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SAMPLING AND ANALYSIS PLAN SITES 278 AND 325 NSA PANAMA CITY FL
3/1/1997
ABB

SAMPLING AND ANALYSIS PLAN
SITES 278 AND 325

COASTAL SYSTEMS STATION
PANAMA CITY, FLORIDA

UNIT IDENTIFICATION CODE: N61331
CONTRACT NO. N62467-89-D-0317/129

MARCH 1997

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

ABB

8538-002

March 12, 1997

Mr. Nick Ugolini
Southern Division
Naval Facilities Engineering Command
2155 Eagle Drive
N. Charleston, SC 29411

SUBJECT: Sampling & Analysis Plan (SAP) and Health & Safety Plan (HASP) for upcoming fieldwork at CSS Panama City, Panama City, Florida Navy CLEAN Contract No. N62467-89-D-0317/129

Dear Nick,

Enclosed please find the abovementioned reports for CTO 129 for your review and comment. I have also sent copies to Mike Clayton and Van Smith (CSS Panama City) for their review and comments. Copies have also been sent to John Mitchell (FDEP) and Rick Akers (Bechtel) for their general information. Please send comments to my attention by April 3, 1997.

If you have any questions please call Gopi Kanchibhatla at Ext. 294, as I will be out of the office, but will be checking my voicemail regularly.

Sincerely,

ABB Environmental Services, Inc.

Kathy Hodak

Kathy Hodak
Project Manager

Enclosure

cc: Gopi Kanchibhatla - ABB-ES
Celora Jackson - ABB-ES
Mike Clayton - CSS PC
Van Smith - CSS PC
John Mitchell - FDEP
Rick Akers - Bechtel
File - 8538-XX

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SAMPLING AND ANALYSIS PLAN

SITES 278 AND 325

COASTAL SYSTEMS STATION
PANAMA CITY, FLORIDA

Unit Identification Code: N61331

Contract No.: N62467-89-D-0317/129

Prepared by:

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

Prepared for:

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

Nick Ugolini, Code 184NJU, Engineer-in-Charge

March 1997

CERTIFICATION OF TECHNICAL
DATA CONFORMITY (MAY 1987)

The Contractor, ABB Environmental Services, Inc., hereby certifies that, to the best of its knowledge and belief, the technical data delivered herewith under Contract No. N62467-89-D-0317/129 are complete and accurate and comply with all requirements of this contract.

DATE: March 5, 1997

NAME AND TITLE OF CERTIFYING OFFICIAL: Kathleen M. Hodak
Task Order Manager

NAME AND TITLE OF CERTIFYING OFFICIAL: Gopi Kanchibhatla, P.E.
Project Technical Lead

(DFAR 252.227-7036)

FOREWORD

Subtitle I of the Hazardous and Solid Waste Amendments of 1984 to the Solid Waste Disposal Act of 1965 established a national regulatory program for managing underground storage tanks (USTs) containing hazardous materials, especially petroleum products. Hazardous wastes stored in USTs were already regulated under the Resource Conservation and Recovery Act of 1976. Subtitle I requires that the U.S. Environmental Protection Agency (USEPA) promulgate UST regulations. The program was designed to be administered by individual States who were allowed to develop more stringent, 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 (CFR), Title 40, Part 280 (40 CFR 280) (*Technical Standards and Corrective Action Requirements for Owners and Operators of Underground Storage Tanks*) and 40 CFR 281 (*Approval of State Underground Storage Tank Programs*). 40 CFR 280 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. Questions regarding this report should be addressed to the Environmental Coordinator, Coastal Systems Station, Panama City Florida at 904-235-5859, or Southern Division, Naval Facilities Engineering Command, Code 184NJU, at DSN 563-0613 or 803-743-5596.

EXECUTIVE SUMMARY

Coastal Systems Station (CSS) in Panama City, Florida, is a Navy research and development facility located on St. Andrew Bay in Bay County, Florida. CSS is bounded by U.S. Highway 98 to the north, St. Andrew Bay to the east, State Route 392B (Magnolia Beach Road) to the south, and State Route 392 (Thomas Drive) to the west. Site 278 is located east of Alligator Bayou, and Site 325 is located north of Alligator Bayou near the entrance to St. Andrew Bay.

Sites 278 and 325 are the locations of underground storage tanks. Both soil and groundwater at the sites were found to exceed Chapter 62-770, Florida Administrative Code, target levels. Additionally free-floating petroleum product was detected in varying amounts in several site monitoring wells. Remedial action plans were prepared to address the cleanup of contaminated soil and groundwater at Sites 278 and 325 and were submitted in April and May 1996.

ABB Environmental Services, Inc. (ABB-ES), was contracted by the Southern Division, Naval Facilities Engineering Command to perform Postconstruction Award Services during remedial action at Sites 278 and 325. The scope of services for work at Sites 278 and 325 is described in Contract Task Order No. 129, the Plan of Action, and the Remedial Action Plans.

This Sampling and Analysis Plan (SAP) describes the data collection and sample analytical procedures to be used in support of the remediation system construction, installation, and operation at Sites 278 and 325, CSS, in Panama City, Florida. Monitoring the performance of the remedial systems in reducing the contaminant concentrations in soil and groundwater is necessary to determine if remedial progress is proceeding at a reasonable pace. The following is a list of sampling episodes included for Site 278 and Site 325:

- Baseline groundwater sampling
- Quarterly groundwater sampling
- Soil vapor and air emissions sampling
- Groundwater-level and free-product-thickness measurements
- Measurement of system design parameters

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Panama City, Florida

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GLOSSARY

ABB-ES	ABB Environmental Services, Inc.
CAR	Contamination Assessment Report
CFR	Code of Federal Regulations
CLP	Contract Laboratory program
COC	chain of custody
CSS	Coastal Systems Station
DOT	Department of Transportation
ECBSOPQAM	Environmental Compliance Branch Standard Operating Procedures and Quality Assurance Manual
°F	degrees Fahrenheit
FAC	Florida Administrative Code
FDEP	Florida Department of Environmental Protection
GC	gas chromatograph
HASP	health and safety plan
IDW	investigation derived waste
LNAPL	light nonaqueous-phase liquid
MS	mass spectroscopy
NEESA	Naval Energy and Environmental Support Activity
NFA	no further action
O&M	operation and maintenance
OVA	organic vapor analyzer
PID	photo ionization detector
QA/QC	quality assurance/quality control
®	registered trademark
RAP	Remedial Action Plan
SAP	sampling and analysis plan
SOP	standard operating procedure
™	trademark
USEPA	U.S. Environmental Protection Agency
UST	underground storage tank
VEE	vacuum-enhanced extraction
VOA	volatile organic aromatic
VOCs	volatile organic compounds

LIST OF FIGURES

Sampling and Analysis Plan
Sites 278 and 325
Coastal Systems Station
Panama City, Florida

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1.0 INTRODUCTION

1.1 **GENERAL**. Coastal Systems Station (CSS) is a Navy research and development facility located on St. Andrew Bay in Bay County, Florida (see Figure 1-1). It is situated approximately 103 miles east of Pensacola, 98 miles west of Tallahassee, and 7 miles west of Panama City. CSS is bounded by U.S. Highway 98 to the north, St. Andrew Bay to the east, State Route 392B (Magnolia Beach Road) to the south, and State Route 392 (Thomas Drive) to the west. Site 278 is located at the east dock next to Alligator Bayou (see Figure 1-2).

Site 278 is the former location of four 7,500-gallon underground storage tanks (USTs) used for storing diesel fuel. The four tanks at Site 278 were removed in 1989 and replaced with two 15,000-gallon USTs. Site 325 is located north of Alligator Bayou near the inlet to St. Andrew Bay (see Figure 1-3). Site 325 is the former location of three 20,000-gallon fiberglass USTs containing jet propellant-5 jet fuel. The three tanks and the associated pipes were removed in 1995. Both soil and groundwater at the sites were found to exceed Chapter 62-770, Florida Administrative Code (FAC), target levels. Additionally, free-floating petroleum product was detected in varying amounts in site monitoring wells CSS-278-MW5, CSS-325-MW18, CSS-325-MW23, and CSS-325-MW26. The contamination assessment reports (CARs) for Sites 278 and 325 were submitted in July 1993 and January 1996, respectively. The CARs recommended that a remedial action plan (RAP) be prepared to address the cleanup of the sites. RAPs were prepared and submitted for Sites 278 and 325 in April and May 1996, respectively. The RAPs were reviewed and approved by the Florida Department of Environmental Protection (FDEP) in May and September 1996.

ABB Environmental Services, Inc. (ABB-ES), was contracted by the Southern Division, Naval Facilities Engineering Command to perform Postconstruction Award Services for Sites 278 and 325 at CSS in Panama City, Florida. The scope of services for work at Sites 278 and 325 is described in Contract Task Order No. 129, the Plan of Action, and the RAP; the scope is summarized in Section 1.3.

1.2 **PURPOSE**. This Sampling and Analysis Plan (SAP) describes the data collection and sample analytical procedures to be used in support of the Remediation System Construction, installation and operation at Sites 278 and 325, CSS, Panama City, Florida. Monitoring the performance of the remedial systems in reducing the contaminant concentrations in soil and groundwater is necessary to determine if remedial progress is proceeding at a reasonable pace.

1.3 **SCOPE**. This plan specifies sampling protocol and procedures, as well as types, locations, frequency of samples to be collected, sample designations, sample handling and analysis, sampling equipment, and handling of investigation derived waste (IDW).

This plan was prepared in accordance with the procedures laid out in the following documents:

- Quality Assurance Program Plan (ABB-ES, 1994).

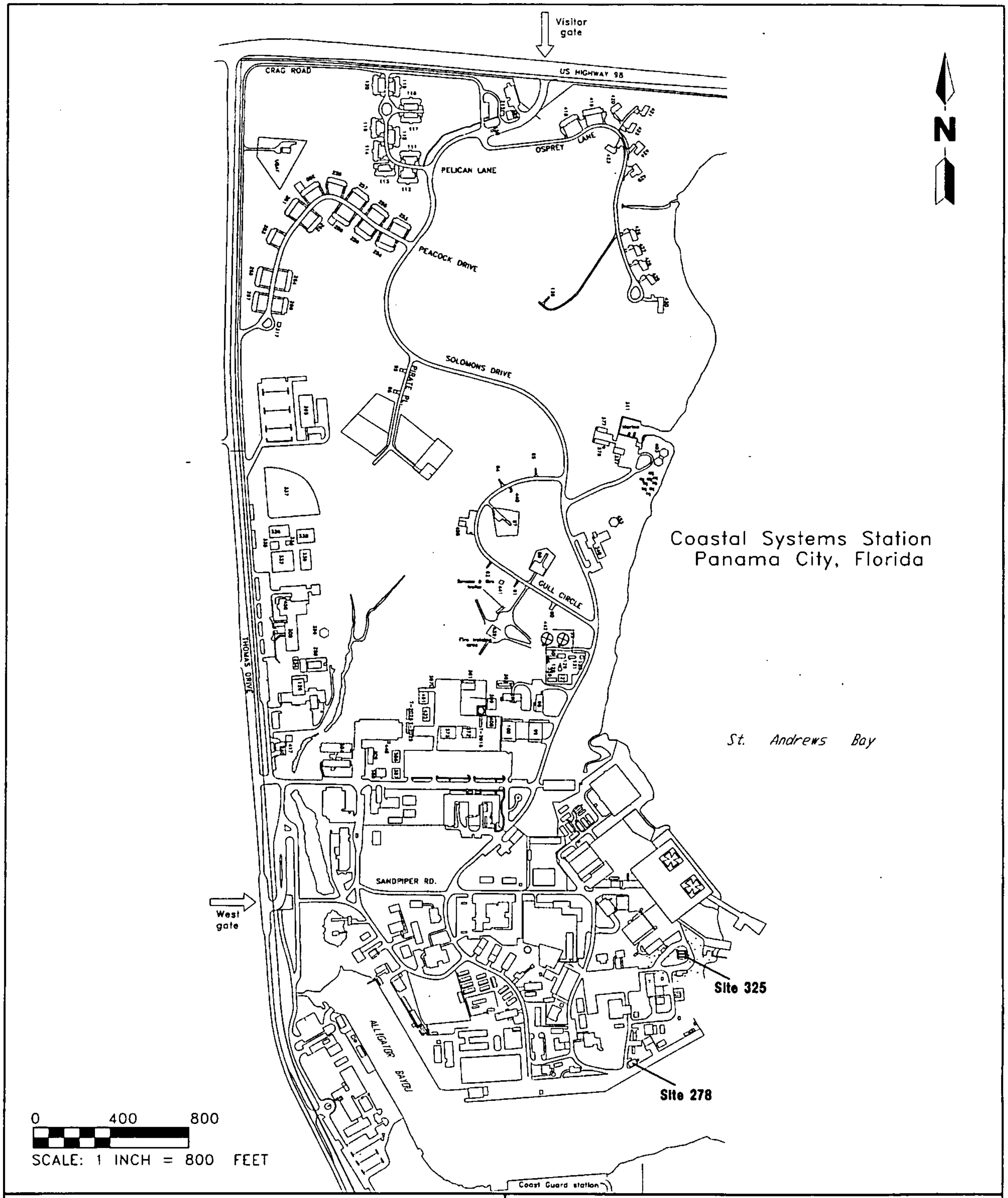

FIGURE 1-1
SITE LOCATION MAP

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SAMPLING AND ANALYSIS PLAN, SITES 278 AND 325

COASTAL SYSTEMS STATION PANAMA CITY, FLORIDA

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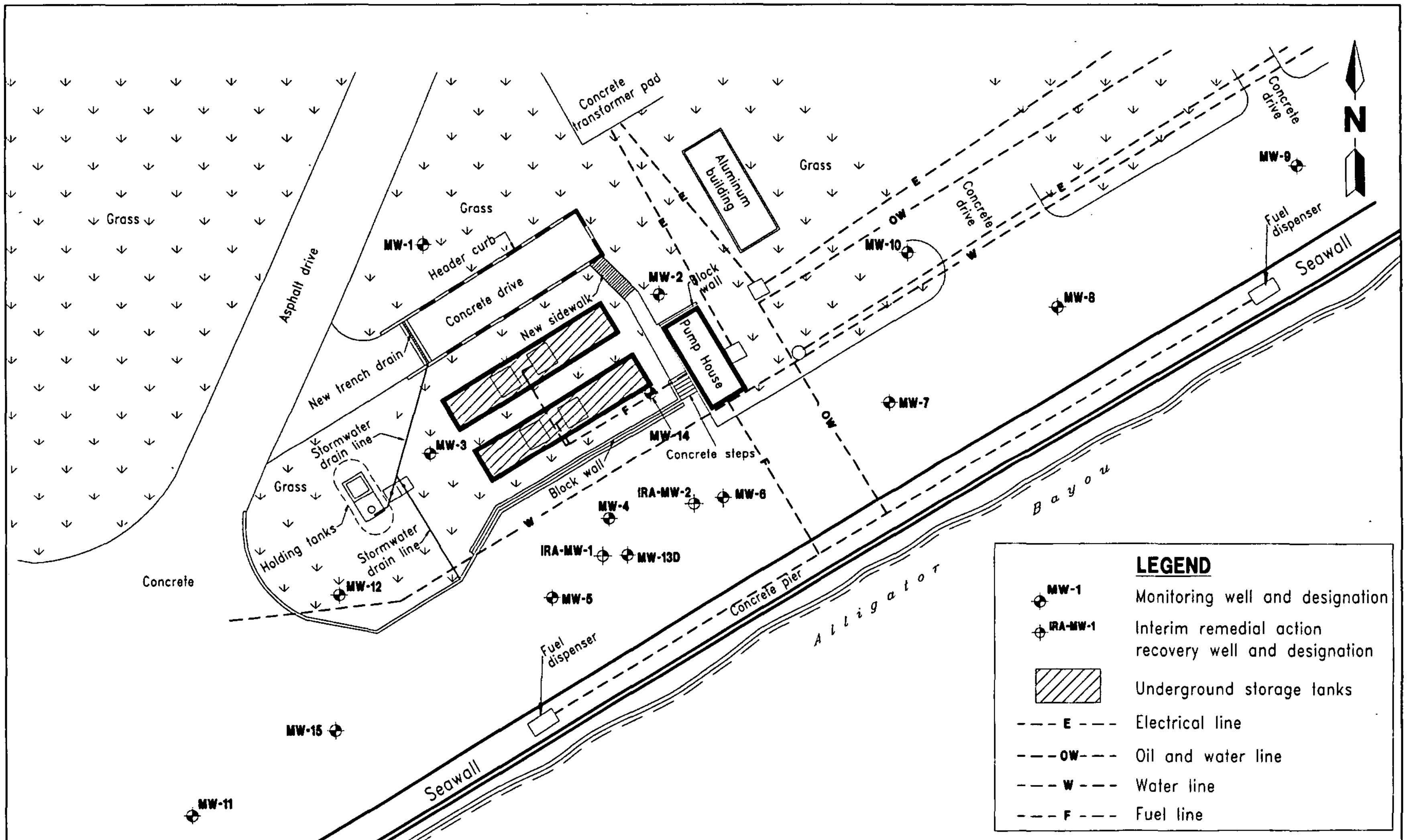

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SCALE: 1 INCH = 40 FEET

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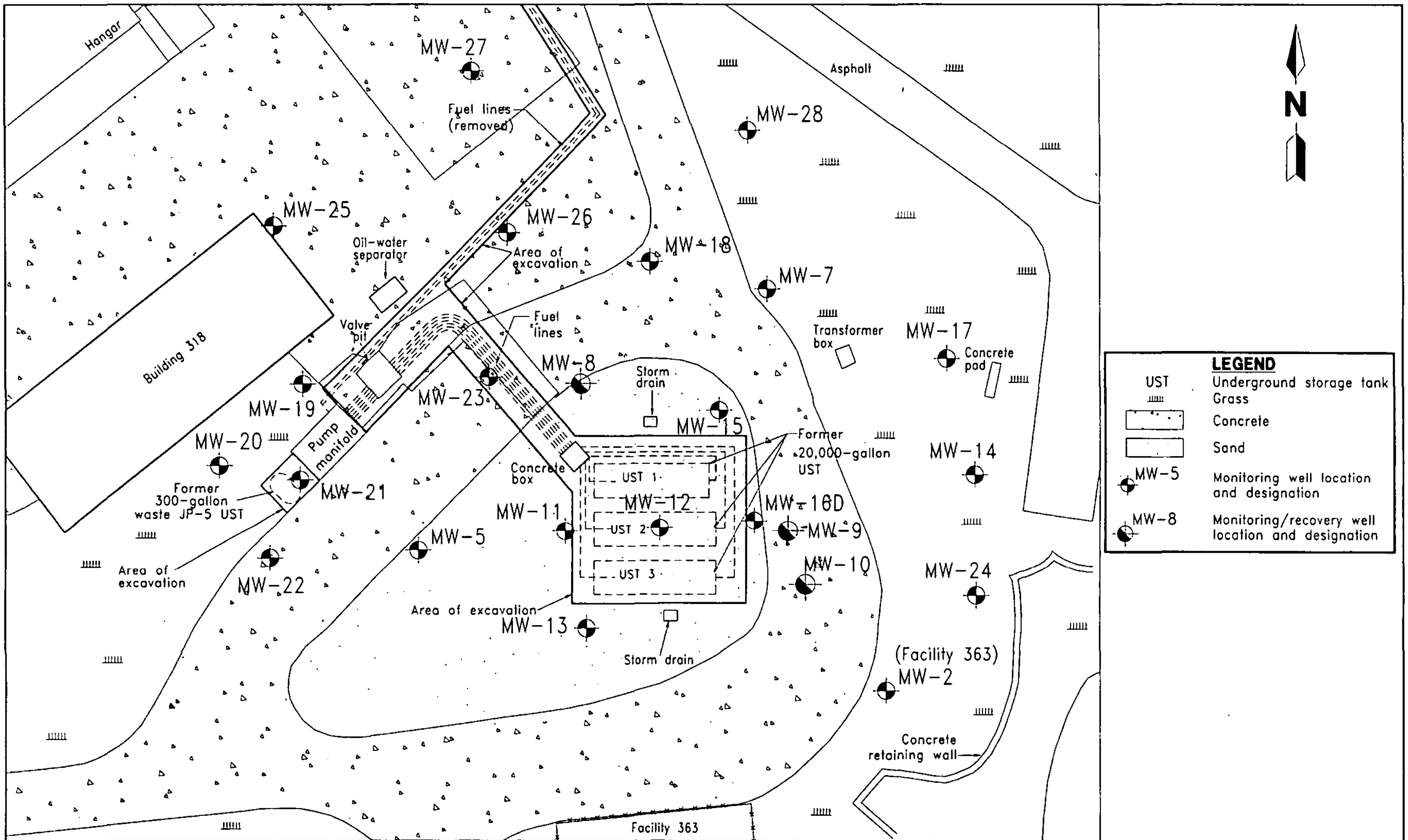
FIGURE 1-2
SITE 278, GROUNDWATER MONITORING WELL LOCATION MAP

SOUTHERN DIVISION NAVAL FACILITIES ENGINEERING COMMAND

SAMPLING AND ANALYSIS PLAN, SITES 278 AND 325

COASTAL SYSTEMS STATION PANAMA CITY, FLORIDA



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SCALE: 1 INCH = 50 FEET

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FIGURE 1-3
SITE 325, GROUNDWATER MONITORING WELL LOCATION MAP

SOUTHERN DIVISION NAVAL FACILITIES ENGINEERING COMMAND

SAMPLING AND ANALYSIS PLAN, SITES 278 AND 325

COASTAL SYSTEMS STATION PANAMA CITY, FLORIDA

- Best Practices Manual for Bioslurping (Naval Facilities Engineering Service Center [NFESC], 1996).
- How to Evaluate Alternative Cleanup Technologies for Under Ground Storage Tank Sites, A Guide for Corrective Action Plan Reviewers (U.S. Environmental Protection Agency [USEPA], 1995).

2.0 FIELD SAMPLING PLAN

2.1 SITE MANAGEMENT. Site Management involves such tasks as mobilization and demobilization from the facility, access to the sites, documentation of all activities during the investigation, decontamination procedures to be implemented for various equipment, and proper disposal of IDW. These tasks are described below.

2.1.1 Mobilization The following activities will be performed at CSS as part of mobilization:

- field team orientation, including security clearances for work in the specific areas, and

- a field team and subcontractor health and safety meeting.

2.1.2 Site Access and Control CSS is an active Navy base with controlled site access. Where necessary, the environmental coordinator will be notified about onbase locations of ABB-ES personnel during field activities.

2.1.3 Documentation Documentation and records of all procedures performed during the remediation system construction, installation, and operation will be maintained as described below. All documentation will be placed in the CSS project files.

2.1.3.1 **Field Logbooks** Field logbooks will document the details of the sampling activities. Field team personnel will be responsible for data entry in field logbooks. These bound logbooks will document sampling activities for the site, including equipment and assembling decontamination activities, sample collection, visual observations, sample handling, and shipping. Entries will be descriptive and detailed as possible so that a particular situation could be reconstructed without reliance on the collector's memory.

All entries will be made with indelible ink and legibly written. The language will be factual and objective. No erasures will be permitted. If an incorrect entry is made, the data will be crossed out with a single mark, initialed, and dated. The following guidelines will be implemented for all logbooks:

- each page will be signed, dated, and numbered;
- blank pages will be marked as such;
- each entry will be identified with the time (24-hour clock); and
- logbook extensions (field sheets and logs) will be recorded.

2.1.3.2 **Calibration Logbook** Instruments will be calibrated and inspected daily before field activities begin, after daily activities, and as suggested by the manufacturers. Calibration information will be recorded in a calibration logbook. Each calibration logbook is kept with its respective equipment.

2.1.3.3 **Plans** A copy of the Workplan, the health and safety plan (HASP), and the SAP will be kept onsite. Copies of the HASP will be placed in a central location and issued to each field team. Appropriate plans, including standard operating procedures (SOPs) and the SAP, will also be provided to each field team.

2.1.3.4 **Operations and Maintenance (O&M) Manual** An O&M manual should be provided at the time of installation and startup. The manual should provide all necessary information for the proper O&M of the system by someone other than the builder. The O&M manual should include, at a minimum, the following:

- system startup instructions;
- system shutdown instructions;
- electrical and controls wiring diagrams;
- system "as-built" drawings;
- equipment manufacturers product operation manuals for each piece of equipment;
- equipment warranty and guaranty information;
- equipment service and repair vendor phone numbers;
- system troubleshooting guide;
- equipment and system maintenance schedule and checklist;
- Material Safety Data Sheets for materials used or being treated;
- monitoring schedule, including sampling frequency, sampling locations, required analyses, parameters for field measurement, vapor monitoring requirements, and vacuum measurement requirements; and
- instructions for maintaining a site activity log.

The manual should be assembled and bound in a manner suitable for use in the field.

2.1.4 Field Monitoring Instrumentation The following monitoring instruments may be used during field activities at CSS for health and safety monitoring:

- photoionization detector (PID),
- organic vapor analyzer (OVA),
- explosimeter,
- dustmeter (i.e., Miniram),
- noise meter,
- radiation badges, and
- Dräger tubes (benzene, vinyl chloride, trichloroethene, and trichloroethane).

Instruments to be used for field measurements include

- Ph-temperature-specific conductance meter,
- turbidity meter,
- electronic water-level meter,
- pressure gauge,
- GA-90 oxygen (O_2), carbon dioxide (CO_2), methane (CH_4) meter, and

- Teflon™ gas sampling pump.

Instruments will be calibrated and inspected daily before field activities begin, after daily activities, and as suggested by the manufacturers. Air monitoring safety equipment used in the field will be calibrated and inspected each time it is turned on, in accordance with the *Region IV Environmental Compliance Branch Standard Operating Procedures and Quality Assurance Manual* (Environmental Compliance Branch Standard Operating Procedures and Quality Assurance Manual [ECBSOPQAM]) (USEPA, 1991). Any equipment not specifically referenced in this document will be calibrated and maintained according to the manufacturers' specifications. Calibration information will be recorded in a calibration logbook that will be kept on file in a central location. Malfunctioning instruments will be repaired or replaced. Monitoring equipment will be protected from contamination during sampling activities as much as possible without hindering operation of the unit. Equipment maintenance will be performed according to manufacturer specifications before field use, or by cycling units out of the field. As appropriate, routine periodic maintenance may be performed as a function of field calibration.

2.1.5 Equipment Decontamination Procedures To assure that analytical results reflect the actual concentrations present at sampling locations, chemical sampling and field analytical equipment will be properly decontaminated prior to the field effort, onsite during the sampling program (i.e., between sampling points), and onsite at the conclusion of the sampling program. This will minimize the potential for cross contamination between sample points and the transfer of contamination offsite. Field decontamination procedures conducted during a field event will be documented in the field logbook.

These cleaning procedures are based on USEPA Region IV SOP and Quality Assurance Manual and FDEP guidelines. To clarify the decontamination procedures the following definitions have been used.

Detergent will be a phosphate-free laboratory detergent such as Alconox™ or Liquinox™.

Acid solution will be made from reagent-grade nitric acid and deionized water.

Solvent will be pesticide-grade solvent (i.e., isopropanol, acetone, hexane, etc.).

Tap or potable water will be treated water from any municipal water treatment system.

Deionized water is tap water that has been treated by passing through a standard deionizing resin column.

Organic-free water is tap water that has been treated with activated carbon and deionizing units. It should contain no pesticides, herbicides, extractable organic compounds, and less than 5 micrograms per liter of purgeable organic compounds as measured by a low-level gas chromatograph/mass spectrometer (GC/MS) scan. This organic-free water will be used for blank preparation and for final rinse in decontamination.

2.1.5.1 **Field Decontamination Procedures** It is ABB-ES policy to transport to the field (when practical) sufficient equipment so that the entire study can be conducted without the need for field cleaning. However, when this is not possible, the following field decontamination procedures will be followed.

Sampling Equipment for Organic and Metal Analytical Parameters. Teflon™, stainless-steel, glass, or metal sampling equipment used to collect samples for organic and metal analytical will be cleaned between sample locations as listed below.

1. Wash and scrub equipment thoroughly with laboratory detergent and tap water.

2. Rinse thoroughly with tap water.

3. Rinse thoroughly with deionized water.

4. Rinse twice with solvent (pesticide-grade isopropanol).

5. Rinse with organic-free water and allow to air dry as long as possible.

6. If organic-free water is not available, allow equipment to air dry as long as possible. Do not rinse again with deionized or distilled water.

Note that deionized water, organic-free water, and solvents must be dispensed from glass, Teflon™, or stainless-steel containers.

Cleaning Procedures for Downhole Equipment. Drilling, sampling, and associated equipment that will come in contact with the downhole sampling medium will be cleaned as outlined below.

1. Wash and scrub with tap water and laboratory-grade detergent.

2. Steam clean and/or high pressure wash, if necessary, to remove soil. The steam cleaner or high pressure washer should be capable of generating a pressure of at least 2,500 pounds per square inch and producing hot water and/or steam (200 °Fahrenheit [°F] and above).

3. Rinse thoroughly with tap water.

4. Rinse thoroughly with deionized water.

5. Rinse twice with solvent. Note: do not rinse polyvinyl chloride materials with solvent.

6. Rinse thoroughly with organic-free water and allow to air dry.

7. If organic-free water is not available, allow equipment to air dry. Do not rinse again with deionized or distilled water.

8. Where appropriate, wrap with aluminum foil to prevent contamination during storage. Augers, drill stems, casings, and other large items can be wrapped in clean plastic if necessary.

9. If caked mud, rust, and/or paint is present that cannot be removed by steam or high pressure wash, the downhole equipment will be sandblasted prior to step number 1 above, and prior to arrival onsite.

10. Printing and/or writing on well casing, screens, tremie, tubing, etc., will be removed with emery cloth or sand paper prior to arrival onsite. Where possible, materials without printing or writing will be ordered.

Note that deionized water, organic-free water, and solvents must be dispensed from glass or Teflon™ containers.

2.1.5.2 **Water-Level Measurement Equipment** The electrical (sounding) tape or steel tape used to measure water levels will be cleaned before and after use at each well to avoid chemical cross contamination between wells. The procedure will include an organic-free water rinse for sites without detected decontamination and a full decontamination for sites where contamination is present. The tape will be placed in a polyethylene bag for storage or transportation.

2.1.5.3 **Decontamination Staging Area and Fluid Disposal** Cleaning and decontamination of all equipment will occur at a designated area onsite that is downgradient and downwind (prevailing wind direction) of the clean equipment drying and storage area. The cleaning and decontamination area will contain an excavated pit, lined with heavy duty plastic sheeting, for containment of washwater and waste. The pit will be designed such that washwater will drain into the pit. Solvent rinsates will be collected in separate containers.

The water in the pit will be poured onto the concrete or poured into the equalization tank and the sediment will be collected in separate drums. The plastic sheeting will be washed and the wastewater will be containerized as contaminated washwater. The plastic sheeting will then be properly disposed of. The pit will be backfilled with the originally excavated material.

The drums containing waste will be properly labeled, sealed, and staged for storage until laboratory analytical results are received.

2.2 SAMPLE CONTAINERS, PRESERVATION, AND HOLDING TIMES.

Table 2-1 presents a summary of samples to be collected according to the media and analytical parameters. For planning purposes and documenting the required considerations associated with sample containers, preservation, and holding times, the sample media are placed in the following categories:

- aqueous environmental media including surface water, groundwater, and aqueous quality assurance and quality control (QA/QC) samples;
- solid environmental media, including sediment and soil; and
- gaseous environmental media including offgas samples

Table 2-1 provides a comprehensive listing of the considerations, according to the analyses to be performed, required for each of these categories. The table is based on the ECBSOPQAM (USEPA, 1991).

Table 2-1
Sample Containers, Preservatives, and Holding Times

Sampling and Analysis Plan
Sites 278 and 325
Coastal Systems Station
Panama City, Florida

Analysis	Sample Matrix	Analytical Method[1]	Sample Preservation	Holding Time	Containers
VOA	Soil	Ref. 1 and USEPA Method 8010/8020 (Ref. 3)	Cool to 4 °C	14 days	1-16 oz glass wide-mouth, Teflon™-lined septa
Base Neutral Acid (BNA) and Pesticide and PCB	Soil	Ref. 1	Cool to 4 °C	14 days to extraction, 40 days to analytical	1-16 oz glass wide-mouth, Teflon™-lined lid
Metals and Cyanide	Soil	Ref. 2	Cool to 4 °C	6 months	1-16 oz glass wide-mouth, Teflon™-lined lid
PAHs	Soil	USEPA Method 8270 (Ref. 3)	Cool to 4 °C	14 days	1-16 oz glass wide-mouth, Teflon™-lined lid
TPH	Soil	USEPA Method 418.1 (Ref. 4)	Cool to 4 °C	28 days	1-16 oz glass wide-mouth, Teflon™-lined lid
Lead	Soil	USEPA Method 6010 (Ref. 3)	Cool to 4 °C	6 months	1-16 oz glass wide-mouth, Teflon™-lined lid
Nitroaromatic	Soil	USEPA Method 8330 (Ref. 3)	Cool to 4 °C	7 days to extraction, 40 days to analytical	1-16 oz glass wide-mouth, Teflon™-lined lid
Additional Pesticide/-Herbicide	Soil	USEPA Methods 8150/8140 and 1,2-dibromo-3-chloropropane (Ref. 3)	Cool to 4 °C	14 days to extraction, 40 days to analytical	1-16 oz glass wide-mouth, Teflon™-lined lid
VOA	Aqueous	Ref. 1	Cool to 4 °C[2]	14 days	2-40 mℓ glass vial, Teflon™-lined septa
BNA and Pesticide and PCB[3]	Aqueous	Ref. 1	Cool to 4 °C	7 days to extraction, 40 days to analytical	1-1 gallon glass amber, Teflon™-lined septa
Metals[3]	Aqueous	Ref. 2	Cool to 4 °C HNO_3 to pH<2	6 months, Hg - 28 days	1-1 ℓ poly, poly-lined closure
Cyanide[3]	Aqueous	Ref. 2	Cool to 4 °C[4] NaOH to pH>12	14 days	1-1 ℓ poly, poly-lined closure
VOA + Naphthalene	Aqueous	USEPA Methods 8010/8020 (modified) (Ref. 3)	Cool to 4 °C[2]	14 days	2-40 mℓ glass vial, Teflon™-lined septa

See notes at end of table.

Table 2-1 (Continued)
Sample Containers, Preservatives, and Holding Times

Sampling and Analysis Plan
Sites 278 and 325
Coastal Systems Station
Panama City, Florida

Analysis	Sample Matrix	Analytical Method[1]	Sample Preservation	Holding Time	Containers
TPH	Aqueous	USEPA Method 418.1 (Ref. 4)	Cool to 4 °C	7 days to extraction, 40 days to analytical	1-1 ℓ glass amber, Teflon™-lined lid
Nitroaromatic	Aqueous	USEPA Method 8330 (Ref. 3)	Cool to 4 °C	7 days to extraction, 40 days to analytical	1-80 oz glass amber, Teflon™-lined lid
Additional Pesticide and Herbicide	Aqueous	USEPA Methods 8150/8140 and 1,2-dibromo-3-chloropropane (Ref. 3)	Cool to 4 °C	7 days to extraction, 40 days to analytical	1-80 oz glass amber, Teflon™-lined lid

[1] Reference 1 is "Statement of Work for Organic Analytical, Multi-Concentration" Document No. OLM01 with all revisions, USEPA Contract Laboratory Program (CLP), revised June 1991.
Reference 2 is "Statement of Work for Inorganic Analytical, Multi-Concentration" Document No. ILM03 with all revisions, USEPA CLP, revised March 1990.
Reference 3 is "Test Methods for Evaluating Solid Waste, Third Edition, SW-846" USEPA Office of Solid Waste and Emergency Response, Washington, DC, November 1986.
Reference 4 is "Methods for Chemical Analytical of Water and Wastes" USEPA Office of Research and Development, Cincinnati, Ohio, March 1983, EPA 600/4-79-020.

[2] Adjust pH of aqueous VOA samples to <2 by the drop-wise addition, to the two 40 mℓ VOA vials, of 1:1 HCl (made with demonstrated organic-free water) prior to filling with sample. Determine the number of acid drops required on a third sample aliquot (of equal volume)--do not acidify sample if effervescence is observed and indicate on sample that no acid preservative has been added.

[3] One field sample must be collected in double volume for matrix spike and matrix spike duplicate analyses.

[4] Check for residual chlorine before preservation. Chlorine: Test a drop of sample on KI starch paper. If blue, add ascorbic acid crystals until a drop of sample produces no color on indicator paper. Then add an additional O.6 gram ascorbic acid/ℓ sample volume.

Notes: VOA = volatile organic analysis.
°C = degrees Celsius.
USEPA = U.S. Environmental Protection Agency.
PCB = polychlorinated biphenyl.
oz = ounce.
PAHs = polynuclear aromatic hydrocarbons.
TPH = total petroleum hydrocarbon.
mℓ = milliliters.
ℓ = liters.
HNO_3 = nitric acid.
NaOH = sodium hydroxide.
Hg = mercury.

For the majority of sampling episodes, ABB-ES obtained sample containers from a Naval Energy and Environmental Support Activity (NEESA)-approved subcontract laboratory. ABB-ES and NEESA require all subcontract laboratories to have a current and comprehensive QA plan and sample container requirements that meet USEPA Contract Laboratory program (CLP) QA requirements. The origin of sample containers is noted in equipment room files. ABB-ES obtained sample containers from suppliers that meet USEPA CLP QA requirements; ABB-ES currently contracts with I-CHEM Research, Inc. Records of I-CHEM bottles and their certification paperwork for each bottle lot are maintained by the ABB-ES equipment manager.

In general, samples for organic analysis should be stored in glass containers, and samples for inorganic analysis should be stored in plastic containers. When sample containers are stored onsite, the containers should be kept sealed and as far as possible from stored solvents. Ideally, solvents should be kept in separate facilities from clean containers and organic-free water. Preservatives will be added in the field by ABB-ES personnel. Samples will be preserved immediately upon collection in the field.

<u>2.3 DATA COLLECTION</u>. This section provides a brief description of the startup and long-term performance requirements to be implemented during the remedial system construction, installation, and operation. It should be noted that all system startup procedures, system adjustments, and O&M will be handled by Bechtel Environmental Inc., the Remedial Action Contractor for the project. All system startup sampling and future sampling events will be handled by ABB-ES.

2.4 SITE 278

2.4.1 Baseline Groundwater Quality Monitoring Prior to completion of construction and installation of the equipment and prior to the startup of each system, groundwater from 16 existing monitoring wells will be collected for analysis by USEPA Methods 601/602, 418.1 and 610. Groundwater samples from a selected list of monitoring wells (listed in Subsection 2.4.3) from the source area and the perimeter area will be collected on a quarterly basis for the first year and yearly thereafter to monitor the conditions of the groundwater in the vicinity of the remedial action.

2.4.2 Startup Performance Monitoring and System Tuneup The operation of a vacuum-enhanced extraction (VEE) system at Site 278, CSS, will start with a shakedown test. Following the system shakedown, the system will be operated over a few days or even few weeks under different configurations to determine effective operating conditions. System performance should be monitored closely during this initial stage as well as during continuous operation.

The shakedown test is conducted to ensure that all system components are operating properly and that there are no leaks in the system. Components to be checked include the valves; pressure/vacuum gauges; liquid ring pump; aqueous transfer pump; vapor, fuel, and water flow meter; oil-water interface probes; and any vapor/effluent treatment system components.

Table 2-2 presents a checklist of recommended components that need to be checked during the shakedown test and monitored thereafter.

Table 2-2
Checklist for System Shakedown
Vacuum-Enhanced Extraction System

Sampling and Analysis Plan
Sites 278 and 325
Coastal Systems Station
Panama City, Florida

Site:____________________

Date:____________________

Equipment	Check if Okay	Comments
Liquid Ring Pump		
Aqueous Effluent Transfer Pump		
Oil-Water Separator		
Connections to Vapor Treatment		
Vapor Flowmeter		
Analytical Field Instrumentation		
Magnehelic Pressure Gauges		
Oil-water interface Probe		
Organic Vapor Analyzer		
Explosimeter		

Following the shakedown, the baseline data for the site are collected. These data include light nonaqueous-phase liquid (LNAPL) thickness and depth to the groundwater table at each VEE well. Then the openings of the VEE suction tubes at each well will be placed at the LNAPL/water interface. Once the vacuum source is connected to the VEE well head, the system will be started by gradually opening all the valves at the well head seals. Provision of adequate vacuum will be required to ensure (1) effective recovery of LNAPL from wells to the treatment system, (2) creation of a vacuum gradient that extends up to the radius of influence to promote LNAPL flow toward the VEE well, and (3) aeration of larger areas.

At locations where water table fluctuations are minimal or the soil has moderate to low permeability, it is likely that vertical position of the slurper tube can essentially remain unchanged. However, at Site 278, CSS, potentially high water table fluctuations and high permeability soil are present, and as a result, the suction tube may have to be adjusted from time to time to improve fuel recovery and minimize the volume of groundwater extracted.

2.4.3 Long-Term Performance Monitoring The overall performance of VEE will be evaluated based on the data obtained for the monitoring parameters listed below.

Recover Free Product:

- Initial and final thicknesses of free product in source area and perimeter area monitoring wells.

- Composition of total fluids collected at the end of extraction event.

Reduce Groundwater Contamination at the Source Area Wells:

- Groundwater samples from source area and perimeter area wells.

- Increase in dissolved oxygen concentrations in groundwater at the source area and perimeter area wells.

Reduce Soil Contamination within the Capillary Zone:

- Vapor flow rates from the recovery wells.

- Vapor concentrations during application of VEE.

- Vacuum readings at the well heads from source area and perimeter area wells during application of VEE.

Table 2-3 presents the data log for VEE.

Frequency of monitoring and recovery events for free product and groundwater weekly, monthly, and quarterly will vary according to the flow scheme presented on Figure 2-1.

Table 2-3
Vacuum-Enhanced Extraction Data Log

Sampling and Analysis Plan
Sites 278 and 325
Coastal Systems Station
Panama City, Florida

Site:

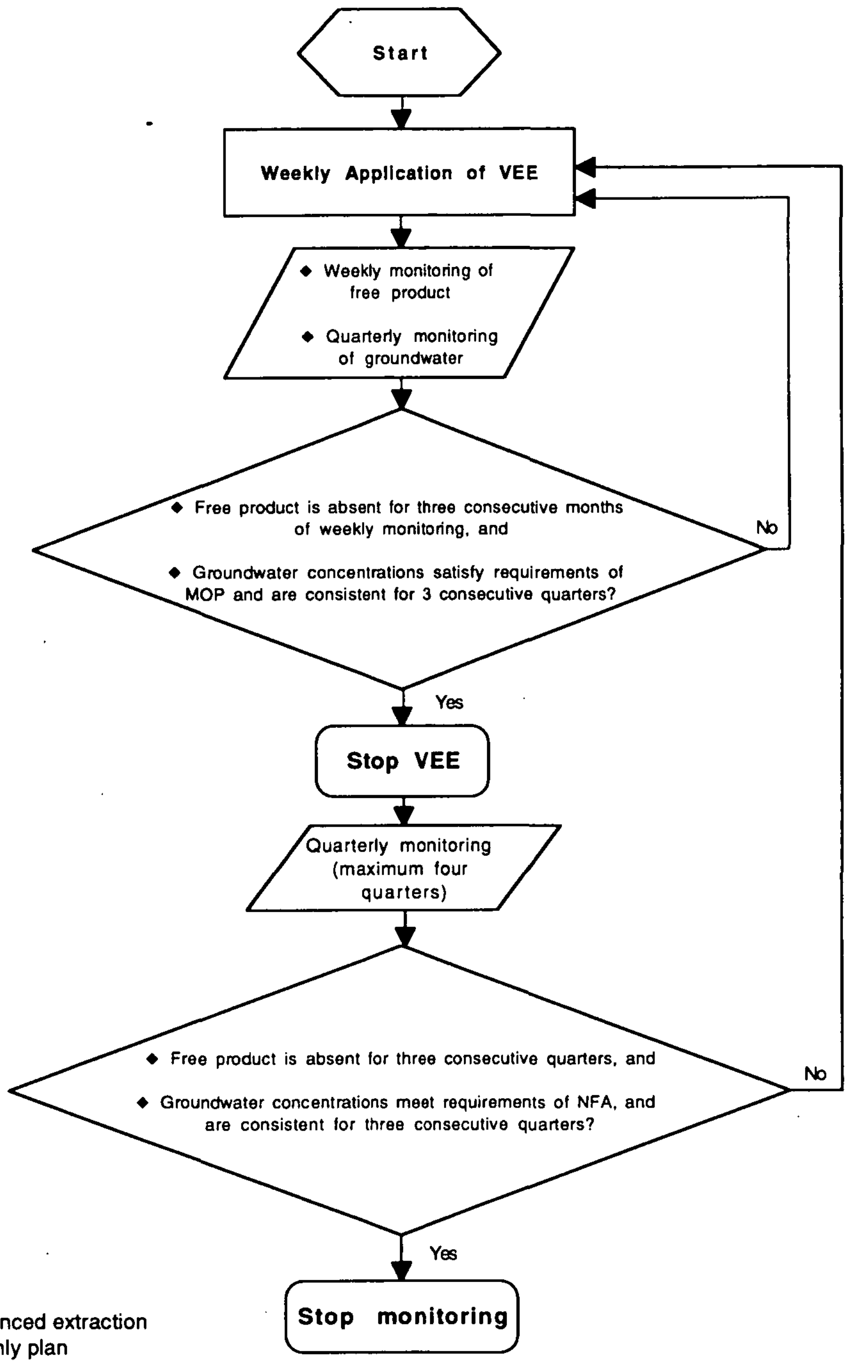
Date: | **Vac-Truck Operator:**

Logged By: | **Checked By:**

Time[1]	Applied Vacuum[2] (H_2O in.)			Vapor Flow Rate[3] (SCFM) at the Recovery Well	Vapor Concentration[4]	Well Head Vacuum[5] (H_2O in.)					Volume of Fluids[6] (gallons)		
	Total	Drop Tube	Well Casing	Total	Total	MW-4	MW-5	MW-6	MW-7	MW-12	Total	Water	FP

[1] Time: Time at which the measurements are made.
[2] Applied Vacuum: Vacuum measured at V1, V2, and V3. Use Vacuum Gauges.
[3] Vapor Flow Rate: .Measured at V1. Use Anemometer.
[4] Vapor Concentration:. Measured at V1. Use Tedlar Bags to collect Vapor Sample and measure with a VOA analyzer.
[5] Well Head Vacuum: Vacuum measured at monitoring wells. Use Vacuum Gauges.
[6] Volume of Fluids: Measured from the polyethylene tank. Use Oil Water Interface Probe.

Notes: H_2O = water.
SCFM = standard cubic feet per minute.
FP = free product.
V1 = at Vac-Truck.
V2 = at the drop tube.
V3 = at the well casing.
VOA = volatile organic aromatic.



NOTES:
VEE = vacuum-enhanced extraction
MOP = monitoring only plan
NFA = no further action

FIGURE 2-1
FREE PRODUCT AND GROUNDWATER RECOVERY AND MONITORING PLAN AT SITE 278

SAMPLING AND ANALYSIS PLAN, SITES 278 AND 325

COASTAL SYSTEMS STATION PANAMA CITY, FLORIDA

8538-02 FIG 2-1 030597MAW

- Extraction events will be scheduled once every week. However, if excessive volumes of free product are observed to be accumulating near any of the recovery wells, extraction frequency will be changed to twice every week. VEE will be applied for an 8-hour period during each extraction event.

- Application of VEE will be continued until no recoverable free product is observed for three consecutive months of weekly monitoring.

- Groundwater concentrations of total volatile organic compound (VOCs), total naphthalene, and total recoverable petroleum hydrocarbons at the source area monitoring wells will be verified if they meet "monitoring only plan" requirements of Chapter 62-770, FAC, and are consistent for three consecutive quarters of monitoring.

It is anticipated that the free product recovery program will last about 12 months. Groundwater will be monitored quarterly for a period of 12 months and once at the end of the second year.

Presented in Table 2-4 is a summary of the recommended sampling episodes and associated tests for the first year.

Table 2-4
Groundwater Monitoring Plan Sampling Schedule For Site 278

Sampling and Analysis Plan
Sites 278 and 325
Coastal Systems Station
Panama City, Florida

Task	Monthly Monitoring						Quarterly Monitoring (2nd Year)			
	1	2	3	4	7	10	1	4	7	10
Measure water levels	0	0	0	0	0	0	X	X	X	X
Measure free-product thickness	0	0	0	0	0	0	X	X	X	X
Sample perimeter area wells[1]	X			X	X	X	X	X	X	X
Sample source area wells[2]	X			X	X	X	X	X	X	X
Air emissions samples	0	X	X	X	X	X	X	X	X	X

[1] Includes monitoring wells MW-3, MW-4, MW-7, MW-8, MW-13D, MW-15, and MW-16D.
[2] Includes monitoring wells MW-5, and MW-6.

Notes: 0 indicates task to be performed weekly in the given month.
X indicates task to be performed once in the given month.

2.5 SITE 325

2.5.1 Baseline Groundwater Quality Monitoring Prior to completion of construction and installation of the equipment and prior to the startup of each system, groundwater from 28 existing monitoring wells will be collected for analysis by USEPA Methods 601/602, 418.1 and 610. Groundwater samples from selected list of monitoring wells from the source area and the perimeter area will be collected on a quarterly basis for the first year and yearly thereafter to monitor the conditions of the groundwater in the vicinity of the remedial action.

2.5.2 Startup Performance Monitoring and System Tuneup

2.5.2.1 **VEE System** The operation of a VEE system at Site 325, CSS, will start with a shakedown test. Following the system shakedown, the system will be operated over a few days or even few weeks under different configurations to determine effective operating conditions. System performance should be monitored closely during this initial stage as well as during continuous operation.

The shakedown test is conducted to ensure that all system components are operating properly and that there are no leaks in the system. Components to be checked include the valves; pressure/vacuum gauges; liquid ring pump; aqueous transfer pump; vapor, fuel, and water flow meter; oil-water interface probes; and any vapor/effluent treatment system components.

Table 2-1 presents a checklist of recommended components that need to be evaluated during the shakedown test and monitored thereafter.

Following the shakedown, the baseline data for the site are collected. These data include LNAPL thickness and depth to the groundwater table at each VEE well. Then the openings of the VEE suction tubes at each well will be placed at the LNAPL/water interface. The system will be started gradually opening all the valves at the well head seals. Provision of adequate vacuum will be required to ensure (1) effective recovery of LNAPL from wells to the treatment system, (2) creation of a vacuum gradient that extends up to the radius of influence to promote LNAPL flow towards the VEE well, and (3) aeration of larger areas for effective soil vapor extraction and promotion of biological activity.

At locations where water table fluctuations are minimal or the soil has moderate to low permeability, it is likely that vertical position of the slurper tube can essentially remain unchanged. However, at Site 325, CSS, potentially high water table fluctuations and high permeability soil are present hence the suction tube may have to be adjusted from time to time to improve fuel recovery and minimize the volume of groundwater extracted.

2.5.2.2 **Air Sparging System** The startup phase should begin with only the VEE portion of the system as described in the previous sections. After the VEE system is adjusted, the air sparging system should be started. Startup operations should include 7 to 10 days of manifold valving adjustments to balance injection rates and optimize mass flow rates. Injection and extraction rates, pressures, depth to groundwater, hydraulic gradient, and VOC levels should be recorded hourly during initial startup until the flow is stabilized. Injection rates should then be monitored daily. Vapor concentration should also be monitored in any nearby utility lines, basements, or other subsurface confined spaces.

2.5.3 Long-Term Performance Monitoring Presented in Table 2-5 is a summary of the recommended sampling episodes and associated tests for the first year and consecutive years.

To maximize and monitor system performance, monitoring during every extraction event is recommended.

Table 2-5
Groundwater Monitoring Plan Sampling Schedule For Site 325

Sampling and Analysis Plan
Sites 278 and 325
Coastal Systems Station
Panama City, Florida

Task	Monthly Monitoring						Quarterly Monitoring (2nd year)			
	1	2	3	4	7	10	1	4	7	10
Measure water levels	0	0	0	X	X	X	X	X	X	X
Measure free-product thickness	0	0	0	X	X	X	X	X	X	X
Sample perimeter area wells[1]	X	X	X	X	X	X	X	X	X	X
Sample source area wells[2]	X	X	X	X	X	X	X	X	X	X
Soil Vapor Samples	0	0	0	X	X	X	X	X	X	X
Air Emissions Samples	0	X	0	X	X	X	X	X	X	X
Air Sparging Pressure	0	0	0	0	X	X	X	X	X	X
Air Sparging Flow Rate	0	0	0	0	X	X	X	X	X	X

[1] Includes monitoring wells MW-2, MW-7, MW-12, and MW-14.
[2] Includes monitoring wells MW-8, MW-9, MW-10, MW-15, MW-21, MW-23, and MW-26.

Notes: 0 indicates task to be performed weekly in the given month.
X indicates task to be performed once in the given month.

Long-term monitoring should consist of contaminant-level measurements (in groundwater, vapor wells, and blower exhaust), flow-balancing (including flow and pressure measurements), and vapor concentration readings. Measurements should take place at biweekly to monthly intervals for the duration of the system operation period.

Once the yearly groundwater monitoring program has stopped, a No Further Action (NFA) request will be submitted based on FDEP's essential conditions for an approvable NFA found in the Technical Criteria Overview Section of the No Further Action and Monitoring Only Guidelines for Petroleum Contaminated Sites document (Florida Department of Environmental Protection, 1990), the guidelines document lists four of the following NFA criteria that must exist at the site:

- the source of the contamination has been abated;
- free product is not currently present;
- excess soil contamination is not currently present; and
- the groundwater contamination (if present) is not wide spread, not extending offsite, or not migrating vertically.

It is anticipated that the free product recovery program will last about 12 months. Groundwater will be monitored quarterly for a period of 12 months and once at the end of the second year. Table 2-5 summarizes the intervals of the groundwater monitoring plan.

2.6 SAMPLE IDENTIFICATION. Samples collected for laboratory analysis during the field investigation will be labeled with a sample identification code, which identifies the installation, site location, sample type, sample location and number, and modifier as described below. This coding system will provide a tracking procedure to allow retrieval of information concerning a particular sample and assure that each sample is uniquely identified.

The sample identification system consists of alphanumeric characters in five information groups:

- installation,
- site,
- type,
- sample location and number, and
- modifier.

These information groups may contain the following entries. If no information is required for the particular sample, the spaces will be filled with an X.

Installation The installation code identifies the facility:

PCY = the CSS facility.

Site The site code identifies a specific area of investigation, such as the following:

278 = Site Identifier
325 = Site Identifier

Type The two-character sample type code identifies the general source type and media of the sample. Codes can include the following:

G = groundwater
V = soil vapor or offgas
VE = VEE well
AA = aqueous airsparging well
AI = air inlet well
R = equipment rinsate
T = trip blank

Sample Location and Number The number sequence for the monitoring wells sampled or sampling port should be noted (e.g., G-6 or VE-4).

Modifier Examples of modifiers include the following:

D, duplicate sample;
S, matrix spike; and
M, matrix spike duplicate.

Note that the field program will continue using the existing sample numbering system for monitoring wells at each site.

2.7 SAMPLING EQUIPMENT AND PROCEDURES. Sampling procedures for each sample matrix are outlined in this section. The purpose is to provide specific protocols to the field personnel when performing the work.

2.7.1 Groundwater Sampling The purging and sampling techniques outlined below help ensure the collection of a representative sample.

2.7.1.1 Purging Technique Wells will be purged before groundwater sampling to remove stagnant water so that a representative sample may be obtained. At least three to five well volumes will be pumped if the well responds to the purging. Wells should be sampled as soon as possible after purging, within 10 hours. If the well purges dry, the same criteria applies.

Purging equipment includes

- pump, tubing, Teflon™ bailer, and line;
- power source (e.g., generator), if required;
- water-level meter or weighted surveyor tape;
- pH-temperature-conductivity meter;
- turbidity meter;
- personal protective equipment;
- Teflon™ leader;
- nylon line;
- decontamination supplies; and
- disposal drums, if required.

Volumetric Method of Well Purging. The procedures to follow when purging the monitoring wells are discussed below.

1. Open well cover and check condition of the well head.

2. Determine volume of water in well by measuring distance from the bottom of the well to the static water level (height of standing water), then measure the inside diameter of well or casing. Water-level measurement to the nearest 0.010 foot will be taken. The same reference mark will be used for subsequent water-level measurements. Note: more stringent measurements may be required for specific projects.

3. Calculate well volume by using the following formula (or its equivalent):

$$V = 0.041d^2h \qquad (1)$$

where
v = volume of water in gallons,
d = inside diameter of well in inches, and
h = height of standing water column in feet.

4. Prepare pump and tubing, or bailer, and lower it into casing.

5. Set up probes of indicator meters at the discharge outlet of the pump or in a clean beaker. Allow probes to equilibrate according to manufacturers' specifications.

6. Remove five well volumes. Record indicator parameter readings at regular intervals. Pumping should continue until indicator parameter readings remain stable within ± 10 percent for two consecutive recording intervals (5 minutes apart) and at least three well volumes have been purged.

7. Record pertinent data in field logbook.

8. Remove pump assembly or bailer from the well and decontaminate as required.

9. Dispose of liquid IDW either by pouring onto the concrete or by pouring into the equalization tank for treatment.

10. Note: All fuel-powered units will be placed away from and downwind of any site activity (purging, sampling, etc.)

Whenever possible, monitoring well purging should be accomplished with a pump. Wells should be purged with bailers only when circumstances make the use of a pump difficult, or impossible, or excessively time consuming.

To prevent backflow of purged water into wells, submersible pumps must be equipped with a check valve, and centrifugal pumps must have a foot valve. When sampling for organics or metals, certain precautions must be taken to minimize the risk of contaminating the groundwater sample with the pump. In general, any parts of the pump and tubing that contact the groundwater must be constructed of Teflon™ or stainless steel.

2.7.1.2 Specific Protocols for Groundwater Sampling Where possible, sampling of monitoring wells will proceed from the upgradient (background) wells to the downgradient (or potentially contaminated) wells.

Groundwater sampling equipment includes

- bailers constructed of appropriate material (Teflon™) with a Teflon™ coated, stainless-steel leader;
- clean (nylon twine or monofilament) line of sufficient length to lower bailer (new lanyard must be used for each well);
- a pump (type dictated by physical conditions);
- appropriate sample containers with labels and preservatives, as required;
- coolers with wet ice;
- water-level meter and/or other water-level measuring device;
- plastic sheeting;
- decontamination supplies, as required; and
- personal protective clothing and equipment, as required by the site-specific HASP.

Groundwater sampling procedures include the steps listed below.

1. Put on protective clothing and equipment, as necessary.

2. Prepare the location for sample collection by covering the ground surface around the well head with plastic sheeting.

3. Open well and note condition of casing and cap. Check for vapors using an OVA and/or PID.

4. Determine static water level using a water-level meter or tape. Depth to well bottom is recorded prior to the sampling event for all monitoring wells at a specific site. This information is then used to calculate the water column in each monitoring well prior to sampling. Record this information in the field logbook.

5. Determine purge volume and purge the well.

6. Arrange sample containers in order of use. Volatile organic aromatic (VOA) samples will be taken first, followed in order by metals, semivolatile organic compounds, and other samples.

7. Lower bailer or pump intake into well. Bailer should enter the water slowly to prevent aeration.

8. Collect the samples.

   - Fill the VOA samples directly from Teflon™ or stainless-steel bailer with as little agitation as possible. Fill until the sample forms a convex meniscus above the top edge of the vial, and then carefully cap the vial. Invert VOA sample bottles and tap to check for air bubbles.

   - Other samples will be placed directly in the appropriate container from the discharge tubing of the pump or Teflon™ bailer.

   - Filter the appropriate samples to be analyzed for target analyte list parameters.

9. Add preservative (if needed), cap, seal, and properly label all containers. Place filled containers into the cooler(s) immediately.

10. Record sample types and amounts collected, and time and date of collection in the field logbook. Prepare chain of custody (COC) forms. Prepare samples for shipment to the laboratory.

11. Decontaminate sampling equipment and dispose of lanyard.

<u>2.7.2 Soil Gas Vapor Air Emissions Sampling</u> Vapor samples for laboratory analyses will be collected from the VEE wells during the period of offgas venting from the subsurface to the surface. The sampling technique outlined below helps to ensure the collection of a representative sample.

2.7.2.1 **Specific Protocols for Vapor Sampling** Vapor sampling procedures include the steps listed below.

1. The sample must be obtained in such a way to assure that it is representative of actual emissions. In view of the anticipated concentration levels of benzene, sample collection methods using a Tedlar^R bag are recommended.

2. Dilutions of the original sample may be made using techniques outlined in Method TO3 for preparing standards. Teflon™ (or Tedlar^R) Bags is the preferred dilution method.

3. Method TO3 should be followed for the analysis of the sample.

4. The GC must be equipped with a PID. Alternatively, the sample may be analyzed by GC/MS.

5. Calculations of analyte concentration must be done according to methods outlined in Method 18 (initial sample collection) and Method TO3 (sample analysis).

6. The laboratory must be able to demonstrate that it can effectively analyze samples using the above techniques (by spike recoveries, duplicates, etc.) and that it can achieve air quality standards for benzene in ambient air.

7. At suspected high concentration of benzene, it may be more appropriate to use direct injection for analysis. The aliquot must be taken with a gas tight syringe and injected directly into the GC or GC/MS. Calibration standards would need to be analyzed in the same manner.

3.0 QUALITY ASSURANCE PROJECT PLAN

3.1 SAMPLING PROCEDURES. Step-by-step instructions for each type of sampling activity are necessary to enable the field team to gather data that will meet the sampling requirements. Sampling procedures for each sample matrix are outlined in Chapter 2.0.

3.2 SAMPLE CUSTODY. Each sample received by the analytical laboratory for processing must be properly documented to ensure complete and accurate analysis for all parameters requested.

3.2.1 COC After the sample is collected, the outside of the sample container is properly decontaminated, and documentation for sample shipment is completed, a COC record must be prepared to maintain the legal transfer of the sample from the field team to the laboratory. The COC lists each sample in that shipment. The COC record is used to record the custody of samples and will accompany samples at all times. Procedures for maintaining the appropriate sample custody information will be in accordance with ABB-ES's Comprehensive Quality Assurance Plan. The COC record will contain the following information:

- project name;
- signature of samplers;
- sampling station number or sample number;
- date and time of collection;
- brief description of the type of sample and sampling location;
- analysis to be performed and sample bottle type;
- for each sample, the number of containers for each bottle type;
- signatures of individuals involved in sample transfer (i.e., relinquishing and accepting samples);
- sample label number; and
- matrix.

All samples will be accompanied by the COC record. The original and one copy of the record will be shipped inside the shipping container if samples are shipped. By using a unique sample identification number for each sample, all ancillary records can be traced to specific sampling events. One copy of the COC record will be retained by the field investigator. The original record will be transmitted to the field investigator after samples are accepted by the laboratory. This copy will become part of the project records. The COC record will be signed and dated upon receipt by the laboratory. Custody tracking will be maintained by the laboratory from sample receipt through storage, analytical, and disposal in accordance with the individual laboratory's QA plan. Figure 3-1 shows an example of a typical COC record.

When samples are relinquished to a shipping company for transport, the tracking number from the shipping bill or receipt will be recorded on the sample COC record. As necessary, ABB-ES uses carriers (i.e., Federal Express) to ship samples. In these cases, the airbill becomes part of the COC.

3.2.2 Sample Labels Samples, other than those collected for field measurements or analyses, are identified by using a standard sample label that is attached to the sample container. The following information is included on the sample label:

ABB ENVIRONMENTAL SERVICES, INC. SDG # COC #

Task Order #:
Job #:
Office Ph #:
Field Office Ph #:

PROJECT NAME:
SITE NAME:
PROJECT MANAGER:
COPY TO:
REQ. COMPLETION DATE:

A 0263

Comments	SAMPLE IDENTIFIER	SAMPLE DATE	SAMPLE TIME	MATRIX	SAMPLE TYPE COMP	SAMPLE TYPE GRAB	TICOS (Y/N)	TOTAL CONTAINERS	LAB TEST CODES								LAB CODE PARAMETER METHOD PRESERVATIVE VOLUME	LAB BATCH NO: Comments

TOTAL PARAMETERS PER COLUMN

NOTES:

LAB COMMENTS

SAMPLED BY: RECEIVED BY: RELINQUISHED BY: DATE TIME RECEIVED BY: DATE TIME

RELINQUISHED BY: DATE TIME RECEIVED BY: RELINQUISHED BY: DATE TIME RECEIVED BY: DATE TIME

RELINQUISHED BY: DATE TIME RECEIVED BY: RELINQUISHED BY: DATE TIME RECEIVED BY: DATE TIME

SHIPPING/AIRBILL NUMBER:

SHIPPED VIA:

WHITE/YELLOW COPY – LABORATORY PINK COPY – ABB-ES PAGE ___ OF ___

FIGURE 3-1
SAMPLE CHAIN-OF-CUSTODY FORM

SAMPLING AND ANALYSIS PLAN, SITES 278 AND 325

COASTAL SYSTEMS STATION
PANAMA CITY, FLORIDA

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- site name,
- field identification or sample station number,
- date and time of sample collection,
- designation of the sample as a grab or composite,
- the signature(s) of the sampler(s),
- sample preservation and preservative used, and
- the general types of analyses to be conducted.

Figure 3-2 shows an example of a sample label.

<u>3.2.3 Handling, Packaging, and Shipping Requirements</u> After the sample labels are affixed to the sample container and the COC record is completed, shipping containers can be prepared.

Sample packaging and shipping procedures should protect the integrity of the samples and prevent detrimental effects from leakage or breakage. Regulations for packaging, marking, labeling, and shipping hazardous materials and wastes are promulgated by the U.S. Department of Transportation (DOT) and described in the Code of Federal Regulations (49 CFR 171 through 177; in particular 172.402h, Packages Containing Samples). In general, these regulations were not intended to hamper shipment of samples collected at controlled or uncontrolled hazardous waste sites or samples collected during emergency responses. However, the USEPA has agreed through a memorandum of agreement to package, mark, label, and ship samples observing DOT procedures.

Prior to packaging, each sample container should be inspected to verify correct labeling. Labels should be secured to containers with clear tape. Samples will be shipped to the laboratory via commercial ground or air carrier within 24 hours of sample collection.

All breakable sample containers (glass) will be protected with packing. Bubble-pack bags or strips are acceptable. Sample containers may be placed together in heavy duty garbage bags and sealed.

Samples will be shipped in durable coolers packed with bubblepack or vermiculite. Samples will be kept cool with double-bagged clean ice. Completed COC records will be placed in a plastic bag and taped to the inside lid of the shipping container. If COC records refer to multiple containers, they will be placed in the lead container.

A signed and dated COC seal will be secured with clear tape over the front of the container lid. The container will be sealed by wrapping it in filament tape.

Until relinquished to the carrier, the shipping containers are to remain with ABB-ES or subcontractor personnel and remain in a locked vehicle so as not to be accessible to others. Upon shipping, the laboratory will be contacted and advised of the contents, arrival date and time, carrier, and number of containers.

<u>3.3 INTERNAL QUALITY CONTROL</u>. Internal QC procedures are designed to assure the consistency and continuity of data. The frequency of QC checks is based on the type of QC analytical. Standard sample QC analyses include, but are not limited to, duplicate samples, equipment rinsate blanks, trip blanks, matrix spike and matrix spike duplicate samples, and field water blanks. All QC samples will be

Sample ID: ______________________________

Site Description: ___________________________

Analysis: ________________________________

Preservation: _____________________________

________________	____________	__________
Sampler	Date	Time

FIGURE 3-2
SAMPLE LABEL

SAMPLING AND ANALYSIS PLAN, SITES 278 AND 325

COASTAL SYSTEMS STATION PANAMA CITY, FLORIDA

8538-02 FIG 3-2 030597MAW

analyzed by the offsite laboratory performing CLP analyses at DQO Level III. QC samples will be analyzed for the same parameters as the environmental samples collected during the site-specific sampling event, except for trip blanks, which will be analyzed for volatile organics only. Each of these types of QC samples is explained below.

Other internal QC activities are undertaken during the performance of work to ensure that the service, designs, and documents produced meet currently accepted professional standards. Small assignments or tasks entail periodic discussions among the technical staff, the project manager, and program manager. QC on larger assignments may require professional review teams and/or internal audits.

Duplicate Samples. Duplicate samples are two or more samples collected simultaneously into separate containers from the same source under identical conditions. One duplicate will be collected for every 10 samples of a single matrix (from a single site). Duplicate samples are intended to assess the homogeneity of the sampled media and the precision of the sampling protocol.

Trip Blanks. Trip blanks are prepared by the laboratory prior to the sampling event and accompany empty sample bottles to the facility when samples are collected. The trip blanks are kept with the investigative samples throughout the sampling event and are packaged and shipped with the investigative samples. These containers should never be opened prior to laboratory analytical. One trip blank will be included with each shipment of samples scheduled for VOC analysis. Trip blanks are required for assessing the potential for contaminating samples with VOCs during sampling or in transit.

Equipment Rinsate Blanks. Equipment rinsate blanks are collected by running organic-free water over and/or through sample collection equipment after it has been decontaminated. Equipment rinsate blanks will be collected at a frequency of one per day or one per decontamination event. These blanks are used to assess the adequacy of decontamination procedures and to trace potential cross contamination.

Matrix Spike and Matrix Spike Duplicates. Matrix spike and matrix spike duplicate samples are additional samples collected in the field from a single sampling location. These samples are spiked in the laboratory with a known compound (or set of compounds) of known concentration. The concentration detected, after analytical, provides an estimate of the amount of compound "lost" (e.g., sorbed to glassware, volatilized, degraded, etc.) during the analytical procedure. A comparison of the original concentration to the final concentration provides data concerning analytical precision and accuracy. One set of matrix spike and matrix spike duplicate samples will be collected per 20 samples per matrix.

Field Water Blanks. Field water blanks include a complete set of samples collected from each water source used in the investigation. One set of samples will be collected from each water source used at the beginning of the project and one set at the completion of the project. Samples may be collected in the middle of the project, if deemed necessary. These samples should account for potential artifacts that could be introduced through decontamination procedures.

REFERENCES

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