

N61165.AR.005000
CNC CHARLESTON
5090.3a

DRAFT WORK PLAN WITH TRANSMITTAL FOR SOIL REMEDIATION AND FREE PRODUCT
RECOVERY AT CHICORA TANK FARM CNC CHARLESTON SC
10/10/2002
SOLUTIONS TO ENVIRONMENTAL PROBLEMS, INC.



October 10, 2002

Naval Facilities Engineering Command
Gabe Magwood
Attn: Code ES24
2155 Eagle Drive
P.O. Box 190010
North Charleston, SC
29419-9010

Re: Soil Remediation and Free Product Recovery at Chicora Tank Farm, Draft Document
Submittal

Dear Mr. Magwood:

Please find enclosed one copy of the following Draft documents for the activities regarding the
Soil Remediation and Free Product Recovery at Chicora Tank Farm, Charleston Naval Shipyard,
Charleston, South Carolina:

- Work Plan
- Health and Safety Plan
- Environmental Protection Plan
- Quality Control Plan

If you have any questions or need additional information, please do not hesitate to call me at
865-481-7837 ext. 279.

Sincerely,
STEP, Inc.

Roy Hoekstra, P.E.
Project Manager

Enclosure

cc: Project Files
Reader File

**Work Plan
for
Soil Remediation and Free Product Recovery
at Chicora Tank Farm,
Charleston Naval Shipyard,
Charleston, South Carolina**

October 2002

**Submitted to:
Department of the Navy
Southern Division
Naval Facilities Engineering Command**

Under Contract No. N62467-02-R-0466

**Submitted by:
Solutions To Environmental Problems, Inc.
1006 Floyd Culler Court
Oak Ridge, Tennessee 37830**

**Work Plan
Table of Contents**

**Soil Remediation and Free Product Recovery
at Chicora Tank Farm,
Charleston Naval Shipyard,
Charleston, South Carolina**

Acronyms and Abbreviations	ii
1.0 INTRODUCTION.....	1
2.0 PROJECT ORGANIZATION.....	1
3.0 SITE DESCRIPTION.....	2
4.0 SITE HISTORY	2
5.0 FIELD ACTIVITIES.....	5
5.1 Mobilization	5
5.2 Utility Identification	5
5.3 Site Control	6
5.4 Groundwater Sampling.....	6
5.5 Well Abandonment	6
5.6 Soil Excavation	8
5.7 Confirmatory Soil Samples	8
5.8 Installation of Monitoring Wells	9
5.9 Site Reclamation	9
6.0 WASTE MANAGEMENT	9
7.0 HEALTH AND SAFETY PLAN	10
8.0 ENVIRONMENTAL PROTECTION PLAN.....	10
9.0 QUALITY CONTROL PLAN.....	10
10.0 COMPLETION REPORT	10
11.0 REFERENCES.....	12

List of Figures

Figure 3-1, Site Location Map	3
Figure 3-2, Facility Location Map	4
Figure 5-1, Facility Layout	7

Acronyms and Abbreviations

AOC	areas of concern
BTEX	benzene, toluene, ethylbenzene, and xylene
CAP	Corrective Action Plan
CFR	<i>Code of Federal Regulations</i>
COC	chemical of concern
CSO	Caretaker Site Office
CTF	Chicora Tank Farm
DET	Environmental Detachment Charleston
EPA	United States Environmental Protection Agency
ft	feet
HASP	Health and Safety Plan
NAD	National American Datum 1983
OSHA	Occupational Safety and Health Administration
PM	project manager
POC	point of contact
RA	rapid assessment
RAR	Rapid Assessment Report
RBSL	risk based screening levels
RCRA	Resource Conservation and Recovery Act
SCDHEC	South Carolina Department of Health and Environmental Controls
SOUTHDIV	Naval Facilities Engineering Command, Southern Division
SSTL	site-specific target levels
STEP	Solutions To Environmental Problems, Inc.
TtNUS	Tetra Tech NUS, Inc.
USACE	United States Army Corps of Engineers
USGS	United States Geological Survey

1.0 INTRODUCTION

Solutions To Environmental Problems, Inc. (STEP) has been contracted by the Department of the Navy to remove and properly dispose of petroleum-contaminated soil and free phase petroleum product from three areas at the Chicora Tank Farm (CTF) located in Charleston, South Carolina. In addition, STEP will perform backfilling, compacting and grading, soil sampling, well abandonment, and installation of monitoring wells. Removal and disposal of petroleum-contaminated soil and free phase petroleum product at the CTF are required in accordance with the *Active Corrective Action Plan for Chicora Tank Farm* (Tetra Tech NUS, Inc., May 2002).

2.0 PROJECT ORGANIZATION

STEP has assigned Roy Hoekstra as the STEP project manager (PM) for removal and disposal of petroleum contaminated soil and free phase petroleum product from CTF. The STEP PM is responsible for coordination and execution of the project, administers all instructions from Naval Facilities Engineering Command, Southern Division (SOUTHDIV), and provides answers to all project-related questions. Additionally, the STEP PM coordinates and manages all subcontracted activities. Table 2-1 shows all project points of contact.

The STEP team is composed of personnel experienced in appropriate disciplines who will accomplish the specified work.

Table 2-1, Project Points of Contact

Name	Organization/Role	Contact Number
Gabe Magwood	SOUTHDIV Remedial Project Manager	(843) 820-7307
Amy Daniels/Rick Neilson	Caretaker Site Office	(843) 743-2985
Roy Hoekstra	STEP Project Manager	(865) 481-7837
Terry McKamey	STEP Site Superintendent	(865) 740-1096
Michael Palmer	PSC Safety, Project CIH/Safety Manager	(865)-777-1401

3.0 SITE DESCRIPTION

The CTF is a 23-acre site located approximately 500 yards west of the Charleston Naval Shipyard. In the past, the tank farm supplied fuel and lubricants to the shipyard. The tank farm is in the city of North Charleston, near the west bank of the Cooper River in Charleston County, South Carolina. A site location map is shown in Figure 3-1.

The CTF consisted of 6 cut-and-cover storage tanks. Five of the tanks had a capacity of 50,000 barrels, and one tank had a capacity of 27,000 barrels. Each tank interior was approximately 25 feet in height and was constructed of 24-inch reinforced concrete walls and a domed roof. Each tank was connected to a pump room and had an exterior coating of gunite to minimize infiltration of groundwater into the tanks. A facility location map is shown in Figure 3-2.

4.0 SITE HISTORY

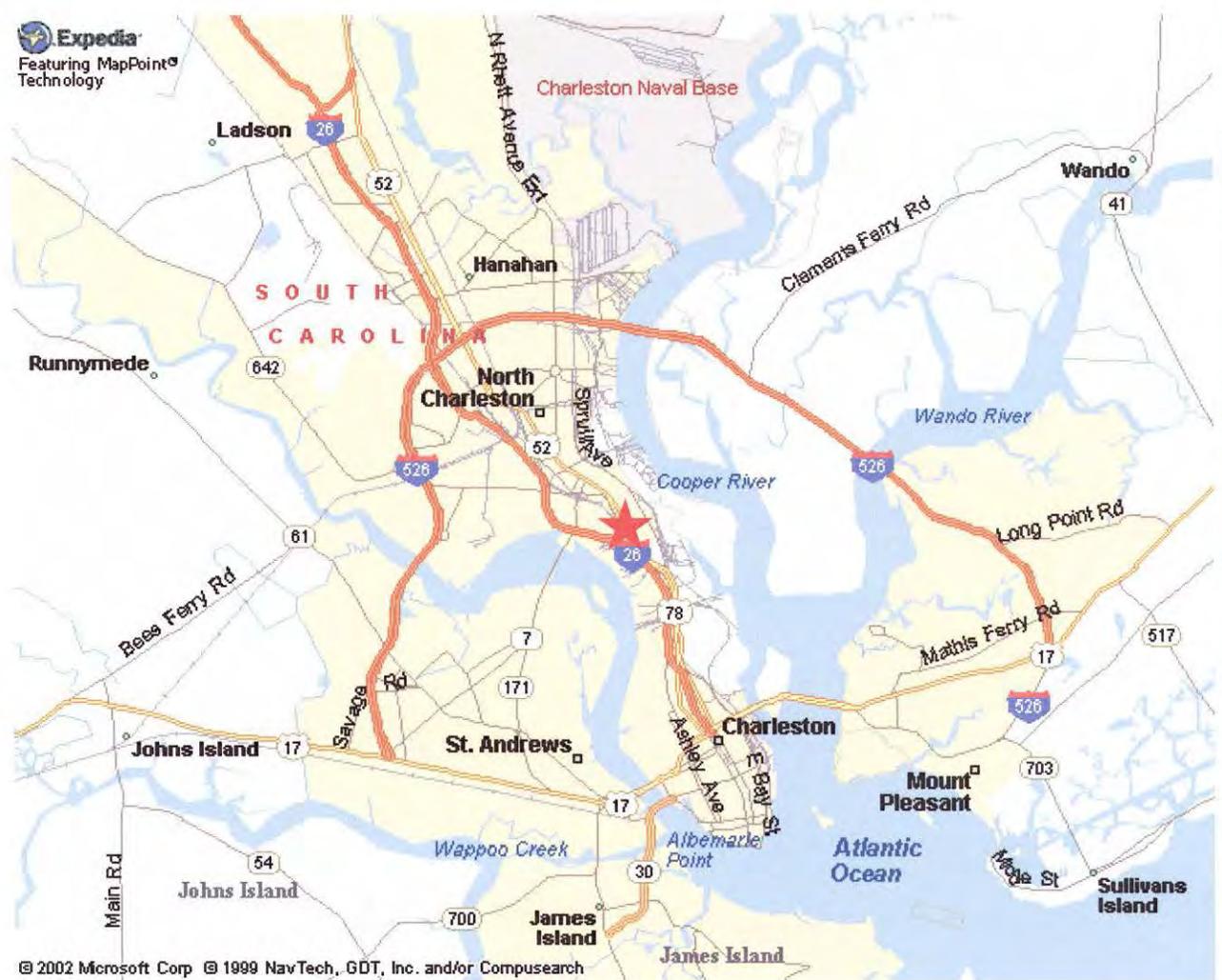
The CTF was formerly used to store Bunker "C" fuel, Navy special fuel, and diesel marine fuel. All of the tanks at this location were removed in 1999 and the facility is no longer in use. During closure assessment activities, petroleum contamination was discovered along a fuel transfer pipeline while exposing a valve pit. A Tank Closure Assessment Report and Rapid Assessment Report (RAR) were submitted and approved by SCDHEC.

The RAR reported that naphthalene, found in six well samples, was the only chemical of concern (COC) detected above Risk Based Screening Levels (RBSLs). Site-specific target levels (SSTLs) were calculated for construction worker and surface water receptors to evaluate the exposure pathway for groundwater COCs. Even though naphthalene exceeded RBSLs in six groundwater samples, no concentrations of naphthalene exceeded the most conservative migration model for the onsite construction worker SSTL. The RAR recommended an intrinsic Corrective Action Plan (CAP) for monitoring natural attenuation of the groundwater.

Concurrent with the site investigation associated with the Rapid Assessment (RA), Environmental Detachment Charleston (DET) excavated and removed contaminated soil that was discovered during the assessment. Approximately 2,887 tons of soil was removed from four excavated areas at the site.



Expedia
Featuring MapPoint®
Technology



© 2002 Microsoft Corp © 1999 NavTech, GDT, Inc. and/or CompuSearch

Location map chicora tank.apr 10/03/2002

LEGEND

★ Site Location

Source: Expedia
Prepared By: STEP, Inc. Oak Ridge, TN
Job Title: Work Plan for
Soil Remediation and Free Product
Recovery at Chicora Tank Farm
Charleston Naval Shipyard
Charleston, South Carolina

Figure 3-1 Site Location Map

In May 2001, Tetra Tech NUS, Inc. (TtNUS) sampled groundwater to provide baseline analytical data for preparation of the Intrinsic CAP. During the sampling event, a thick, viscous petroleum free product was found in two on-site wells (MW-07 and MW-13) and later in a third well (MW-01). The free product was believed to be Bunker "C" fuel. Due to viscosity of the free product found at CTF, the thickness of the layer of free product could not be accurately determined; however, a layer approximately 0.5 foot was observed at monitoring well MW-01. In accordance with SCDHEC guidance, implementation of an Active CAP was required because free phase product was present with a thickness greater than 0.01 feet.

TtNUS personnel returned to the facility in August, September, and October 2001, and recovered free product using a vacuum extraction truck at monitoring wells MW-01, MW-07 and MW-13. A total of 1,900 gallons of water/petroleum mixture were extracted over the course of four events. In December 2001, during the installation of three additional well monitoring wells, the existing wells were checked and free product had returned to two of these wells.

5.0 FIELD ACTIVITIES

Upon approval of the project plans, STEP personnel will begin field activities to remove and properly dispose of petroleum-contaminated soil and free phase petroleum product from three areas at the CTF.

5.1 Mobilization

Mobilization will include delivering all construction equipment, tools, materials, and supplies to the job site and establishing a work area. A temporary laydown area for equipment and materials will be coordinated with the Caretaker Site Office (CSO). In addition, an interim on-site storage area for the excavated soils will be identified.

5.2 Utility Identification

STEP will coordinate with the CSO before fieldwork begins to obtain any necessary excavation permits and authorizations. Utilities or other potential underground interferences will be marked with flags or paint before any intrusive activity begins. Any interruption of utility services will be kept at a minimum and shall be at such times and duration as approved by the CSO. Any interruptions in service will be scheduled with the CSO and approved in advance.

5.3 Site Control

Field activities will be performed in a manner that least interferes with the normal functions of the government. Site controls will be maintained for construction and on-site personnel. STEP will rope off excavation locations to limit access to the construction area. During removal activities, the sides of the excavation will be sloped to prevent injury to on-site personnel, damage to structures, injurious caving, and erosion.

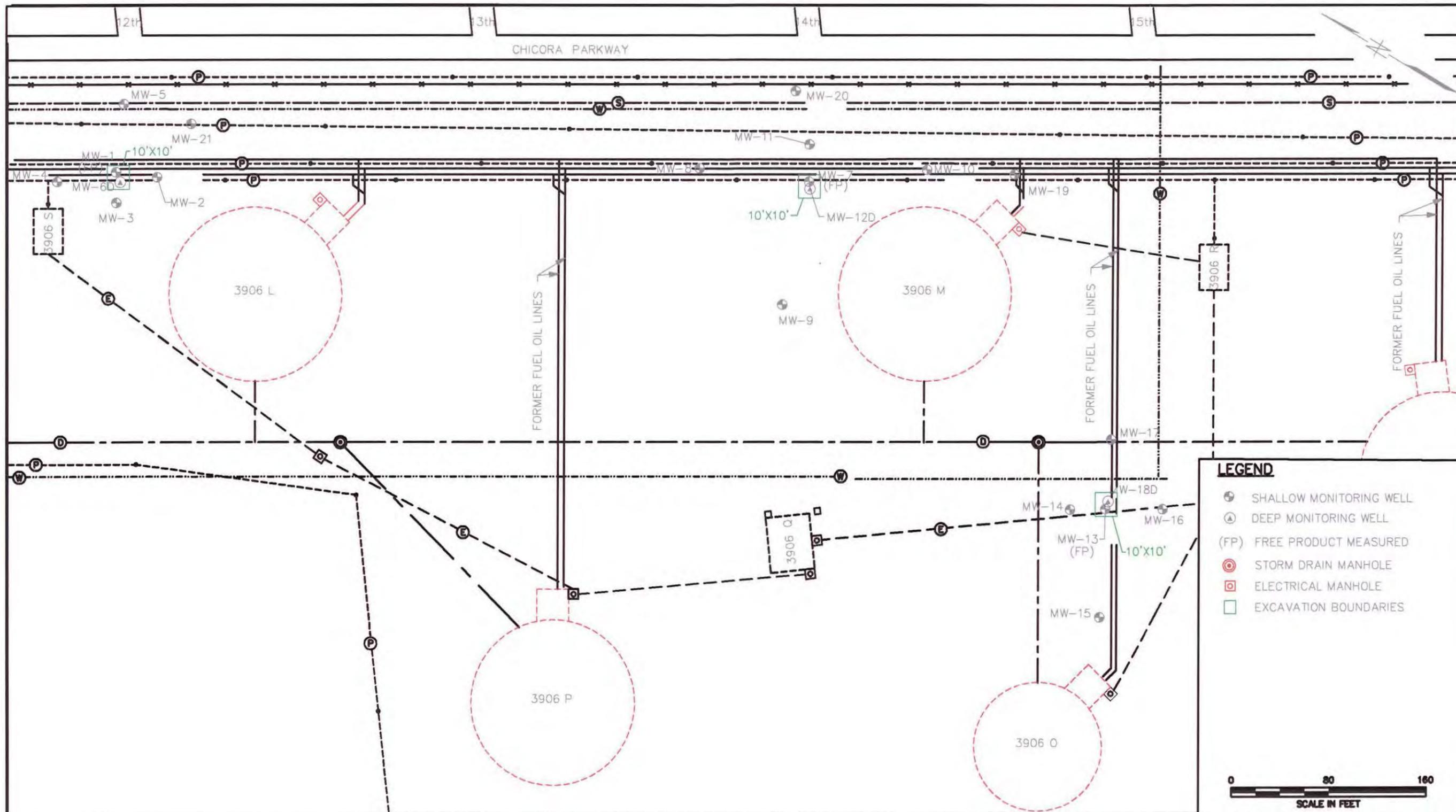
5.4 Groundwater Sampling

Three shallow wells will be sampled within the excavations and analyzed for benzene, toluene, ethylbenzene, xylene (BTEX), total organic halogens, Resource Conservation and Recovery Act (RCRA) 8 metals, flashpoint, and pH. Sample results will be used for waste characterization of the groundwater so that any water removed from the excavations can be disposed immediately, eliminating the need for on-site storage of water mixed with free phase petroleum product. A SCDHEC approved laboratory will be chosen to analyze the samples.

5.5 Well Abandonment

Six monitoring wells within the excavation areas will be properly abandoned in accordance SCDHEC Well Standards and Regulations, R.61-71. Care will be taken to protect wells not impacted by removal efforts. If a groundwater monitoring well is damaged during excavation, STEP will notify the SOUTHDIV PM, and replace the well if deemed necessary by the SOUTHDIV PM.

The following monitoring wells will be abandoned: MW-01, MW-06D, MW-07, MW-12D, MW-13, and MW-18D. These wells are shown in Figure 5-1.



LEGEND

- SHALLOW MONITORING WELL
- ⊙ DEEP MONITORING WELL
- (FP) FREE PRODUCT MEASURED
- ⊙ STORM DRAIN MANHOLE
- ⊙ ELECTRICAL MANHOLE
- EXCAVATION BOUNDARIES



NO.	DATE	REVISIONS	BY	CHKD	APPD	REFERENCES	DRAWN BY	DATE	<p align="center">FACILITY LAYOUT MAP CHICORA TANK FARM – SITE 42 CHARLESTON NAVAL SHIPYARD CHARLESTON, SOUTH CAROLINA</p>	CONTRACT NO.	
							CHECKED BY	DATE		APPROVED BY	DATE
							COST/SCHED-AREA			APPROVED BY	DATE
							SCALE AS NOTED			DRAWING NO. FIGURE 5-1	REV. 0

5.6 Soil Excavation

Petroleum-contaminated soil will be excavated and removed from three areas of concern (AOC) at the CTF. Locations of the AOCs are shown in Figure 5-1. An interim on-site storage area will be identified and temporarily used for the excavated soil material. The Trident District Office of SCDHEC [(843)-820-5630] will be notified at least 48 hours before excavation activities begin.

During excavation, soil will be segregated based upon field screening (visual observation for petroleum staining, petroleum odors, and use of a photo ionization detector). Soil suspected to be contaminated will be placed into covered roll-off containers. The uncontaminated soil will be placed in a lined containment area. The containment area will be bermed and lined with at least 10-mil plastic sheeting with taped seams. Materials temporarily stored in the containment area will be covered with 6-mil plastic sheeting to prevent saturation during rain events.

The bottom of the each excavated pit will be approximately 10 feet (ft) x 10 ft x 8 ft deep. STEP assumes that the top 3 -4 ft of excavated soil will be clean, however this material will be visually inspected as it is removed to confirm this assumption. The top layer of excavated material will be removed, properly stored, and if clean, reused as surface soil backfill only. The 4-ft to 8-ft smear zone is anticipated to be contaminated and will be removed. Excavation below the water table (approximately 5 ft to 6 ft below ground surface) will require dewatering. Damage to existing structures will be prevented wherever possible.

Approximately 55 cubic yards of petroleum-contaminated soil will be removed from the three areas, and approximately 12,000 gallons of mixed free phase petroleum product and water will be treated and disposed at an off-site authorized treatment facility.

5.7 Confirmatory Soil Samples

To confirm that all contamination was removed, a total of 5 soil samples will be collected within each excavated area. At each pit, four sidewall samples will be collected just above the water table and one sample will be collected from the bottom. Soil samples will be analyzed by a SCDHEC-approved laboratory for BTEX, naphthalene, and polyaromatic hydrocarbons.

5.8 Installation of Monitoring Wells

In accordance with SCDHEC Well Standards and Regulations, a request to install monitoring wells will be submitted to SCDHEC for approval. Within each excavation, one permanent monitoring well will be installed in the former location of the following abandoned wells:

- MW-13 near former Tank O,
- MW-07 near former Tank M,
- and MW-1 near former Tank L.

All wells will be installed by a South Carolina Certified Permanent Well Driller and constructed in compliance with the SCDHEC Well Standards and Regulations, R.61-71. In addition, monitoring well construction logs will include all information requested in this guidance. Wells will be installed after the excavations are backfilled.

Each monitoring well will be located with respect to horizontal and vertical datum in accordance with U.S. Geological Survey (USGS) North American Datum (NAD) 1983. Monitoring well surveys will be supervised and certified by a state registered land surveyor.

5.9 Site Reclamation

After the analytical results are received, excavations will be backfilled with clean material and compacted to meet a 90% proctor density. Soil material will be free of debris, roots, wood, scrap materials, vegetable matter, refuse, soft unsound particles or other objectionable materials. Fill will be brought to the level of the surrounding soil and graded to drain water. Seed and straw will be placed on the disturbed areas.

6.0 WASTE MANAGEMENT

Waste and debris generated from the project fieldwork will be placed in appropriate containers and characterized for disposal in accordance with federal, state, and local regulations. Waste will be handled and managed in such a manner as to prevent spills and contamination. In the event of oil or hazardous substance spills that constitute a reportable quantity, the SOUTHDIV PM and the CSO will be notified immediately.

The following waste streams will be generated:

- trash and debris,

- excavated soils, and
- wastewater (free phase petroleum product and/or water, decontamination water and well development water).

Any excavated contaminated soil will be containerized in roll-offs and characterized for disposal. The characterization testing will include TCLP for the RCRA eight metals, BTEX and flashpoint. Trash and debris will also be placed into roll-offs for off-site disposal. Wastewater will be collected in a vacuum truck and disposed of off-site.

7.0 HEALTH AND SAFETY PLAN

A site-specific Health and Safety Plan (HASP) has been prepared for this project to address the hazards anticipated. The HASP has been developed to incorporate appropriate sections of the *STEP Corporate Safety and Health Program Manual* (STEP, August 2001). All work activities performed in association with this project shall be conducted in strict compliance with applicable provisions within the project plans, SCDHEC regulations, Occupational Safety and Health Administration (OSHA) *29 Code of Federal Regulations* (CFR) 1910 and 1926 Standards, and the U.S. Army Corps of Engineers Safety and Health Requirements Manual, EM 385-1-1.

8.0 ENVIRONMENTAL PROTECTION PLAN

An environmental protection plan has been prepared for this project. The plan outlines STEP's methods and responsibilities for protecting natural resources and the environment during field work. STEP will comply with applicable federal, state, local, and base environmental laws.

9.0 QUALITY CONTROL PLAN

A Quality Control Plan (QCP) has been prepared for this project to address the quality control measures that will be implemented.

10.0 COMPLETION REPORT

Within 45 days of the end of fieldwork, STEP will provide an excavation completion report. This report will include trip tickets/manifests of contaminated soil removed and disposed, quantity of backfill soil, quantity and method of oil/water mixture removed and disposed, well abandonment and installation

approval letters from SCDHEC, a map of excavated areas, and sampling locations and analysis. The excavation completion report will also include a map showing locations of all new and existing wells, and photographs taken during fieldwork.

One draft copy of the report will be provided to SOUTHDIV for review and approval. After it has been approved and signatures have been obtained, SOUTHDIV will receive two paper copies and three compact disc (CD) copies, and SCDHEC will receive two paper copies and two CD copies. In accordance with the scope of work, electronic files will be provided in PDF format.

11.0 REFERENCES

STEP, Inc. (Solutions To Environmental Problems, Inc.), August 2001. *Corporate Safety and Health Program Manual*.

SCDHEC (South Carolina Department of Health and Environmental Control), April 2002. *Well Standards and Regulations, R. 61-71*.

SCDHEC (South Carolina Department of Health and Environmental Control), January 1998. *Risk Based Corrective Action for Petroleum Releases*.

Tetra Tech NUS, Inc. May 2002. *Active Corrective Action Plan for Chicora Tank Farm, Charleston Naval Complex, North Charleston, South Carolina*.

Tetra Tech NUS, Inc. October 1999. *Rapid Assessment Report for Site 42, Chicora Tank Farm, Charleston Naval Complex, North Charleston, South Carolina*.

USACE (U.S. Army Corps of Engineers). *Safety and Health Requirements Manual*, EM 385-1-1, latest edition.