson Avenue
North Charleston, SC 29405-2106
DWG DATE: 23 June 97 | DWG NAME: B42_2_3

3.0 INVENTORY OF PROXIMATE POTABLE WATER WELLS

There are no potable water wells on the NAVBASE. Groundwater in the surficial aquifer at the NAVBASE discharges into the Cooper River and its tributaries and therefore flows away from any potable water wells in residential areas nearby.

4.0 BACKGROUND

4.1 FIELD INVESTIGATION. Prior to the beginning of the field investigation, a pre-work briefing will be held. All DET personnel associated with the investigation will review the scope of work in the SAP and the Site Specific Health and Safety Plan (SSHSP). Scheduling, logistics and special precautions will be discussed.

The purpose of the field investigation is threefold. The first objective is to evaluate the horizontal and vertical extent of soil contamination at the site from PAHs. The second objective is to determine whether contamination has entered the groundwater at the tank site, assess the areal extent of the contaminant plume, if one exists, and install monitoring wells to detect plume movement off the site. The final objective is to collect site-specific background information required to prepare the contamination assessment report.

A minimum of 9 soil borings will be made, of which 2 will be completed as downgradient temporary monitoring wells (refer to Figure 4-1). The borings completed as monitoring wells will be advanced using a portable drill rig and soil samples will be collected using a split-spoon sampling device. Remaining soil borings will be advanced with a hand auger. In all soil borings, samples will be collected in 2-foot intervals until the water table is reached. Water samples will be collected from both temporary monitoring wells. All sampling will be performed in accordance with the RFI Comprehensive Sampling and Analysis Plan (CSAP). All monitoring wells will be installed in accordance with South Carolina R. 61-71, *Well Standards and Regulations*. The proposed soil boring locations are shown in Figure 4-1. Actual locations of soil borings will be determined by the field team as more information is obtained about the contaminant plume during soil sampling.

Where the initial 9 soil borings are not sufficient to define the extent of the plume, the South Carolina Department of Health and Environmental Control (SCDHEC) will be notified that the sampling grid needs to be extended in those directions where the plume is undefined. Any additional soil borings will be advanced using the same methods as the initial borings.

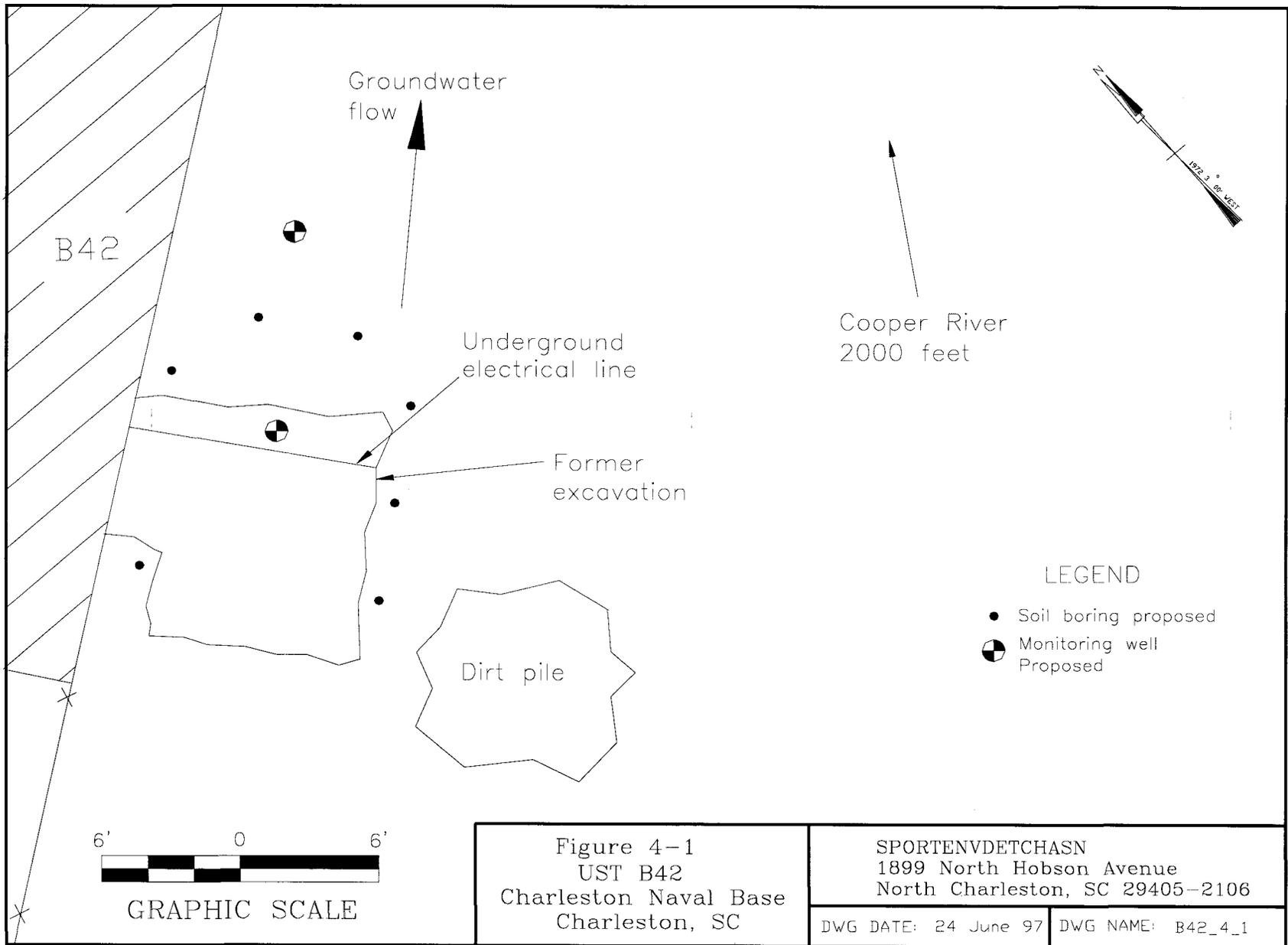
Once the extent of soil and groundwater contamination has been determined, a background soil boring will be made in nearby uncontaminated soil.

Detailed information including lithologic descriptions, split-spoon samples, groundwater elevations and other pertinent data for each monitoring well will be presented in the Assessment Report. Soil will be classified in accordance with the unified Soil Classification System.

All wastes shall be disposed of in accordance with the Investigation Derived Waste (IDW) procedures included in Section 16 of the RFI CSAP.

4.2 PREPARATION OF REPORTS. After completion of the field investigation, an assessment report will be prepared and submitted to Southern Division Naval Facilities Engineering Command (SOUTHDIV) for review and approval. The report will discuss site background information, site conditions, findings and recommendations for the former UST site at Building 42. Recommendations will also be made as to the need for any follow-up investigations. Site location maps, locations of soil borings and soil contamination delineation maps will be included with the report.

4-3



GRAPHIC SCALE

Figure 4-1
UST B42
Charleston Naval Base
Charleston, SC

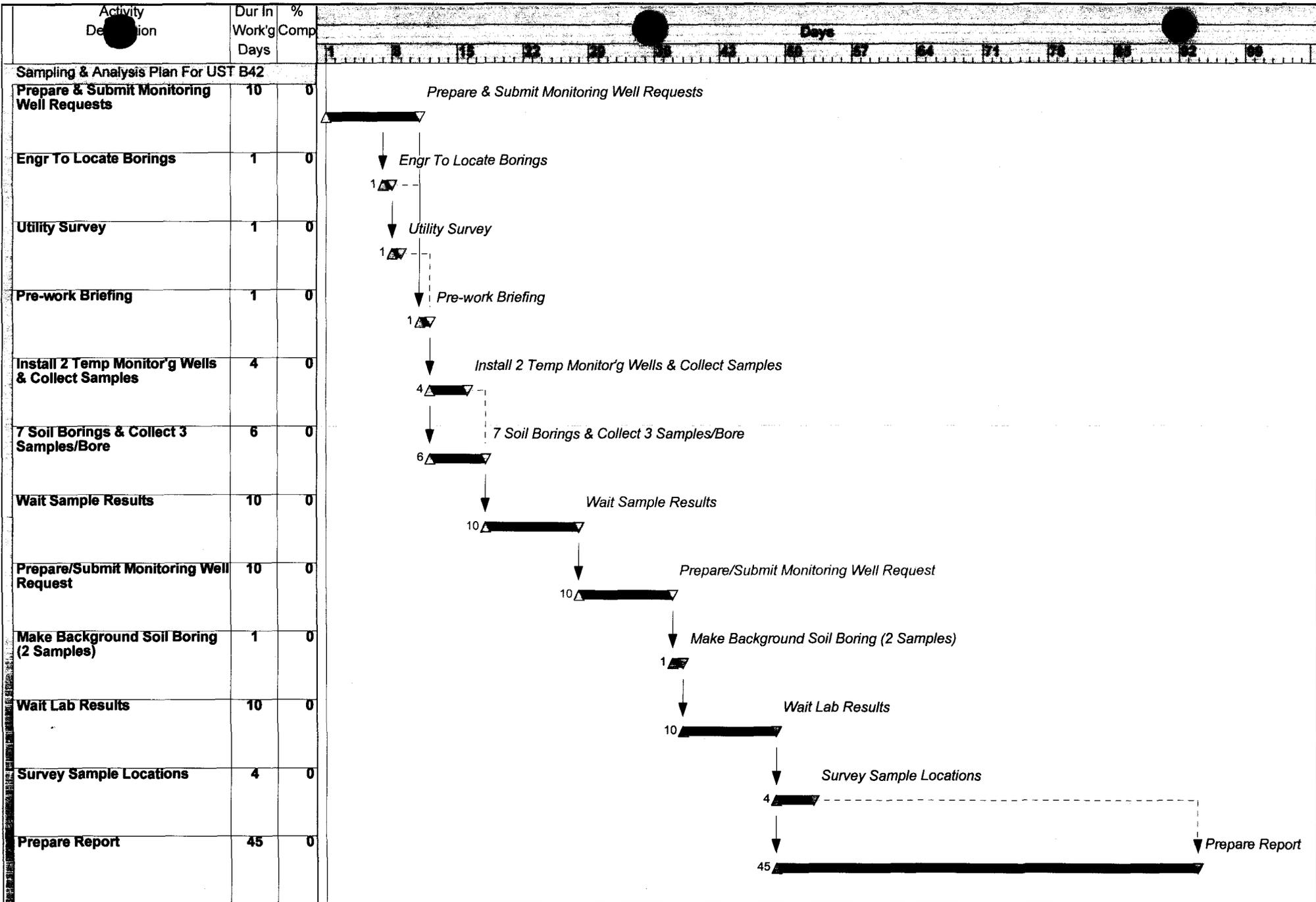
SPORTENVDETHASN
1899 North Hobson Avenue
North Charleston, SC 29405-2106

DWG DATE: 24 June 97

DWG NAME: B42_4_1

5.0 SCHEDULE

The projected schedule to complete the SAP field investigation at the site for UST B42 is approximately 10 weeks (see Figure 5-1). This includes mobilization, drilling, sampling, surveying and demobilization.. An Assessment Report for the site is scheduled for delivery within 45 days after completion of the field investigation.



Project Start 01-APR-96
 Project Finish 23-AUG-96
 Data Date 01-APR-96
 Plot Date 27-JUN-97

Early Bar
 Progress Bar
 Critical Activity

Sample & Analysis Plan For UST B42
Figure 5-1 Page 5-2
Environmental Detachment Charleston

Sheet 1 of 1



REFERENCES

Ensafe/Allen & Hoshall, Final Comprehensive Sampling and Analysis Plan (CSAP) RCRA Facility Investigation dated August 30, 1994

Ensafe/Allen & Hoshall, Draft Zone I RCRA Facility Investigation Report NAVBASE Charleston dated January 1996

Ensafe/Allen & Hoshall, Final RCRA Facility Investigation Work Plan for Zones D, F and G Naval Base Charleston dated June 13, 1996

Ensafe/Allen & Hoshall, Final RCRA Facility Investigation Report for Zone H Naval Base Charleston dated July 5, 1996

SCDHEC Underground Storage Tank Assessment Guidelines for Permanent Closure, Change-in Owner and Change-in-Service dated June 1995

SCDHEC Risk-Based Corrective Action for Petroleum Releases

South Carolina R. 61-71 South Carolina Well Regulations and Standards

SUPSHIP Portsmouth Va., Environmental Detachment Charleston, Base Realignment and Closure Tank Management Plan

United States Environmental Protection Agency (USEPA) Environmental Services Division *Standard Operating Procedures and Quality Assurance Manual* (SOPQAM)

SITE SPECIFIC HEALTH AND SAFETY PLAN

1.0 Purpose

This plan provides supplemental site specific information and is to be used with the Detachment Comprehensive Health and Safety Plan.

2.0 Work Location

Former petroleum oil underground storage tank locations.

3.0 Work Scope Brief (refer to the work document for full details)

The work scope is to perform a sampling program that will evaluate the horizontal and vertical extent of petroleum contamination in soil and determine the extent of ground water contamination.

4.0 Hazards

The primary health hazard is from petroleum oils which are a primary irritant. Dermatitis, a defatting of the skin, can result from continued skin contact. Some individuals develop hypersensitivity.

Safety hazards include the personal injury hazards of heavy equipment operation, and the dangers of underground and above ground utility installations.

5.0 Personal Protective Equipment

Gloves and coveralls (either tyvek or cloth). If oil soaked soil is encountered, shoe covers or boots should be worn. At the employee's option an organic vapor respirator may be worn, although it is not required.

6.0 Special Personnel Training Qualifications

Hazwoper training.

7.0 Occupational Safety and Health Precautions

Prior to the start of work the area must be checked for the presence of above or below ground utilities, and they must be marked and secured by lockout tagout if they will be endangered. Follow the detachment policy and procedures for location and evaluation of these utilities.

Wash hands before eating or smoking.

If work requires entry into a confined space, contact the project engineer for additional instructions, as a confined space entry permit and gas testing may be required.

Work that involves sewage exposure (e.g. standing sewage liquid or broken sewer pipes), will require the use of workers who are in the NavHospChas C5 medical surveillance program. These workers shall avoid skin exposure by using appropriate protective equipment such as aprons, tyvek suits, boots, and latex or plastic gloves worn under heavier protective gloves. If splashing is a hazard, wear face shields over goggles. Sewage wetted clothing should be removed promptly and the person should then wash with soap and water. Wet clothing should be bagged and then washed separately with hot soap and water and one cup of bleach per wash load. Sewage contaminated equipment should be washed with soap, water, and bleach. Wash hands and face after any contact or sewage work and prior to eating, smoking or going home.

Sewage work also has a risk of fire, explosion, and oxygen deficiency due to the possibility of gases. Cutting of sewer pipes, or the repair of accidentally damaged pipes, should be done only after an assessment of the work by the team leader or project engineer. Typically, gas testing and the use of a confined space entry permit will be required.

8.0 Material safety data sheets

A typical MSDS for fuel oil is included as part of the official folder.

9.0 Medical Surveillance

Hazardous waste worker, (B27,711). This code refers to a NAVHOSPCHASN Medical Surveillance Classification.