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CORRECTIVE ACTION PLAN AMENDMENT 01 FOR SITE 19 AST 3909 ZONE G CNC CHARLESTON SC

3/1/2003

CH2M HILL

CORRECTIVE ACTION PLAN
AMENDMENT 01
FOR

SITE 19, AST 3909, ZONE G
Site Identification # 01093

Charleston Naval Complex
Charleston, South Carolina

SOUTHERN DIVISION
NAVAL FACILITIES ENGINEERING COMMAND

Contract Number N62467-99-C-0960

March 2003

CORRECTIVE ACTION PLAN
AMENDMENT 01
FOR

SITE 19, AST 3909, ZONE G
Site Identification # 01093

Charleston Naval Complex
Charleston, South Carolina

Submitted to:
Southern Division
Naval Facilities Engineering Command
2155 Eagle Drive
Charleston, South Carolina 29406

Submitted by:
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Charleston Navel Complex
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CH2MHILL

Contract Number: N62467-99-C-0960

March 2003

ACRONYMS

AST	Aboveground storage tank
bls	below land surface
BTEX	benzene, toluene, ethylbenzene and xylenes
BRAC	Defense Base Realignment and Closure Act
CAP	Corrective Action Plan
CNC	Charleston Naval Complex
CoC	Chemical of Concern
DOT	Department of Transportation
EISOPQAM	Environmental Investigations Standard Operating Procedures and Quality Assurance Manual
EPA	Environmental Protection Agency
ft bls	feet below land surface
mg/kg	milligram per kilogram
mg/L	milligram per liter
OVA	Organic Vapor Analyzer
PAHs	Polyaromatic Hydrocarbons
PCB	Polychlorinated Biphenyls
PVC	polyvinyl chloride
QA	Quality Assurance
QC	Quality Control
RA	Rapid Assessment
RAR	Rapid Assessment Report
RBSL	Risk-Based Screening Level
RCRA	Resource Conservation Recovery Act
SCDHEC	South Carolina Department of Health and Environmental Control
SOUTHDIV	Southern Division Naval Facilities Engineering Command
SSTL	Site-Specific Target Level
SWMU	Solid Waste Management Unit
TtNUS	Tetra Tech NUS
UST	Underground Storage Tank
µg/L	micrograms per liter

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1.0 INTRODUCTION

This Corrective Action Plan (CAP) has been prepared by CH2M-JONES, LLC. The plan is designed for Site 18, Building 123, Zone G and Site 19, AST 3909, Zone G; located at the Charleston Naval Complex (CNC), Charleston, South Carolina. Site 18 contains the location of a former petroleum Underground Storage Tank (UST) system used to store waste oil from the oil/water separator from the boiler systems at the Boiler House building. Site 19 contains the location of a former Aboveground Storage Tank (AST) system used to supply fuel oil for the boilers. The South Carolina Department of Health and Environmental Control (SCDHEC) has designated Site 18 with Identification Number 167673 and Site 19 with Identification Number 01093.

This CAP provides a method for active remediation of the sites by removing petroleum affected soils and free-phase petroleum product identified in the vicinity of the former UST basin; conducting groundwater sampling to evaluate the active remediation of the site; and implementing intrinsic remediation and monitoring well abandonment as a corrective action in accordance with SCDHEC Corrective Action Guidance, June 1997. The CAP was developed using the information provided in the Rapid Assessment Report (RAR) for Sites 18 and 19 prepared by Tetra Tech NUS, Inc. (TtNUS), dated May 2000. The applicable tables and figures from the RAR have been incorporated into this CAP.

1.1 GENERAL SITE DESCRIPTION

The CNC is located in the city of North Charleston, on the west bank of the Cooper River in Charleston County, South Carolina (Figure 1). This installation consists of two major areas: an undeveloped dredge materials area on the east bank of the Cooper River on Daniel Island in Berkley County, and a developed area on the west bank of the Cooper River. The developed portion of the base is on the peninsula bounded on the west by the Ashley River and on the east by the Cooper River. The site is located within the developed portion of the base (Figure 2).

The area surrounding CNC is "mature urban", having long been developed with commercial, industrial, and residential land use. Commercial areas are primarily west of CNC; industrial areas are primarily to the north of the base along Shipyard Creek. A site vicinity map, which exhibits adjacent properties and structures, vicinity roads, current utilities, and vicinity surface drainage, is included as Figure 2.

1.2 SITE BACKGROUND

The CNC began operations in 1901, when the Navy acquired the property. In 1993, the CNC was added to the list of bases schedule for closure under the Defense Base Realignment and Closure Act (BRAC). BRAC regulates the closure of the base and transition of the property back to the community. With the scheduled closure of the base, environmental cleanup has proceeded to make the property available for redevelopment after closure.

Building 123 is the former Boiler House, constructed in 1997, which supplied steam to ships and parts of the base at CNC. There was one UST and one AST associated with Boiler House systems. The UST was used to store waste oil from the boiler systems oil/water separator. The Site 18 UST was a 1,000-gallon steel tank installed in 1997 on the north side of Building 123 (Figure 3). The AST was used to store the fuel oil supply for the boiler systems. The Site 19 AST was a 200,000 gallon steel tank installed in 1964 on a concrete foundation. The AST is located approximately 160 feet east of building 123 (Figure 3).

The UST and AST tank removals and closures were completed on June 20, 1996 and February 6, 1998, respectively. Petroleum-contaminated soil and groundwater was identified during the removal activities based upon soil sampling results. Excavated soil was returned to the original tank basins. A SCDHEC UST Assessment Report and AST Assessment report were completed by SPORTENVDETCHASN in 1996 and 1998, respectively. Strong petroleum odors were observed in the excavations. Groundwater with a sheen was encountered in the UST excavation. A laboratory analytical sample was collected from the groundwater in the excavation.

The site lies within the Resource Conservation Recovery Act (RCRA) designated Solid Waste Management Unit (SWMU) 178, which has been identified because of Polychlorinated Biphenyls (PCBs). No PCBs were detected in soil samples in the tank closure activities (SPORTENVDETCHASN, 1997).

From April 1999 through April 2000, TtNUS completed a Rapid Assessment (RA) for Sites 18 and 19. The information from the Rapid Assessment Report (RAR), prepared by TtNUS, dated May 2000, is summarized in Section 2.0 of this report. The RAR was approved by SCDHEC on May 19, 2000.

2.0 PROPOSED CORRECTIVE ACTION

This CAP Amendment provides a method for active remediation of the site by removing free petroleum product identified in the vicinity of the former UST 123 piping trench; conducting groundwater sampling to evaluate the active remediation of the site; and implementing intrinsic remediation and monitoring well abandonment as a corrective action in accordance with SCDHEC Corrective Action Guidance, June 1997. Based on the results of the RA, source removal of free petroleum product will be performed at this site to remove CoCs from groundwater and to reduce contaminant concentrations below SSTLs. At which time, intrinsic remediation will be implemented until contaminant concentrations decrease below RBSLs or action levels approved by SCHDEC. The proposed active remediation plan is described in Section 4.0, and the proposed intrinsic remediation plan is described in Section 5.0.

2.1 GROUNDWATER REMEDIATION

Free product and groundwater contamination was identified in the vicinity of the former UST 123 piping trench. On February 18, 2003 SCDHEC approved the installation of two additional monitoring wells. The wells were installed as approved on February 25, 2003.

An 8-hour Aggressive Fluid – Vapor Recovery (AFVR) event or multiple events will be conducted to remove free product from the source area. The AFVR will consist of a vacuum truck utilized to extract fluid and vapor from target well points. The AFVR assembly will connect the vacuum hose to the top of the wellhead with the design such that liquid and vapor will be extracted from the top of the water column in the target well point. All monitoring wells that contain free product (CNC19MW001 and FDSGW01A) will be used to vacuum the free product.

3.0 SAMPLING AND ANALYSIS PLAN

After removing all free product from the site, groundwater samples will be collected from monitoring wells FDS01A, FDS01B, FDS01C, FDS01D, CNC19-MW01, CNC18-MW01, and CNC18-MW02, and the two newly installed monitoring wells. The groundwater samples will be submitted to a certified laboratory for analysis of benzene, toluene, ethylbenzene and xylenes (BTEX) by EPA Method 8260, and Polyaromatics Hydrocarbons (PAHs) by EPA Method 8270.

Groundwater level measurements will be collected from all monitoring wells prior to all groundwater sampling events. Measurements will be taken with an electrical water level indicator or interface probe if floating product is present. No groundwater samples will be collected if free product is measurable.

Three to six well volumes will be purged from each well prior to groundwater sampling. Field measurements of pH, groundwater temperature, specific conductance, dissolved oxygen, and turbidity will be taken during groundwater sampling events.

All sampling procedures will be conducted in accordance with EPA Environmental Investigations Standard Operating Procedures and Quality Assurance Manual (EISOPQAM), 1996. Any contaminated groundwater collected during the well sampling events will be containerized in DOT-approved (Specification 7H) 55-gallon drums and disposed of at a later date pending fluid contents analysis.

3.1 REPORTING

Monitoring reports will be submitted to SCDHEC immediately following each sampling event. The reports will summarize and include copies of field and laboratory analytical data. Upon completion of active remediation, a Performance Evaluation Report will also be submitted to SCDHEC to summarizes the remediation activities, evaluate the soil and water quality data, and provide recommendations for the site.

3.2 EQUIPMENT DECONTAMINATION

All drilling equipment, augers, well casing and screens, and soil and groundwater sampling equipment involved in field sampling activities will be decontaminated according to the EPA EISOPQAM.

3.3 SAMPLE HANDLING

Sample handling will be conducted in accordance to the following references: EPA EISOPQAM, Code of Federal Regulations 136, 1990, and EPA Users Guide to Contract Laboratory Program, 1988. The following forms will be completed for packing/shipping process: sample labels, chain-of-custody labels, appropriate labels applied to shipping coolers, and chain-of-custody forms.

3.4 QUALITY CONTROL

In addition to periodic calibration of field equipment and the completions of the appropriate documentation, quality control (QC) samples will be collected during sampling events. QC samples may include field blanks, field duplicates, and trip blanks. Definitions of each can be found below as described by the EPA EISOPQAM:

- **Field Blank:** A sample collected using organic-free water, which has been run over/through sample collection equipment. These samples are used to determine if contaminants have been introduced by contact of the sample medium with sampling equipment. Equipment field blanks are often associated with collecting rinse blanks of equipment that has been field cleaned.

- **Field Duplicates:** Two or more samples collected from a common source. The purpose of a duplicate sample is to estimate the variability of a given characteristic or contamination associated with a population.

- **Trip Blank:** A sample, which is prepared prior to the sampling event in the actual container and is stored with the investigative samples throughout the sampling event. They are often packaged for shipment with the other samples and submitted for analysis. At no time after their preparation are trip blanks to be opened before they reach the laboratory. Trip blanks are used to determine if samples were contaminated during storage and/or transportation back to the laboratory (a measure of sample handling variability resulting in positive bias in contaminant concentration). If samples are to be shipped, trip blanks are to be provided with each shipment but not for each cooler.

3.5 FIELD QUALITY ASSURANCE / QUALITY CONTROL (QA/QC)

All sampling procedures will be conducted in accordance with EPA EISOPQAM. More information on field QC can be found in Sections 4.8 through 4.10.

QA/QC specifications for selected field measurements are summarized below.

Analysis	Control Parameter	Control Limit	Corrective Action
Air Monitoring	Check Calibration of OVA daily	Calibrate to manufactures specifications	Recalibrate. If unable to calibrate, replace.
pH of water	Continuing calibration check of pH 7.0 buffer	pH = 7.0	Recalibrate. If unable to calibrate, replace electrode.
Specific Conductance of water	Continuing calibration check of standard solution	> 1% of standard	Recalibrate.

3.6 RECORD KEEPING

In addition to required sampling documentation standardized forms, log sheets and logbooks will be completed during all field activities.

4.0 SITE MANAGEMENT AND BASE SUPPORT

Throughout the investigation activities, work on the CNC will be coordinated through SOUTHDIV and SCDHEC.

The primary contacts for each are as follows:

1. SOUTHDIV point of contact
   Gabe Magwood
   Southern Division Engineering Command
   2155 Eagle Drive
   North Charleston, SC 29406
   (843) 820-7307

2. SOUTHDIV point of contact
   Rob Harrell
   Southern Division Engineering Command
   2155 Eagle Drive
   North Charleston, SC 29406
   (843) 820-5525

3. SCDHEC point of contact
   Paul Bristol
   South Carolina Department of Health and Environmental Control
   2600 Bull Street
   Columbia, SC 29201
   (843) 898-3559

5.0 REFERENCES

Comprehensive Sampling and Analysis Plan (Ensafe/ Allen & Hoshall. July 1996).

South Carolina Department of Health and Environmental Control. 1997. Corrective Action Guidance.

SPORTENVDETCHASN. 1996. UST Assessment Report.

SPORTENVDETCHASN. 1998. AST Assessment Report.

Tetra Tech NUS, Inc. May 2000. Rapid Assessment Report for Site 18, Building 123 and Site 19, AST 3909, Zone G, Charleston, South Carolina.

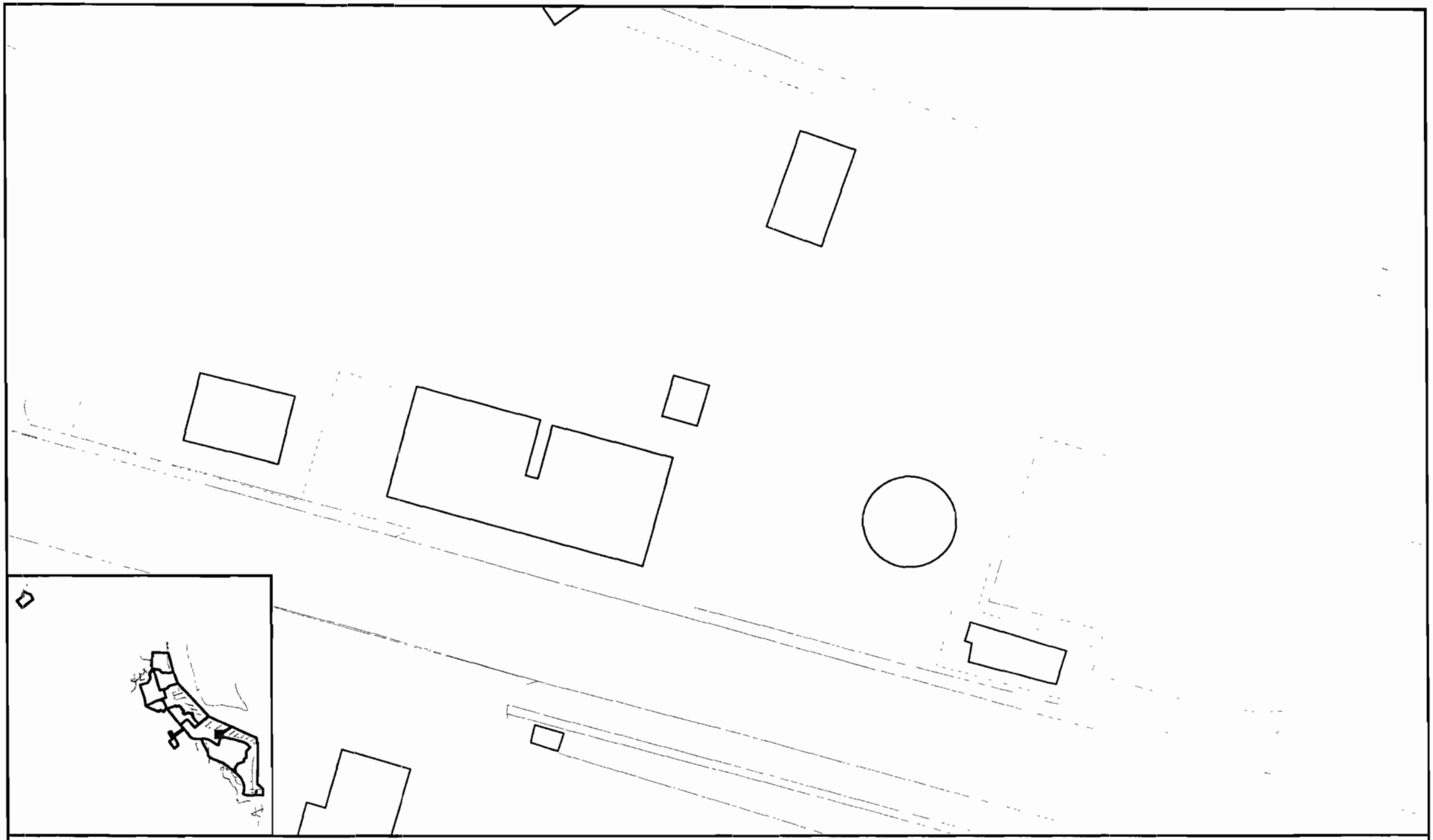
United States Environmental Protection Agency. 1990. Code of Federal Regulations 136.

United States Environmental Protection Agency. 1996. EPA Environmental Investigations Standard Operating Procedures for Quality Assurance Manual.

United States Environmental Protection Agency. 1988. EPA How to Effectively Recover Free Product at Leaking Underground Storage Tank Sites.

FIGURES

NOTE Original figure created in color



Fence
Pavement
Sidewalk
Buildings

N

0 40 80 Feet

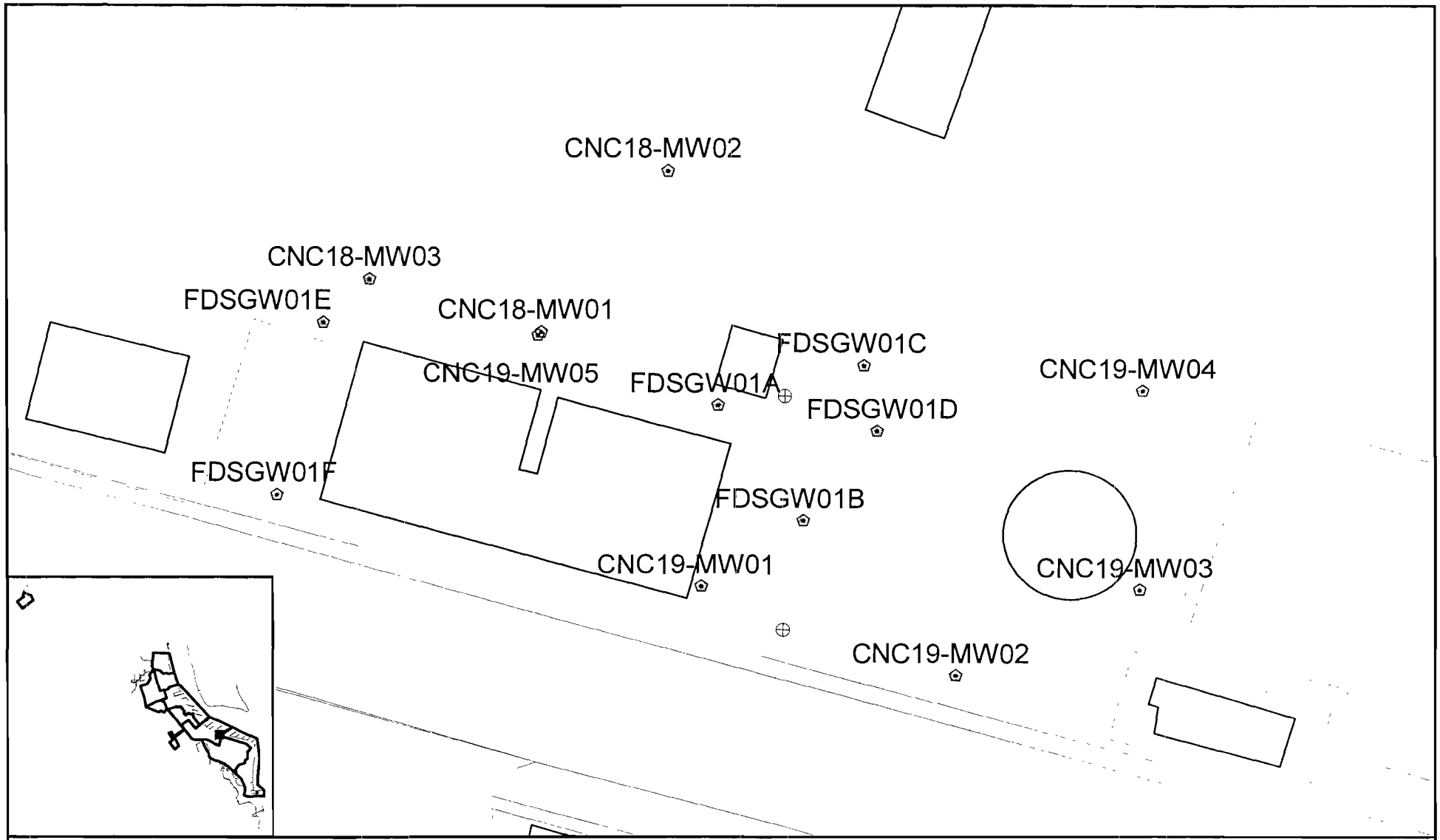
1 inch = 44.7645 feet

Figure 1
AST 3909
Zone G
Charleston Naval Complex

CH2MHILL

File Path C:\18gis\CNC\cnc-egis apr, Date 10 Mar 2003 13 51, User BCRAWFOR, EGIS Charleston Naval Complex - Figure 1 AST 3909

NOTE Original figure created in color



Abandoned
Active
New Well
Fence
Pavement
Sidewalk
Buildings

N

0 20 40 Feet

1 inch = 31.3821 feet

Figure 2
Well Location Map
Map Subtitle
Charleston Naval Complex

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File Path C:\18gis\CNC\cnc-egis apr, Date 10 Mar 2003 13 54, User BCRAWFOR, EGIS Charleston Naval Complex - Figure 2 Well Location Map