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FINAL REVISED CORRECTIVE MEASURES IMPLEMENTATION WORK PLAN SOLID WASTE MANAGEMENT UNIT (SWMU) 68 WITH TRANSMITTAL LETTER NAVAL ACTIVITY PUERTO RICO
9/3/2010
RIGHT WAY ENVIRONMENTAL CONTRACTORS

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September 3, 2010

U.S. Environmental Protection Agency - Region II
290 Broadway – 22nd Floor
New York, New York 10007-1866

Attn: Mr. Adolph Everett, P.E.
Chief, RCRA Programs Branch

Re: Contract N69450-08-C-0093
Corrective Action for SWMUs 14, 56, 68 and 69
Naval Activity Puerto Rico, Ceiba, Puerto Rico
U.S. Naval Activity Puerto Rico (NAPR)
EPA I.D. No. PR2170027203
Revised Final Corrective Measures Implementation Work Plan for SWMU 68

Dear Mr. Everett:

Right Way Environmental Contractors, Inc. (RWEC), on behalf of the Navy, is pleased to provide you with replacement pages to make up the Revised Final Corrective Measures Implementation Work Plan for SWMU 68 and one electronic copy of the Revised Final Corrective Measures Work Plan for SWMU 68 provided on CD. Additional distribution has been made as indicated below.

This document is being submitted in accordance with EPA comments dated June 16, 2010. The Navy responses to these comments are attached for your review.

If you have questions regarding this submittal, please contact Mr. Mark Davidson at (843) 743-2124.

Sincerely,

Right Way Environmental Contractors, Inc.

Pedro R. Tejada
Vice President

Attachments

cc: Ms. Debbie R. Sanders, BRAC PMO SE (letter only)
Mr. David Criswell, BRAC PMO SE (letter only)
Mr. Mark E. Davidson, BRAC PMO SE (1 hard copy and 1 CD)
Mr. Pedro Ruiz, NAPR (1CD)
Mr. Mark E. Kimes, P.E., Michael Baker Jr., Inc. (1 hard copy and 1 CD)
Mr. Tim Gordon, US EPA Region II (1 hard copy and 1 CD)
Mr. Carl Soderberg, US EPA Caribbean Office (1 hard copy and 1 CD)
Ms. Gloria Toro, PR EQB (1 hard copy and 1 CD)
Ms. Wilmarie Rivera, PR EQB (1CD)
Mr. Felix Lopez, US F&WS (1CD)
Mr. Jonathan Flewelling, TechLaw, Inc. (1CD)

NAVY RESPONSES TO EPA COMMENTS DATED JUNE 4, 2010 ON THE FINAL CORRECTIVE MEASURES IMPLEMNTATION DESIGN PACKAGE AND WORK PLAN FOR SWMU 68 DATED MAY 14, 2010

(EPA and PREQB comments are provided in italics while Navy responses are provided in regular print.)

EPA Comments dated June 4, 2010

The following comments were generated based on an evaluation of the January 28, 2010 Response to Comments on the Draft Basis of Design Report for Corrective Measures Implementation – SWMU 68, Naval Activity Puerto Rico (NAPR), Ceiba, Puerto Rico, dated November 19, 2009 (Draft Basis), Technical Specifications for Corrective Measures Implementation – SWMU 68, NAPR, Ceiba, Puerto Rico, dated November 19, 2009 (Draft Specifications) and the Draft Corrective Measures Implementation Work Plan – SWMU 68, NAPR, Ceiba, Puerto Rico, dated November 19, 2009 (Draft CMI WP). All of the above documents are part of the Draft Corrective Measures Implementation Design Package and Work Plan for SWMU 68, dated November 19, 2009 (Draft CMI Design Package).

GENERAL COMMENTS

Evaluation of the January 28, 2010 Response to General Comment 2: *The response addresses the comment. However, Section 2.4 (Remediation Levels) of the Final Basis of Design Report for Corrective Measures Implementation – SWMU 68, NAPR, Ceiba, Puerto Rico, dated May 14, 2010 (Final Basis) has not been revised to state that EPA approved the Final Corrective Measures Study Final Report – SWMU 68 on August 6, 2009. Revise Section 2.4 of the Final Basis to state that EPA approved the Final Corrective Measures Study Final Report – SWMU 68 on August 6, 2009.*

Navy Response to General Comment 2: Section 2.4 of the Final Basis of Design Report for Corrective Measures Implementation has been revised to replace "USEPA approved Final Corrective Measures Study (CMS) Final Report (dated June 12, 2009) at SWMU 68" with "EPA approved the Final Corrective Measures Study Final Report – SWMU 68 on August 6, 2009".

Evaluation of the January 28, 2010 Response to General Comment 4: *The response addresses the comment. However, a reference to Figure 3-1 (Confirmation Soil Sampling Points) has not been included in Section 3.2 (Description of the Proposed Removal Actions). Revise Section 3.2 to include a reference to Figure 3-1 for clarity.*

Navy Response to EPA General Comment 4: A reference to Figure 3-1 has been added to Section 3.2 of the Sampling and Analysis Plan.

Evaluation of the January 28, 2010 Response to General Comment 7: *The response addresses the comment. However, roll-off boxes are still referenced in Section 3.8.1 (Waste Storage Areas) of Appendix C (Final Sampling and Analysis Plan – SWMU 68) of the Final Corrective Measures Implementation Work Plan – SWMU 68, NAPR, Ceiba, Puerto Rico, dated May 14, 2010 (Final CMI WP). Revise the Final CMI Design Package to replace all references to roll-off boxes with appropriate waste storage containers.*

Navy Response to EPA General Comment 7: All references to "roll-off boxes" in the Final CMI Design Package (Section 3.8.1 of Appendix C, "Sampling and Analysis Plan") have been replaced with "appropriate waste storage containers".

Evaluation of the January 28, 2010 Response to General Comment 9: *The response addresses the comment. However, the information provided in the response has not been incorporated into Section 4.4 (Excavation Procedures) of the Final CMI WP. Revise Section 4.4 of the Final CMI WP and Section 3.2 (Soil Confirmation and Characterization Sampling) of Appendix C (Final Sampling and Analysis Plan – SWMU 68) of the Final CMI WP to include the information provided in the response.*

Navy Response to EPA General Comment 9: The original response to the comment concerning confirmatory sampling pit bottoms is not correct. The corrected response should have stated that no confirmation samples will be taken from the excavation pit bottoms after excavation. The purpose of the confirmation sampling is to confirm that the level of a COC is below the respective CAO. The associated risk in this case is to the ecological (avian) receptors within the top two feet of the surface soil. By removing the top two feet of soil, the pathway is removed and the CAO is satisfied. Therefore, any additional confirmation sampling below 2 feet would not result in any further soil removal. Reference to confirmation sampling requirements for exaction pit bottoms has been removed from Section 3.2.1 of the SAP. However, confirmation samples for pit walls will be collected as discussed in the SAP.

The following paragraph has been added to Section 4.4 (Excavation Procedures) of the Final CMI WP and Section 3.2.1 of the SAP:

> The CAOs from the EPA approved Final CMS identify potential risk to ecological (avian) receptors to surface soil. Since soil below depths greater than 2.0 feet bgs do not represent significant exposure points for ecological receptors no additional excavation beyond the 2.0 ft bgs is required. No human health risks were indentified for the surface or subsurface soils or groundwater for the site. No ecological risks were identified in the subsurface soils for the site. Therefore, confirmation samples for excavation pit bottoms will not be collected because the pathway (top two feet of surface soil) has been removed and CAO has been satisfied.

Evaluation of the January 28, 2010 Response to General Comment 10: *The response addresses the comment. However, Appendix A (Construction Schedule) of the Final Basis has not been updated to include the "Wetland Delineation," "Field Stake Locations,"*

and "ROICC/NTR Field Stake Location Review" tasks. Revise Appendix A of the Final Basis to include the "Wetland Delineation," "Field Stake Locations," and "ROICC/NTR Field Stake Location Review" tasks. It should be noted that Appendix F (Project Schedule) of the Final CMI WP has been updated to include these three tasks.

Navy Response to EPA General Comment 10: Although this level of detail is not necessary for the Basis of Design, the Construction Schedule, Appendix A of the Final Basis of Design has been updated to include the following tasks; "Wetland Delineation," "Field Stake Locations," and "ROICC/NTR Field Stake Location Review" to reflect the Project Schedule, Appendix F of the Final CMI Work Plan,

Evaluation of Response to General Comment 11: *The response partially addresses the comment. While the response references the Master Project Plans (which include the Project Management Plan (PMP), Data Collection Quality Assurance Plan (DCQAP), Data Management Plan (DMP), and Health and Safety Plan (HASP) for NAPR (Baker, 1995)) for acceptable data requirements and error levels associated with the field and analytical portions of this Draft CMI WP, the Master Plans present outdated information and do not specifically apply to SWMU 68. Site-specific data quality objectives and updated data quality information need to be included in the Final CMI WP. Revise the Final CMI WP to reference the specific sections of the Master Plan that will be used. If sections contain outdated information (e.g., old methods, outdated QC acceptance limits) or are not applicable to this SWMU, ensure that the most recent information which supersedes the outdated or inapplicable information is included in the Final CMI WP.*

Additionally, while it is understood that EPA will be notified of the laboratory chosen, laboratory specific information should still be included in the Sampling and Analysis Plan (SAP). For example, Table 3-2 of the SAP should include laboratory specific reporting limits. Revise the Final CMI WP to include laboratory specific reporting limits.

Navy Response to EPA General Comment 11: In response to previous comments by the EPA on Phase I RFI Work Plans for SWMUs 62 and 71 (see the April 17, 2008 letter from Baker to the EPA), the Navy provided an evaluation of the Master Project Plans (Baker, September 14, 1995) in relation to the QA/R-5 requirements ("EPA Requirements for Quality Assurance Project Plans." EPA/240/B-01/003. [EPA, March 2001]). Table 1 of the April 17, 2008 letter provides a map between the DCQAP sections, the work plan content and the sections required by QA/R-5 and illustrates that although there are format and minor content differences, the DCQAP is generally consistent with and includes all of the main elements required by QA/R-5. For example, data validation is discussed in Section 10 of the DCQAP; PARCCS measures are discussed in Section 4 of the DCQAP; and forms and checklists are provided in the tables and appendices of the DCQAPP.

The analytical methods, analyte lists, detection limits, etc. may have changed to some degree since publication of the DCQAP. Consequently, the CMI Work Plan (Appendix C - SAP) contains the following tables specifying the sampling and analytical program requirements so that data of sufficient quality for future risk management decisions is

collected:

- Table 3-1 Confirmation and Characterization Sampling Summary Sampling and Analysis Plan
- Table 3-2 Method Performance Limits and Contract Required Quantitation Limits (CRQL)

The information provided in these tables has been reviewed against screening levels and have been determined to generally meet these levels. Table 3-2 has been revised to include laboratory specific reporting limits and preparation methods. These quantitation limits have also been reviewed by the analytical laboratory to ensure that they can be met. In all cases, the quantitation limits are the lowest achievable by the laboratory for the specified analytical method. These tables are then provided to the analytical laboratory subcontractor as part of their scope of work so that the laboratory is clearly aware of the analytical requirements of the project. Additionally, only laboratories capable of providing as acceptable Laboratory Quality Manual (LQM) will be selected for this project. The LQM may be provided on request (after selection of the analytical laboratory).

This evaluation (presented in the April 17, 2008 letter), which was approved by EPA on May 13, 2008, indicated that the Phase I RFI Work Plan structure, with reference to the 1995 Master Project Plans and inclusion of project-specific tables summarizing the sampling and analysis program for environmental and QA/QC samples and method performance limits, and other factors as discussed in the April 17, 2008 letter, when taken together provide the information and guidance necessary for the project team to generate good quality data and to use that data for developing risk management based recommendations and decisions.

Evaluation of the January 28, 2010 Response to General Comment 13: *The response addresses the comment. However, the confirmation sampling frequency (i.e., one sample for every 625 square feet (25 feet by 25 feet)) for the bottom of the excavation has not been included in Section 3.2.1 (SWMU 68) of Appendix C (Final Sampling and Analysis Plan – SWMU 68) of the Final CMI WP. Revise Section 3.2.1 of Appendix C of the Final CMI WP to include the confirmation sampling frequency (i.e., one sample for every 625 square feet (25 feet by 25 feet)) for the bottom of the excavation.*

Navy Response to EPA General Comment 13: The original response to the comment concerning confirmatory sampling pit bottoms is not correct. The corrected response should have stated that no confirmation samples will be taken from the excavation pit bottoms after excavation. The purpose of the confirmation sampling is to confirm that the level of a COC is below the respective CAO. The associated risk in this case is to the ecological (avian) receptors within the top two feet of the surface soil. By removing the top two feet of soil, the pathway is removed and the CAO is satisfied. Therefore, any additional confirmation sampling below 2 feet would not result in any further soil removal. Reference to confirmation sampling requirements for exaction pit bottoms has been removed from Section 3.2.1 of the SAP. However, confirmation samples for pit

walls will be collected as discussed in the SAP.

The following paragraph has been added to Section 3.2.1 of the SAP:

> The CAOs from the EPA approved Final CMS identify potential risk to ecological (avian) receptors to surface soil. Since soil below depths greater than 2.0 feet bgs do not represent significant exposure points for ecological receptors no additional excavation beyond the 2.0 ft bgs is required. No human health risks were indentified for the surface or subsurface soils or groundwater for the site. No ecological risks were identified in the subsurface soils for the site. Therefore, confirmation samples for excavation pit bottoms will not be collected because the pathway (top two feet of surface soil) has been removed and CAO has been satisfied.

Evaluation of the January 28, 2010 Response to General Comment 16b: *The response addresses the comment. However, Section 2.1 (Backfill) of Section 02 61 13 of the Final Technical Specifications for Corrective Measures Implementation – SWMU 68, NAPR, Ceiba, Puerto Rico, dated May 14, 2010 (Final Specifications) has not been revised to clarify that backfill material shall be sampled at a frequency of one sample for every 3,000 cubic yards of potentially clean/borrow material. Revise Section 2.1 of Section 02 61 13 of the Final Specifications to clarify that backfill material shall be sampled at a frequency of one sample for every 3000 cubic yards of potentially clean/borrow material.*

Navy Response to EPA General Comment 16b: Section 2.1 of Section 02 61 13 in the Final Specifications has been revised to clarify that backfill material shall be sampled at a frequency of one sample for every 3000 cubic yards of potentially clean/borrow material.

Evaluation of Response Specific Comment 8: *The response addresses the comment. However, the response has not been incorporated into the text. Section 01 35 45.00 10, Part 1.5.5 states that 10 percent of the data will be validated using EPA 540/R 9 -008. However, the section should reference EPA 540-R-04-004. Revise the Final CMI WP to reference the correct guidance.*

Navy Response to EPA Specific Comment 8: Section 01 35 45.00 10, Part 1.**6**.5 has been revised to EPA 540-R-04-004.

Evaluation of Response to Specific Comment 15: *The response partially addresses the comment. While the response references the Master Project Plans (which include the Project Management Plan (PMP), Data Collection Quality Assurance Plan (DCQAP), Data Management Plan (DMP), and Health and Safety Plan (HASP) for NAPR (Baker, 1995)) for information on data validation, the Master Plans present outdated information and do not specifically apply to SWMU 68. Neither the Final CMI WP nor the DCQAP describe in detail how precision, accuracy, representativeness, comparability, completeness, and sensitivity (PARCCS) criteria are calculated or will be incorporated into a future data usability report. Revise the Final CMI WP to include an appropriately detailed discussion of PARCCS criteria given that data collected is in support of a removal action and therefore represents the final verification step that the corrective*

measures have been implemented as int

Navy Response to EPA Specific Comment 15: In response to previous comments by the EPA on Phase I RFI Work Plans for SWMUs 62 and 71 (see the April 17, 2008 letter from Baker to the EPA), the Navy provided an evaluation of the Master Project Plans (Baker, September 14, 1995) in relation to the QA/R-5 requirements ("EPA Requirements for Quality Assurance Project Plans." EPA/240/B-01/003. [EPA, March 2001]). Table 1 of the April 17, 2008 letter provides a map between the DCQAP sections, the work plan content and the sections required by QA/R-5 and illustrates that although there are format and minor content differences, the DCQAP is generally consistent with and includes all of the main elements required by QA/R-5. For example, data validation is discussed in Section 10 of the DCQAP; PARCCS measures are discussed in Section 4 of the DCQAP; and forms and checklists are provided in the tables and appendices of the DCQAPP.

PREQB Comments dated June 2, 2010

SPECIFIC COMMENTS

3. *The provided response is appropriate, but at the final document the Section 1.3 was not revised accordingly. Please, also include in the revised text, which section is related to sampling point 14E-01 and which is related to 14E-03.*

Navy Response to PREQB Specific Comment 3: The text stating "as presented in Design Drawing C-2, Removal Action Plan" has been added to Section 1.3 in the final document. The first bullet in Section 1.3 describes the planned excavation surrounding sample point 14E-01, and the second bullet describes the excavation surrounding sample point 14E-03.

11. *Although response to comment is adequate and the clarification required in this comment is provided by the response to all the comments related to project personnel, for future documents please be as specific as possible and avoid relaying on information that "should be evident" as the response is claiming.*

Navy Response to PREQB Specific Comment 11: Comment noted.

15. Please notice that the provided SOP lack of approval signatures

Navy Response to PREQB Specific Comment 15: The Sampling and Analysis Plan, Appendix A, Standard Operating Procedures, F102, Field Equipment Operation and Maintenance Procedures – Soil and Rock Sampling Acquisition has been revised to remove the signature requirement for Technical Approval and QA Manager Approval.

22. Please provide in the text of the document appropriate reference to the agreements reached by the letter to EPA dated April 17, 2008.

Navy Response to PREQB Specific Comment 22: The April 17, 2008 letter from the Navy to EPA has been referenced in Section 1.0 of the Sampling and Analysis Plan (SAP).

24. PREQB respectfully disagrees with the statement that "confirmatory sampling of the pit bottoms is not necessary". Moreover, confirmatory sampling is proposed in the Basis of Design prepared and submitted within the data package. Also, a comment related the matter was issued by EPA. PREQB understand that the confirmatory sampling during soil removal as a selected corrective action is a recommended practice in order to provide evidence that the activity was successfully completed and no further action is required.

Navy Response to PREQB Specific Comment 24: The original response to the comment concerning confirmatory sampling pit bottoms is not correct. The corrected response should have stated that no confirmation samples will be taken from the excavation pit bottoms after excavation. The purpose of the confirmation sampling is to confirm that the level of a COC is below the respective CAO. The associated risk in this case is to the ecological (avian) receptors within the top two feet of the surface soil. By removing the top two feet of soil, the pathway is removed and the CAO is satisfied. Therefore, any additional confirmation sampling below 2 feet would not result in any further soil removal. Reference to confirmation sampling requirements for exaction pit bottoms has been removed from Section 3.2.1 of the SAP. However, confirmation samples for pit walls will be collected as discussed in the SAP.

The following paragraph has been added to Section 3.2.1 of the SAP:

> The CAOs from the EPA approved Final CMS identify potential risk to ecological (avian) receptors to surface soil. Since soil below depths greater than 2.0 feet bgs do not represent significant exposure points for ecological receptors no additional excavation beyond the 2.0 ft bgs is required. No human health risks were indentified for the surface or subsurface soils or groundwater for the site. No ecological risks were identified in the subsurface soils for the site. Therefore, confirmation samples for excavation pit bottoms will not be collected because the pathway (top two feet of surface soil) has been removed and CAO has been satisfied.

25. The areas being excavated have been thoroughly characterize for purposes of determining if they meet the Corrective Action Objectives (CAOs) established base on risk assessment for the site. The parameters to characterize a solid waste as hazardous, for disposal objectives, are different.

Navy Response to PREQB Specific Comment 25: The Navy agrees with EPA's comment. The parameters to characterize a solid waste as hazardous for disposal objectives are very different than those parameters used to characterize as to whether they meet the Corrective Action Objectives for the site. Table 3-2 of the Sampling and Analysis Plan identifies the parameters to be used to evaluate the waste material for

disposal purposes. The testing parameters required to characterize a solid waste for disposal may be modified to conform to the disposal facilities (landfill) requirements prior to acceptance of the waste.

REVISED FINAL BASIS OF DESIGN REPORT FOR CORRECTIVE MEASURES IMPLEMENTATION - SWMU 68

For:

NAVAL ACTIVITY PUERTO RICO
EPA I.D. No. PR2170027203
CEIBA, PUERTO RICO

Prepared for:

Department of the Navy
NAVFAC SOUTHEAST
North Charleston, South Carolina

Contract No. N69450-08-C-0093

September 3, 2010

Prepared by:

Right Way Environmental
Contractors, Inc.
Naranjito, Puerto Rico

Corrective Action for SWMUs 14, 56, 68, and 69,
Naval Activity Puerto Rico, Ceiba, Puerto Rico

REVISED FINAL
BASIS OF DESIGN REPORT FOR
CORRECTIVE MEASURES IMPLEMENTATION
SWMU 68

NAVAL ACTIVITY PUERTO RICO
EPA I.D. NO. PR2170027203
CEIBA, PUERTO RICO

SEPTEMBER 3, 2010

Prepared for:

DEPARTMENT OF THE NAVY
NAVFAC SOUTHEAST
North Charleston, SC

Under:

Contract No. N69450-08-C-0093

Prepared by:

RIGHT WAY ENVIRONMENTAL CONTRACTORS, INC.
Naranjito, Puerto Rico 00719

I certify under penalty of law that I have examined and am familiar with the information submitted in this document and all attachments and that this document and its attachments were prepared either by me personally or under my direction or supervision in a manner designed to ensure that qualified and knowledgeable personnel properly gather and present the information contained therein. I further certify, based on my personal knowledge or on my inquiry of those individuals immediately responsible for obtaining the information, that the information is true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowingly and willfully submitting a materially false statement.

Signature: _____

Name: **Mark E. Davidson**

Title: **BRAC Env. Coordinator**

Date: **September 3, 2010**

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LIST OF ACRONYMS AND ABBREVIATIONS

Baker	Michael Baker Jr., Inc.
bgs	below ground surface
BRAC	Base Realignment and Closure
CAO	Corrective Action Objective
CERCLA	Comprehensive Environmental Response Compensation and Liability Act
CERFA	Community Environmental Response Facilitation Act (CERFA)
CFR	Code of Federal Regulations
CMI	Corrective Measures Implementation
CMS	Corrective Measures Study
CY	Cubic Yards
DRO	Diesel Range Organics
GRO	Gasoline Range Organics
ECP	Environmental Condition of Property
FID	Flame Ionization Detector
ft	feet
LANTDIV	Naval Facilities Engineering Command, Atlantic Division
MCL	Maximum Contaminant Level
mg/kg	milligrams per kilogram
NAPR	Naval Activity Puerto Rico
NAVFAC	Naval Facilities Engineering Command
NEESA	Naval Energy and Environmental Support Activity
NSRR	Naval Station Roosevelt Roads
NTR	Navy Technical Representative
PAH	Polycyclic Aromatic Hydrocarbon
PCB	Polychlorinated Biphenol
PEM	Palustrine Emergent Persistent
PI	Photo Identified
PID	Photoionization Detector
PMO	Program Management Office
PPE	Personal Protective Equipment
PRG	Preliminary Remediation Goal
RCRA	Resource Conservation and Recovery Act
RFI	RCRA Facility Investigation
ROICC	Resident Officer in Charge of Construction
RWEC	Right Way Environmental Contractors
SAP	Sampling and Analysis Plan
SE	Southeast
SWMU	Solid Waste Management Unit
SVOCs	Semi-Volatile Organic Compounds

LIST OF ACRONYMS AND ABBREVIATIONS
(continued)

TCLP	Toxicity Characteristic Leachate Procedure
TPH	Total Petroleum Hydrocarbons
USEPA	United States Environmental Protection Agency
VOCs	Volatile Organic Compounds

1.0 INTRODUCTION

This document presents the Basis of Design for Corrective Measures Implementation (CMI) for the removal of contaminated soil from Solid Waste Management Unit (SWMU) 68 (Former Southern Fire Training Area) at Naval Activity Puerto Rico (NAPR), Ceiba, Puerto Rico. This Basis of Design document has been prepared by Michael Baker, Jr., Inc. (Baker) for the Navy Base Realignment and Closure (BRAC) Program Management Office (PMO) Southeast (SE) Office under contract with the Naval Facilities Engineering Command (NAVFAC) SE (Contract Number N69450-08-R-0093).

A regional map depicting the location of NAPR is included with this Basis of Design as Figure 1-1. The location of SWMU 68 is shown on Figure 1-2. A detailed site plan of SWMU 68 is presented as Figure 1-3. Based on the results of past investigations conducted at SWMU 68, contaminated soil poses a potentially unacceptable risk to ecological receptors; therefore, a soil removal action will be conducted.

1.1 Purpose of the Basis of Design

The primary purposes of this Basis of Design are to present background data on the project, describe the primary elements of the remedial design, recommended cleanup criteria, and present assumptions and special requirements that may affect the design. This document is not intended to be part of the construction plans or technical specifications to be utilized by the Contractor for execution of the Removal Action. Baker assumes no responsibility for the use of this report for any purpose other than these intended uses.

2.0 BACKGROUND INFORMATION

This section provides a site description, site history, and summary of pertinent environmental investigations and actions conducted at SWMU 68.

2.1 Site Descriptions and History

The following subsections detail the general history and describe the features of NAPR and SWMU 68.

2.1.1 NAPR

NAPR occupies over 8,890 acres on the northern side of the east coast of Puerto Rico, along Vieques Passage with Vieques Island lying to the east about 10 miles off the harbor entrance. The north entrance to NAPR is about 35 miles east along the coast road (Route 3) from San Juan. The closest large town is Fajardo (population approximately 37,000), which is about 10 miles north of NAPR off Route 3. Ceiba (with a population of approximately 17,000) adjoins the west boundary of NAPR (Figure 1-1).

Naval Station Roosevelt Roads (NSRR) was commissioned in 1943 as a Naval Operations Base, and redesignated a Naval Station in 1957. NSRR operated as a Naval Station from 1957 until March 31, 2004. During its operation, NSRR was one of the largest naval facilities in the world with more than 100 miles of paved roads, approximately 1,300 buildings, a large scale airfield (Ofstie Field), a deep water port and over 30 tenant commands. NSRR played a major role in providing communication support to the Atlantic and Caribbean and also served as a major training site for fleet exercises.

Section 8132 of the Fiscal Year 2004 Defense Appropriations Act, signed into law on September 30, 2003, directed that NSRR be disestablished within 6 months, and that the real estate disposal/transfer be carried out in accordance with procedures contained in the BRAC Act of 1990. This legislation required that the base closure be conducted in accordance with the Comprehensive Environmental Response Compensation and Liability Act (CERCLA), as amended by the Community Environmental Response Facilitation Act (CERFA). NSRR was closed on March 31, 2004 and designated as Naval Activity Puerto Rico. The mission of NAPR is to protect the physical assets remaining, comply with environmental regulations, and sustain the value of the property until the final real estate transfer is completed.

In anticipation of operational closure of NSRR, the Naval Facilities Engineering Command, Atlantic Division (LANTDIV) prepared Phase I/Phase II Environmental Condition of Property (ECP) Reports to document the environmental condition of NSRR. The Phase I ECP Report identified new sites at NAPR based on the results of review of records, an analysis of historic aerial photographs, physical site inspections, and interviews with persons familiar with past and current operations and activities. The new ECP sites had not been previously identified or investigated under existing environmental program areas. A Phase II ECP field investigation was performed in 2004 to conduct environmental sampling to determine if a release/disposal actually occurred at any of the Phase I ECP sites recommended for further evaluation in the Phase I ECP and, if so, whether any potential risk to human health was present. The Final Phase II Environmental Condition of Property Report recommended additional sampling (to be undertaken as part of the Resource Conservation and Recovery Act (RCRA) Program) at several sites to permit a more detailed assessment (NAVFAC Atlantic, 2005).

The United States Environmental Protection Agency (USEPA) issued a RCRA 7003 Administrative Order on Consent [Environmental Protection Agency] Docket No. RCRA-02-2007-7301 which identifies SWMU 68 as having documented releases of solid and/or hazardous waste and hazardous constituents. Following a public comment period, the Consent Order became effective on January 29, 2007 (USEPA, 2007).

2.1.2 SWMU 68 Description and History

SWMU 68, the Former Southern Fire Training Area, (also designated as ECP Site 14) is located at the southwest end of the Ofstie Airfield within a flat lying, open area surrounded by secondary growth vegetation. The location of SWMU 68 is shown on Figure 1-2. It is suspected that this area was used in the 1950s and 1960s for fire training exercises (Naval Energy and Environmental Support Activity [NEESA], 1984). A physical site inspection conducted during the ECP assessment observed a disturbed circular area consistent with that of a fire training area, but no stressed vegetation or stained soils were visible.

The former southern fire training area is currently not used. The area consists of a limited vegetative circular area which was formerly bisected by a road running generally east to west.

2.2 Summary of Previous Environmental Investigations

SWMU 68 (ECP Site 14) is located at the southwest end of the Ofstie Airfield within a flat lying open area surrounded by secondary growth vegetation. An aerial photography analysis identified this area as photo identified (PI) Site 19, due to the observation of a circular, graded area with an aircraft fuselage and two stained areas consistent with a fire training area during the period from 1961-1964. The physical site inspection conducted during the ECP identified a disturbed circular area consistent with that of a fire training area, but no stressed vegetation or stained soils were observed. However, the Phase I/II ECP investigation performed in 2004 noted several depressed areas at this site containing vegetation such as vines; while the remaining areas consisted of dense, tall grass. Trees enclose the perimeter of the site.

Three soil borings were advanced at SWMU 68 during the ECP investigation to profile surface and subsurface conditions. Three surface soil and three subsurface soil samples were collected and analyzed for Appendix IX volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), metals, and total petroleum hydrocarbon (TPH) gasoline range organics (GRO) and diesel range organics (DRO). Groundwater samples were not collected at SWMU 68 during the ECP investigation based on the photoionization detector (PID)/flame ionization detector (FID) measurements that did not indicate elevated results. Lead was found in three locations in the surface soil at concentrations ranging from 17 to 230 milligrams per kilogram (mg/kg). These areas were at locations within the areas of distressed vegetation as noted on the historical aerial photographs.

A RCRA Facility Investigation (RFI) was completed at the site in November 2006 (Baker 2008). Surface and subsurface soil samples were collected at locations focusing on the three areas identified in the ECP containing elevated levels of lead. Surface soil samples were collected from a depth of 0 to 1-foot below ground surface (bgs). In addition, subsurface soil samples were collected from the soil borings from two-foot intervals (e.g., 1 to 3 feet bgs, 3 to 5 feet bgs, etc). Two subsurface soil samples were collected from each boring. One sample was collected in the zone ranging from 1 to 7 feet bgs and one sample was collected from the zone just above observed water bearing zones. This ranged from 9 to 15 feet bgs in the borings, with the exception of 68SB03. Soil boring 68SB03 contained a significant amount of lean clay and no

significant wet zones were encountered to 20 feet bgs. The second sample at 68SB03 was collected from 17 to 19 feet bgs.

Surface soil samples 68SS01 through 68SS05 (five primary environmental samples) were collected from a depth of 0 to 1-foot bgs and analyzed for arsenic. Additional surface soil samples taken (68SS06 through 68SS13, 68SS15, and 68SS17) were analyzed for copper, lead, and zinc at a later date to further delineate these contaminants in the surface soils.

Arsenic concentrations in surface soil samples at several locations and in one subsurface soil sample exceeded the arsenic preliminary remediation goal (PRG) and background screening levels. Potential human exposure to arsenic concentrations in soil at SWMU 68 was evaluated. The preliminary risk calculations showed that there are no unacceptable carcinogenic or noncarcinogenic risks from potential exposure to arsenic in soil at SWMU 68. Furthermore, the low carcinogenic and noncarcinogenic risk levels demonstrate that arsenic in soil would not be a risk driver if a baseline human health risk assessment was conducted.

Nine groundwater samples were collected, one from each of nine temporary wells installed. Due to low well yields, the analyte list was reduced for samples 68TW01, 68TW02, and 68TW09. Analytical groups were selected in an attempt to complete the analytical program between 68TW01 and 68TW02. The analytical groups were prioritized in the order of those analyses that would most likely represent contamination related to fuel-and fire-training activities. Appendix IX SVOCs and low level polycyclic aromatic hydrocarbons (PAHs) were eliminated for sample 68TW01, and Appendix IX SVOCs, polychlorinated biphenols (PCBs), dissolved metals, sulfide and cyanide were eliminated for sample 68TW02. Adequate volume of groundwater was available from both temporary wells to analyze Appendix IX VOCs, TPH-GRO and TPH-DRO. The next analytical fraction selected in the order of priority was low-level PAHs (rather than SVOCs), because these represent the more toxic constituents of SVOCs, and therefore, the data was expected to be more useful for risk evaluation. The need for the analysis of PCBs was also recognized because of the potential for waste transformer oil to have been used as fuel; however because of the limited volume of groundwater available at these two locations, only one of the two locations could be selected for analysis of low-level PAHs while the other was selected for the analysis of PCBs, thereby providing a full complement of organic analytes between the two. Sulfide and cyanide were selected as the lowest priority because they were considered least likely to be related to fuel-or fire-training activities.

Similarly because of limited groundwater sample volume at 68TW09, certain analytical fractions were selected in priority over others because of their greater likelihood of representing contamination related to fuel-and fire-training activities. Sulfide and cyanide were considered less important and eliminated. Dissolved metals (filtered samples) were selected instead of total metals (unfiltered samples) because of the turbidity of the sample from the temporary well.

Results of the groundwater sample analyses were compared to USEPA Region IX Tap Water PRGs, Federal Drinking Water Maximum Contaminant Levels (MCLs), surface water screening levels, and NAPR basewide background (metals only) criteria for groundwater. Two VOCs and two SVOCs were detected in the groundwater at very low, estimated concentrations, and only at locations 68TW07, 68TW08, and 68TW09. None of the results were above any criteria. No PAHs, PCBs, or TPH compounds were detected in the groundwater. Twelve inorganic compounds were detected in the total inorganic analyses, and nine inorganic compounds were detected in the dissolved analyses. Arsenic, chromium, lead, and vanadium exceeded the screening criteria. However, none of these compounds exceeded any background screening levels for groundwater at NAPR, and they are unlikely to be present at SWMU 68 as a result of

Navy activities. Only arsenic and vanadium were present above PRGs in the dissolved analyses, and neither exceeded their background screening level.

Based on concentrations found in temporary wells during the investigation, it is concluded that no impact to the groundwater is present due to past Navy operations. The naturally occurring geology, including very tight clay formations, would likely serve to contain any contamination that may have migrated downward to the water table, if it had been present.

The results of the past investigations indicate that very little impact on the environment was found during the Phase I RFI investigation at SWMU 68. However, because concentrations of lead, copper, and zinc from the ECP investigation indicated the presence of contamination in the surface soil above their ecological screening values and respective background levels, and nearby surface soil samples from the Phase I RFI had relatively low concentrations with no exceedances for these metals, a very limited remedial action for surface soil (excavation and disposal) is warranted in order to address potential ecological risks at this site. The extent of contamination associated with lead, copper, and zinc has been adequately defined to support a removal action for surface soil covering an area of 5,000 square feet (100 feet by 50 feet rectangle) around ECP sample location 14E-01 and an area of 2,500 square feet (50 feet by 50 feet square) around ECP sample location 14E-03. The contaminants identified during the ECP investigation were completely delineated during the Phase I RFI investigation and the additional delineation sampling for copper, lead, and zinc, serving as the basis for this design document.

2.3 Current Site Conditions

SWMU 68 (Former Southern Fire Training Area [also known as ECP Site 14]) is located at the southwest end of the Ofstie Airfield clear zone at the end of an active runway. SWMU 68 covers approximately 18 acres and is heavily vegetated with portions of a freshwater wetland classified as Palustrine Emergent Persistent 1 (PEM) by the Cowardin Wetland Classification System (Cowardin et al., 1979). The wetland boundary shown on Figure 2-1 was delineated by Geo-Marine, Inc. in December 1999 from 1993 color infrared and 1998 true color aerial photography.

Access to SWMU 68 is made through the main gate of the airport and the road that extends adjacent to the site. A fence surrounding the active airfield is located just north of the site. Utilities (i.e. power, water, and wastewater) are not available to this site.

The Aerial Photography Analysis presented in the Phase I/II ECP Report (NAVFAC Atlantic, 2005) identified this area as photo identified (PI) Site 19, due to the observation of a circular, graded area with an aircraft fuselage and two stained areas consistent with a fire training area from the period 1961-1964. It is suspected that the SWMU 68 site was used in the 1950s and 1960s for fire training exercises. Results of soil samples collected during the Phase I/II ECP investigation performed in 2004 (NAVFAC Atlantic, 2005) indicated that areas within the boundaries of SWMU contain higher than background metals concentrations and some DRO, consistent with a fire training area.

An RFI conducted at SWMU 68 concluded that there was very little impact on the environment from the past site activities. However, because concentrations of lead, copper, and zinc identified during the ECP indicated the presence of contamination in the surface soil above their ecological screening values and respective background levels, and because nearby surface soil samples from the Phase I RFI had relatively low concentrations with no exceedances of these metals, the Phase I RFI recommended a very limited remedial action for surface soil to address potential ecological risks at this site (Baker, 2008). The locations of samples containing levels of copper, lead, and zinc exceeding screening criteria are shown on Figure 2-1.

The remedial action to be performed is adjacent to designated wetland areas. The wetlands should be delineated in the field prior to excavation activities. This wetland delineation will determine the absence or presence of wetlands in the area where the work is to be conducted. If they are present in this area, then their boundary will be mapped and an evaluation will be conducted to determine if they impact any of this work. Remedial activities such as soil removal and equipment staging will be performed outside of the designated wetland areas if possible.

2.4 Remediation Levels

The corrective action objectives (CAO) established for surface soil from the EPA approved Final Corrective Measures Study Final Report – SWMU 68 on August 6, 2009 are:

- Copper 168 mg/kg
- Lead 87 mg/kg
- Zinc 120 mg/kg

The CMS explains in detail how the CAOs were developed. The identified risk is for avian receptors within the surface soils and the CAOs establish an acceptable threshold for the receptors. The risk is diminished by removing the top two feet of surface soil (Baker, 2009).

2.5 Extent of Contamination

As described in the CMS, the scope of the removal action to be completed at SWMU 68 consists of an area extending 5,000 square feet (100 by 50 feet rectangle) around ECP sample location 14E-01 and an area of 2,500 square feet (50 feet by 50 feet square) around ECP sample location 14E-03. Soil will be removed from the site and handled in a manner consistent with the types of contaminants encountered at the site-primarily copper, lead and zinc. Soil in two areas was identified for remediation:

- An estimated 100 foot by 50 foot area around sample location 14E-01 was assumed for excavation to a depth of two feet below the ground surface (estimated 370 cubic yards [CY]).

- An estimated 50 foot by 50 foot area around sample location 14E-03 was assumed for excavation to a depth of two feet below the ground surface (estimated 185 CY).

The extent of the proposed remediation is as indicated on Figure 2-2.

In addition, in accordance with the Navy responses to USEPA comments dated April 23, 2009 on the Draft Final Corrective Measures Study Final Report for SWMU 68, sampling of the historic drainage feature located southeast of sample location 14E-01 will be conducted. Sample results taken from sample 14E-02 located at the terminus of the historical drainage feature (see Figure 2-3) indicated copper, lead, and zinc concentrations in the surface soil below CAOs (i.e. 28 mg/kg, 17 mg/kg, and 48 mg/kg respectively). Similarly, results obtained from the historical drainage feature at 68SB08 located approximately at the middle of the length of this feature indicated copper, lead, and zinc concentrations below CAOs (29J mg/kg, 53 mg/kg, and 51 mg/kg respectively).

In the response to comments, the Navy acknowledged that soil along the portion of the historical drainage feature between the proposed excavation area and Phase I RFI surface soil sample 68SB08 had not been adequately characterized. Therefore, two samples will be collected from this portion of the historical drainage feature as part of the pre-excavation sampling program

which is detailed in the Work Plan. Each surface soil sample will be analyzed for copper, lead, and zinc. Since the upper portion of the historical drainage area falls within the area to be excavated the additional soil sampling will focus on the portion of the historical drainage feature that lies outside the proposed excavation area. The two samples will be collected within the historical drainage feature between the outside edge of the proposed excavation area and the known clean sample location 68SB08. The first soil sample location will be adjacent to the proposed excavation area within the historical drainage feature. The results from this sample location will determine if additional soil will need to be excavated outside of the proposed excavation area. The second soil sample location will be midway between the edge of the proposed excavation area and the known clean sample location 68SB08. This sample location will be utilized to determine if contamination has traveled along the historical drainage feature toward 68SB08. Both of these samples will be evaluated to determine if additional soils need to be excavated from the historical drainage feature.

3.0 FACTORS AFFECTING THE DESIGN AND IMPLEMENTATION OF THE REMOVAL ACTION

The following sections describe factors affecting the design and implementation of the proposed Removal Action. Supporting information and referenced data are presented in the Appendices as follows.

- Appendix A - Construction Schedule
- Appendix B - Supporting Calculations

3.1 Scope and Goals of the Proposed Removal Action

The proposed removal action for SWMU 68 will provide a cost-effective means of meeting the overall project goal which is the protection of human health and the environment. The Removal Action will provide protection by:

- Reducing the potential for ecological exposure to contaminated surface soil;

- Eliminating the future possibility of contaminants migrating to groundwater, surface water, and sediment.

In terms of contaminant reduction, the scope of the removal action includes removal and disposal of surface soil with contamination at levels greater than the following identified CAOs:

- Copper 168 mg/kg
- Lead 87 mg/kg
- Zinc 120 mg/kg

3.2 Description of the Proposed Removal Actions

The major items associated with the proposed Removal Action for SWMU 68 include:

- Perform delineation soil sampling in the historical drainage feature to fully characterize the extent of contamination in the drainage feature located southeast of 14E-01 downstream to clean sample 68SB08;
- Delineating the limits (absence or presence) of the wetlands adjacent to SWMU 68 prior to construction activities to ensure the wetlands will not be impacted during removal activities;
- Wetlands will be marked in the field and will be avoided during all construction activities including placement of the access roadway and soil stockpile areas.
- Evaluate results from the historic drainage feature delineation samples to determine if additional excavation is required outside of the 50’ x 100’ area identified for soil removal;
- Location by survey the excavation limits;
- Site clearing where required;
- Mobilization of a small backhoe or grade-all, small front end loader, and appropriate waste storage containers;
- Construction of a decontamination pad and equipment laydown area;
- Installation of erosion controls;
- Excavation of soil two feet (ft) deep from the delineated areas;
- Excavated soil will be deposited directly into appropriate waste storage containers;

- While the excavated soil is awaiting transportation for disposal, the soils will be stored in an appropriate waste storage containers with adequate cover (The containers will be positioned so that they slope and drain to one corner of the box);
- Confirmation sampling of the sidewalls of each excavation, soil samples will be collected from the surface of each wall, in undisturbed soil, one sample per every 25 lineal feet at a depth of 0-2 ft below the ground surface;
- Confirmation sampling of the bottoms of each excavation, one sample from each area approximately 25 ft by 25 ft in extent. Confirmation soil sampling points are illustrated on Figure 3-1;
- If additional soils are removed from the historical drainage feature outside of the 50' x 100' area then confirmation samples will be collected from this additional excavation from the side walls and bottom of the excavation as described in the previous bullets;
- Collection, analysis, and disposal of water accumulated in soil filled appropriate waste storage container, open excavation and decontamination fluids;
- Survey the location of confirmation sampling and final limits of excavation;
- Excavated soil will be transported to an off-site disposal facility in the appropriate waste storage containers. Transportation and disposal of debris and soil to an approved disposal facility;
- Backfill existing excavated areas with clean fill to match existing grade;
- Revegetate disturbed areas;
- Demobilization of all equipment, etc.;
- Removal of erosion and sediment control structures upon establishment of vegetation.

The proposed construction schedule is presented in Appendix A. The following are a list of special requirements:

- The surface soils in the historic drainage feature located southeast of 14E-01 will be sampled prior to the commencement of excavation activities to ensure the extent of contamination is defined. These samples will be analyzed for copper, lead, and zinc in accordance with the methods described in the SAP.
- The wetlands must not be disturbed during construction activities. If it appears that construction activities will extend into a designated wetland area, then all construction activities will stop and the NTR will be notified for specific instructions on how to proceed at that time.
- The confirmation sampling will be conducted to ensure that the CAOs for copper, lead, and zinc are met.

3.3 Preliminary Design Criteria and Rationale

The following criteria were used to develop the Basis of Design for this Removal Action:

Remediation Goals - The remediation goals for SWMU 68 from the USEPA approved CMS are as follows:

- Copper 168 mg/kg
- Lead 87 mg/kg
- Zinc 120 mg/kg

Extent of Soil Removal - The extent of soil contamination in excess of the CAOs is limited to two areas, as shown on Figure 2-2. These areas were defined via laboratory analysis conducted as

part of previous investigations. Excavation limits were defined based on available laboratory analytical results. Side-wall confirmatory sampling will verify removal of contaminated soils.

Soil will be removed from two areas on SWMU 68 as follows:

- Approximately 370 CY will be excavated from an area 100 by 50 feet and to a depth of two feet below the ground surface.

- Approximately 185 CY will be excavated from an area 50 by 50 feet in size to a depth of two feet below the ground surface.

- Confirmation Sampling - Confirmation sampling of the sidewalls of each excavation, soil samples will be collected from the surface of each wall, in undisturbed soil, every 25 lineal feet of the sidewalls at a depth of 0-2 feet below the ground surface. Confirmation sampling will be performed from the bottom of the excavations at the rate of one sample per each 25 foot by 25 foot area of the bottom of the excavation to confirm that contamination has been removed. In addition, surface soil in the historic drainage feature located southeast of sample point 14E-01 will be sampled at the two locations presented on Figure 2-3 prior to excavation activities. The final position of the sample points will be located using a GPS unit.

Backfill - The area of removed soil will be replaced with clean backfill in accordance with project specifications.
Top Soil - A 6-inch layer of top soil will be placed upon the backfill in accordance with project specifications.

Revegetation - Once topsoil is placed on the excavation areas, the Contractor shall revegetate the site in accordance with project specifications.

Slope Stability - The existing ground surface is generally flat in the vicinity of the surface soils to be excavated at SWMU 68. There are no slope stability concerns at SWMU 68.

Storage Area - All contaminated surface soil will be placed in appropriate waste storage containers with adequate cover awaiting analysis of data identifying the ultimate disposal location.

Soil Stockpile Area – Contractor may elect to stockpile clean materials (backfill and topsoil) in this designated area prior to backfilling the excavation.

3.4 General Operations and Maintenance Requirements

Minimal maintenance will be required subsequent to implementation of the removal action. Periodic visual inspections will be conducted during the initial weeks following seeding to verify that seeds have germinated and vegetation is established. Subsequently, periodic inspections will be conducted to verify that the top soil cover is not eroding and the vegetation is growing. Additionally, erosion control structures will be inspected and maintained until vegetation is sufficiently established whereupon it will be removed.

4.0 COMPONENTS OF THE REMEDIAL ACTION

The following sections of this Basis of Design describe the individual components of the removal action.

4.1 Mobilization and Preparatory Work

Mobilization involves the acquisition, delivery, and setup of equipment, material, and personnel at the work site which are necessary to accomplish the scope of work outlined for the removal action.

In addition, during the mobilization period, the Contractor shall prepare all necessary pre-construction submittals as described in the technical specifications. These specifications allow the Contractor up to sixty (60) days to prepare and submit the necessary pre-construction submittals. These submittals include:

- Erosion Control Plan
- Environmental Protection Plan
- Site Health and Safety Plan
- General Site Work Plan
- Construction Quality Control Plan
- Materials Handling/Transportation/Disposal Plan
- Sampling and Analysis Plan
- Shop Drawings
- Supplemental Specifications and Calculations
- Site Visit
- Complete Remedial Design Plans
- Organization Chart
- Project Schedule
- Submittal Register
- Quality Control Forms

The Contractor shall provide temporary facilities, including (but not limited to) equipment decontamination and laydown areas, contaminated water storage facilities, and clean soil stockpile/storage areas. The Contractor will also provide any temporary utilities necessary to complete the work.

Pre-construction submittals will be submitted in accordance with Section 01 33 00 of the Technical Specifications. The submittals will be included in the CMI Work Plan for approval by the Navy and USEPA.

The Contractor will be required to coordinate and obtain any necessary construction permits (such as temporary excavation permits) and clearances prior to the start of construction. The Contractor will also be responsible for coordinating all required inspections with the regulators and the designated Navy and Puerto Rico Port Authority personnel, as identified during the project kickoff meeting.

4.2 Monitoring, Sampling, Testing, and Analysis

The Contractor will be responsible for all health and safety monitoring at SWMU 68. Sampling, testing and analysis that will be conducted by the Contractor will include characterization of materials that will be disposed or transported off site by the Contractor.

The Contractor will be required to submit to the USEPA and the BRAC PMO SE, for approval, a Sampling and Analysis Plan (SAP) describing the Contractor's sampling, analytical, and quality control procedures for the chemical data collected during the performance of work required by the specifications. The SAP will ensure that all chemical data generated are scientifically accurate and legally defensible. The SAP will describe the quantity, frequency, and media of samples to be collected and analyses to be performed.

The type and quantity of testing will be based on the requirements set forth in the specifications (and the Contractor's Health and Safety Plan and Air Monitoring Plan) and as required by disposal facilities which will be utilized. All required testing, documentation, and submittal of test results (for samples collected by the Contractor) will be the responsibility of the Contractor.

4.2.1 Liquid Waste Sampling

The Contractor shall collect water samples for chemical analysis from the water generated as part of the Removal Action including, but not limited to, water collected from pressure washing, decontamination activities, and excavated soil stored in the appropriate waste storage containers.

4.2.2 Soil Sampling

Sampling of in situ soils will not be the responsibility of the Contractor. However, the Contractor will be responsible for allowing sampling teams access to soil removal areas and for coordinating construction activities to accommodate sampling procedures. Laboratory analysis will be performed on the samples collected by the sampling teams.

The excavation will remain open while results of the laboratory confirmation testing are obtained. Laboratory analysis will be performed on a "quick turn" (48 hours maximum) basis to minimize this waiting period and the associated dewatering costs (if any).

As outlined in the project specifications, any off-site borrow material to be used as backfill will be sampled (by the Contractor) at a frequency of one sample for every 3000 CY of potentially clean/borrow material. Alternately, the Contractor may submit certification indicating that the soil is clean, with approval from the Navy Technical Representative (NTR). The Contractor will also be required to perform geotechnical testing of soils as outlined in the design drawings and specifications.

4.2.3 Debris, Waste, and Recyclable Material Sampling

The Contractor will be responsible for collecting samples of materials that will be transported off site for disposal. These materials may include, but are not limited to the following:

- Erosion and sediment controls;
- Recyclable materials such as metal and rubber;
- Decontamination pad;
- Soil stockpile;
- Waste generated by the Contractor;

- Personal Protective Equipment (PPE).

4.2.4 Testing and Analysis

The Contractor shall adhere to USEPA chain-of-custody procedures during the collection, transport, and analyses of all samples. The materials to be sampled are discussed in Sections 4.2.1, 4.2.2, and 4.2.3. Samples shall be analyzed as follows:

1. Characterization sampling – Excavated soil will be tested for metals (copper, lead, and zinc). Additionally, fluids collected during excavation and decontamination will also be tested for copper, lead, zinc, Toxicity Characteristic Leachate Procedure (TCLP) metals, TCLP volatiles and Ignitability, Reactivity, and Corrosivity (IRC) to ensure proper characterization for disposal in an off-site landfill. Sampling parameters are presented in Table 4-1.

2. Chemical analyses based on laboratory testing to verify the absence of contaminants in off-site borrow material. Sampling and analysis frequencies and methods will be outlined in the Technical Specifications and Contractor's SAP. Alternately, the Contractor may submit certification indicating that the soil is clean, with approval from the NTR.

3. Geotechnical testing (soil classification and compaction testing) of borrow soils and "clean" soils that will be placed as backfill. Test frequency and methodologies will be outlined in the Technical Specifications and Contractor's SAP.

4.3 Site Work

Site work includes, but is not limited to, the following activities:

- Surface soil sampling in the southeastern section of the historic drainage feature located adjacent to sample point 14E-01;

- Field determination of the absence or presence and delineating wetlands adjacent to proposed removal action;

- Construction of a decontamination pad;

- Clearing and grubbing (and associated chipping, mulching, transportation of mulch);

- Installation of safety measures (such as safety fencing);

- Installation of erosion and sedimentation control facilities;

- Earthwork, including: excavation, fill placement, and site grading.

4.4 Surface Water Collection and Control

The Contractor will be required to provide devices and facilities as necessary to prevent surface water from contacting contaminated materials (e.g., contaminated equipment, excavated soils, exposed debris/contaminated soils within the excavation) throughout the course of all construction activities. The Contractor shall be required to keep all excavated areas dewatered during construction and to collect, sample, analyze, and dispose of any water accumulated in the excavation and staging areas.

The liquid that accumulates within the excavated areas, as well as the liquid collected following contact with contaminated materials and equipment shall not be allowed to flow outside of the limits of construction.

The evacuation of water from the excavation areas can be accomplished via installation of sump pumps within the excavated area and pumping the accumulated water to an appropriate collection vessel (such as a Baker tank or tanker truck). For costing purposes, it is assumed that 1000 gallons of water will be collected from the site. The collected water will be tested for the parameters listed in Table 4-1.

Groundwater at the site is between 6.69 feet bgs and 14.65 feet bgs. Excavation will not extend below 2 feet bgs; therefore groundwater should not be encountered. Should groundwater be encountered in the excavation, work will be stopped and specifications will be developed for dewatering, containerization, sampling, analysis, and disposal of the groundwater.

To avoid surface water contact with contaminated materials, the Contractor may employ devises such as water proof barriers or covers (plastic sheeting) or construct earthen berms to divert surface water away from construction areas. Excavated soil shall be deposited directly into appropriate waste storage containers with appropriate and adequate covers which will not be susceptible to collection of surface water.

4.5 Solids Collection and Containment

The excavation of contaminated soil will be performed with earth moving equipment such as excavators and front-end loaders.

The anticipated extent of excavation is depicted on the design drawings. The estimated in-place volume of contaminated soil that will be excavated is as follows:

- Approximately 370 CY will be excavated from an area, 100 by 50 feet, and to a depth of two feet below the ground surface.

- Approximately 185 CY will be excavated an area, 50 by 50 feet, and to a depth of two feet below the ground surface.

These volumes do not include excavation associated with site work such as grading activities.

The above volumes were calculated on the in situ soils and do not include bulking. The volumes are based on extent of contamination as defined via laboratory analyses that were conducted under previous investigations. The Contractor will establish baselines or reference points as necessary to ensure that excavation is conducted in the proper location, and that the locations can be readily field verified via survey. Excavation will not commence without approval from the Navy's on-site representative.

The Contractor will not excavate beyond the designated areas or depths (as indicated on the design drawings) without approval from the Navy's on-site representative. If the side-wall confirmatory soil sampling indicates that the in situ soils adjacent to the excavated areas exhibit contamination (above the established remediation goals), the Contractor will consult with the Navy's on-site representative to determine the additional areas of soils to be excavated. Excavation (and confirmatory soil sampling) will proceed until the remediation goals are met.

The excavated soil will be placed in appropriate waste storage containers located near the excavation area. Surveying will take place to determine confirmatory sample locations, extent of soil removal as well as post-construction site conditions.

4.6 Liquids Collection and Containment

The Contractor will provide a decontamination pad to collect liquids from the decontamination of personnel and construction equipment. The Contractor will also collect any water that may collect in the excavation areas. The resulting fluids will be collected for analysis and proper disposal or treatment.

4.7 Decontamination and Decommissioning

Demolition of structures is not anticipated. Drums, tanks, or spent PPE, and other non-hazardous solid waste will be disposed of in accordance with USEPA guidance (USEPA Publication 9345.3-05FS).

4.8 Disposal

The following materials will be containerized, manifested, and transported to an approved treatment or disposal facility off-base:

- Contractor-generated waste (e.g., decontamination debris, liquids generated through decontamination procedures and liquids collected in appropriate waste storage containers);
- Surface water runoff and precipitation collected in the soil excavation area;
- Excavated surface soil.

4.9 Site Restoration

After confirmatory sampling results indicate that the contamination has been removed from site, the excavated areas will be surveyed, backfilled with clean soil from off-site borrow sources and vegetated. SWMU 68 will be restored as indicated on the design drawings and in the technical specifications.

4.10 Demobilization

All temporary facilities, equipment, and supplies acquired for this contract shall be decontaminated and removed from the site upon completion of the removal actions.

Post-construction submittals will include: 1) a punch list showing correction of all listed items; 2) a letter from the Contractor certifying completion of all contracted work in accordance with the contract conditions, applicable regulations, and standards of practice; 3) a completed project current condition with an as-built survey for the entire site; 4) submittal, in one collated document, of all quality control daily reports manifests, bills of lading, samples collected, results of the sample analyses, corrective actions taken to correct unacceptable deviations from required quality standards (if required) results of corrective actions; problems encountered and resolved, and lessons learned; and, 5) submittal in one collated document of all quality assurance samples, sample analyses results, and corrective actions taken to correct unacceptable deviations from required quality standards (if required).

The Contractor will submit a detailed report summarizing the removal action, lessons learned, and recommendations for inclusion in future similar contracts.

5.0 REFERENCES

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United States Environmental Protection Agency (USEPA, 2007). RCRA § 7003 Administrative Order on Consent. In the Matter of: United States The Department of the Navy, Naval Activity Puerto Rico formerly Naval Station Roosevelt Roads, Puerto Rico. Environmental Protection Agency, USEPA Docket No. RCRA-02-2007-7301. January 29, 2007.

TABLES

TABLE 4-1

CONFIRMATION AND CHARACTERIZATION SAMPLING SUMMARY
BASIS OF DESIGN
CORRECTIVE MEASURE AT SWMU 68
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

			Fixed Based Analytical Lab Analysis										
Area	**Media/Sample ID**	**Sample Depth (ft bgs)**	Copper	Cromium	Lead	Selenium	Vanadium	Zinc	Low Level PAHs	TCLP	Full TCLP	IRC	**Comment**
Confirmation Soil Samples													
Area A (68A) 14E-03	68ABT01-02	2.0	X		X								
	68ABT02-02	2.0	X		X								
	68ABT03-02	2.0	X		X								
	68ABT04-02	2.0	X		X								
	68AWL01-00	0.0 - 1.0	X		X								
	68AWL02-00	0.0 - 1.0	X		X								
	68AWL03-00	0.0 - 1.0	X		X								
	68AWL04-00	0.0 - 1.0	X		X								
	68AWL05-00	0.0 - 1.0	X		X								
	68AWL06-00	0.0 - 1.0	X		X								
	68AWL07-00	0.0 - 1.0	X		X								
	68AWL08-00	0.0 - 1.0	X		X								

TABLE 4-1

CONFIRMATION AND CHARACTERIZATION SAMPLING SUMMARY
BASIS OF DESIGN
CORRECTIVE MEASURE AT SWMU 68
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

			Fixed Based Analytical Lab Analysis										
Area	**Media/Sample ID**	**Sample Depth (ft bgs)**	Copper	Cromium	Lead	Selenium	Vanadium	Zinc	Low Level PAHs	TCLP	Full TCLP	IRC	**Comment**
Area B (68B) 14E-01	68BBT01-02	2.0			X			X					
	68BBT02-02	2.0			X			X					
	68BBT03-02	2.0			X			X					
	68BBT04-02	2.0			X			X					
	68BBT05-02	2.0			X			X					
	68BBT06-02	2.0			X			X					
	68BBT07-02	2.0			X			X					
	68BBT08-02	2.0			X			X					
	68BWL01-00	0.0 - 1.0			X			X					
	68BWL02-00	0.0 - 1.0			X			X					
	68BWL03-00	0.0 - 1.0			X			X					
	68BWL04-00	0.0 - 1.0			X			X					
	68BWL05-00	0.0 - 1.0			X			X					
	68BWL06-00	0.0 - 1.0			X			X					
	68BWL07-00	0.0 - 1.0			X			X					
	68BWL08-00	0.0 - 1.0			X			X					
	68BWL09-00	0.0 - 1.0			X			X					
	68BWL10-00	0.0 - 1.0			X			X					
	68BWL11-00	0.0 - 1.0			X			X					
	68BWL12-00	0.0 - 1.0			X			X					
Drainage Historic Characterization Samples													
14E-01 Ditch	68DT01-00	0.0 - 1.0	X		X			X					
	68DT02-00	0.0 - 1.0	X		X			X					
Waste Characterization Composite Sample													
Collected Water	68CL01	NA	X		X			X		X	X	X	Composite from collected water
Backfill Evaluation	Borrow Material	N/A	X		X			X		X	X	X	

TABLE 4-2

METHOD PERFORMANCE LIMITS
AND CONTRACT REQUIRED QUANTITATION LIMITS (CRQL)
BASIS OF DESIGN
CORRECTIVE MEASURE AT SWMU 68
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

	Quantitation Limits*		
Toxicity Characteristic Leaching Procedure	**Water mg/kg**	**Soil mg/kg**	**Method**
TCLP Volatiles	20	NA	1311
Reactivity, Corrosivity, Ignitibility			
RCI	various	various	9014/9040/9034/9045/1010

	Quantitation Limits*		
Metals (Total)	**Water mg/kg**	**Low Soil (mg/kg)**	**Method**
Copper	20	2.0	6010B (Inductively Coupled Plasma)
Lead	15	0.5	6010B (Inductively Coupled Plasma)
Zinc	20	2.0	6010B (Inductively Coupled Plasma)

Notes:

* Quantitation limits listed for soil/sediment are based on wet weight. The quantitation limits calculated by the laboratory for soil/sediment, calculated on dry weight basis, will be higher.

µg/kg - micrograms per kilogram

mg/kg - milligrams per kilogram

NA - Not Applicable

FIGURES

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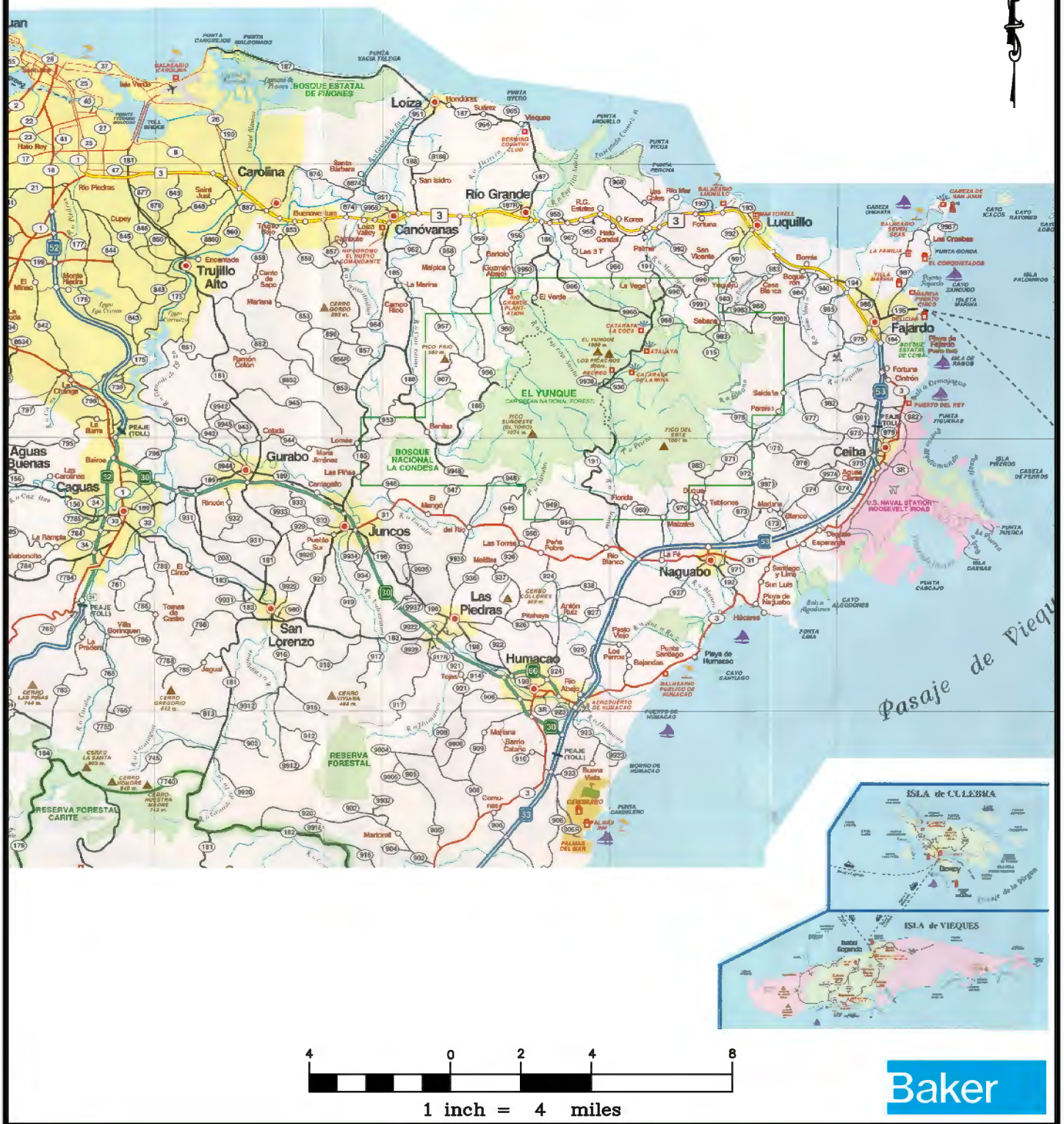


4 0 2 4 8

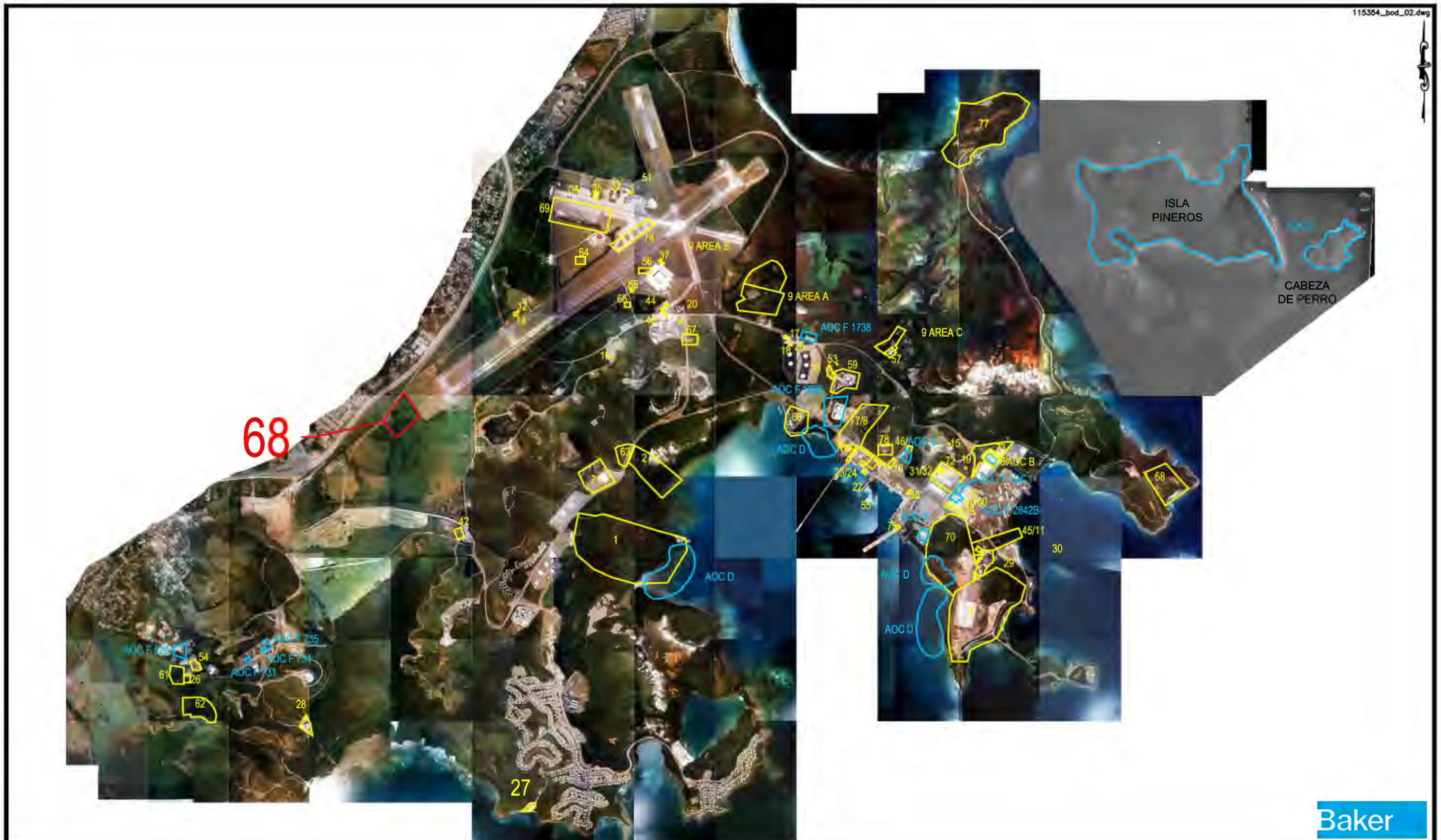
1 inch = 4 miles

Baker

FIGURE 1-1
REGIONAL LOCATION MAP
SWMU 68-FORMER SOUTHERN FIRE TRAINING AREA
BASIS OF DESIGN

NAVAL ACTIVITY PUERTO RICO
CEIBA, PUERTO RICO

SOURCE: METRODATA, INC., 1999.



LEGEND

– SWMUs

– AREA TO WHICH THIS INVESTIGATION PERTAINS

AOC D – AOCs

SOURCE: GEO–MARINE, INC., SEPTEMBER 6, 2000.

3000 0 1500 3000

1 inch = 3000 ft.

FIGURE 1–2
SWMU/AOC LOCATION MAP
SWMU 68–FORMER SOUTHERN FIRE TRAINING AREA
BASIS OF DESIGN
NAVAL ACTIVITY PUERTO RICO
CEIBA, PUERTO RICO

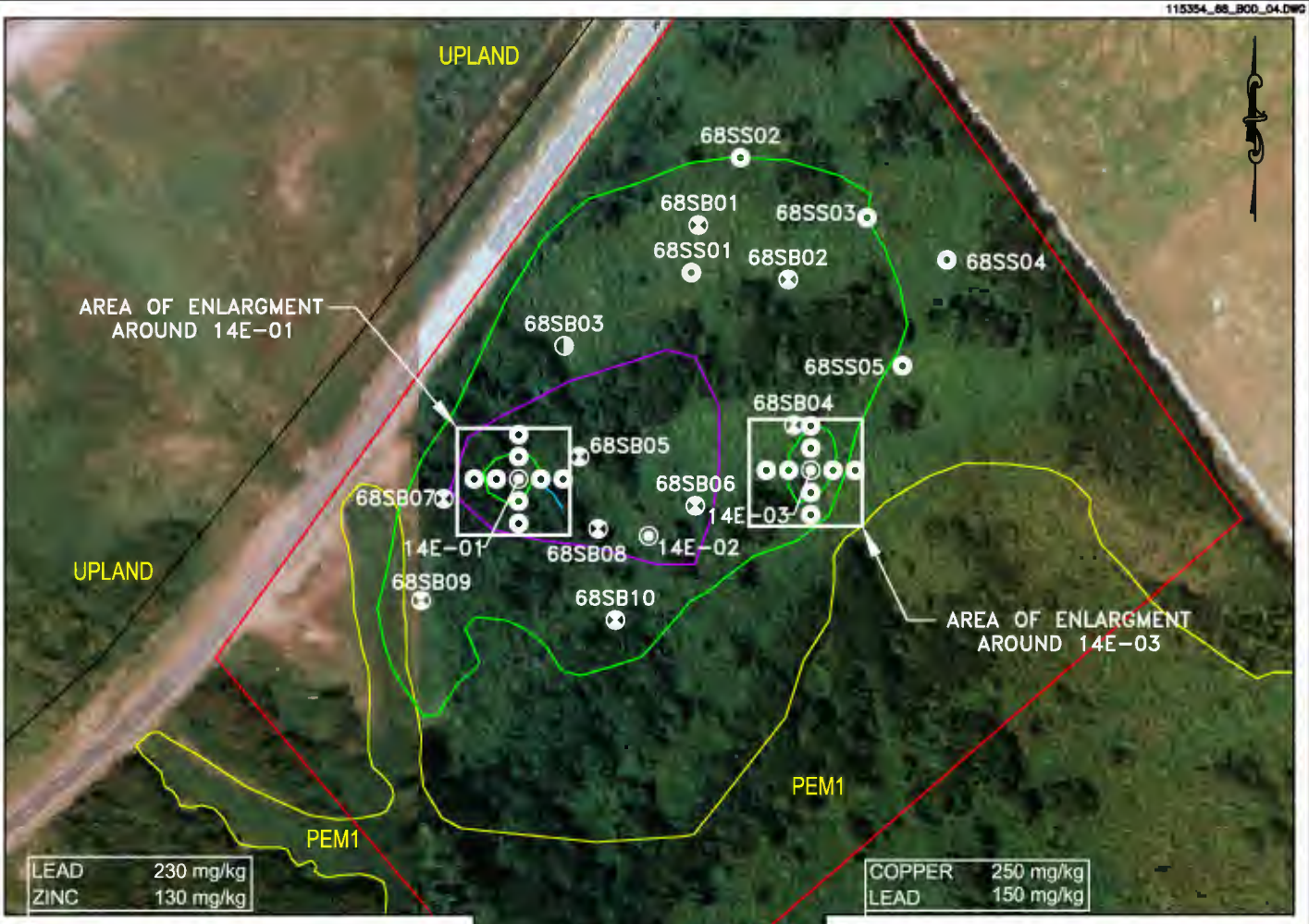
LEGEND

▭ – SWMU 68

SOURCE: GEO–MARINE, INC., SEPTEMBER 6, 2000.

500 0 250 500
1 inch = 500 ft.

FIGURE 1–3
SITE PLAN
SWMU 68–FORMER SOUTHERN FIRE TRAINING AREA
BASIS OF DESIGN
NAVAL ACTIVITY PUERTO RICO
CEIBA, PUERTO RICO



AREA OF ENLARGMENT
AROUND 14E-01

AREA OF ENLARGMENT
SCALE
0 25 50
1 inch = 50 ft.

AREA OF ENLARGMENT
AROUND 14E-03

200 0 100 200
1 inch = 200 ft.

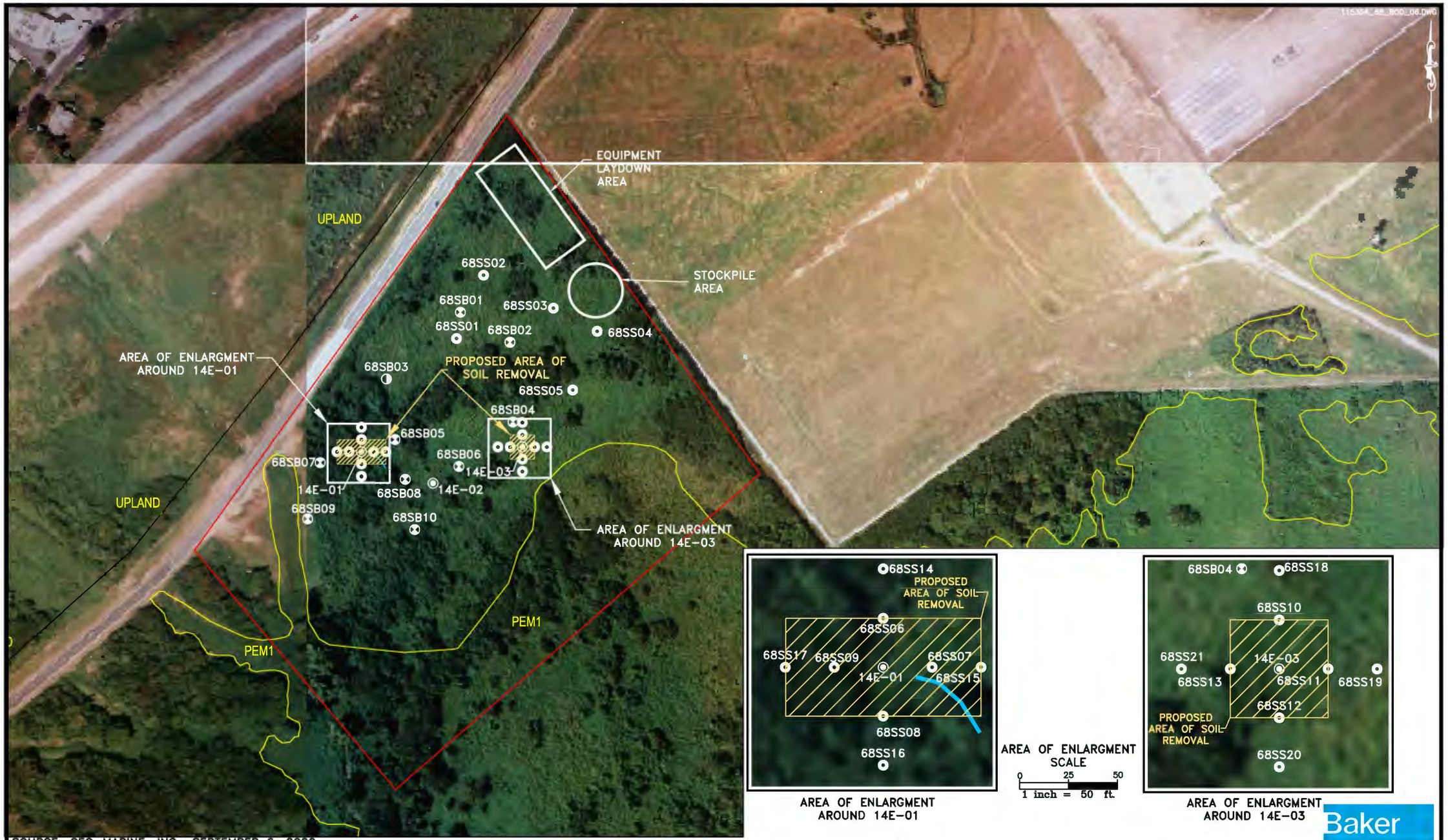
SOURCE: GEO-MARINE, INC., SEPTEMBER 6, 2000.

Baker

LEGEND

- 1961 POLYGON FEATURE
- 1964 POLYGON FEATURE
- 1961 DRAINAGE
- ECP SITE BOUNDARY
- SURFACE AND SUBSURFACE SOIL SAMPLE LOCATION (PHASE II ECP INVESTIGATION)
- SURFACE AND SUBSURFACE SOIL AND GROUNDWATER SAMPLE LOCATION (PHASE I RFI NOV. 06)
- SURFACE AND SUBSURFACE SOIL SAMPLE LOCATION (PHASE I RFI NOV. 06)
- SURFACE SOIL (PHASE I RFI SEPT. AND OCT. 07)
- WETLANDS DELINEATION
- PEM1 – WETLANDS DELINEATION IDENTIFICATION CODES

FIGURE 2-1
COPPER, LEAD, AND ZINC CONCENTRATIONS IN SURFACE SOIL GREATER THAN SOIL SCREENING VALUES AND BACKGROUND SURFACE SOIL SCREENING VALUES
SWMU 68-FORMER SOUTHERN FIRE TRAINING AREA
BASIS OF DESIGN
NAVAL ACTIVITY PUERTO RICO



SOURCE: GEO-MARINE, INC., SEPTEMBER 6, 2000.

LEGEND

- SURFACE AND SUBSURFACE SOIL SAMPLE LOCATION (PHASE II ECP INVESTIGATION)
- SURFACE AND SUBSURFACE SOIL AND GROUNDWATER SAMPLE LOCATION (PHASE I RFI NOV. 06)
- SURFACE AND SUBSURFACE SOIL SAMPLE LOCATION (PHASE I RFI NOV. 06)
- SURFACE SOIL (PHASE I RFI SEPT. AND OCT. 07)
- 1961 DRAINAGE
- ECP SITE BOUNDARY
- WETLANDS DELINEATION
- PEM1 – WETLANDS DELINEATION IDENTIFICATION CODES

500 0 250 500
1 inch = 500 ft.

FIGURE 2-2
CONCEPTUAL DESIGN PLAN
SWMU 68-FORMER SOUTHERN FIRE TRAINING AREA
BASIS OF DESIGN
NAVAL ACTIVITY PUERTO RICO
CEIBA, PUERTO RICO

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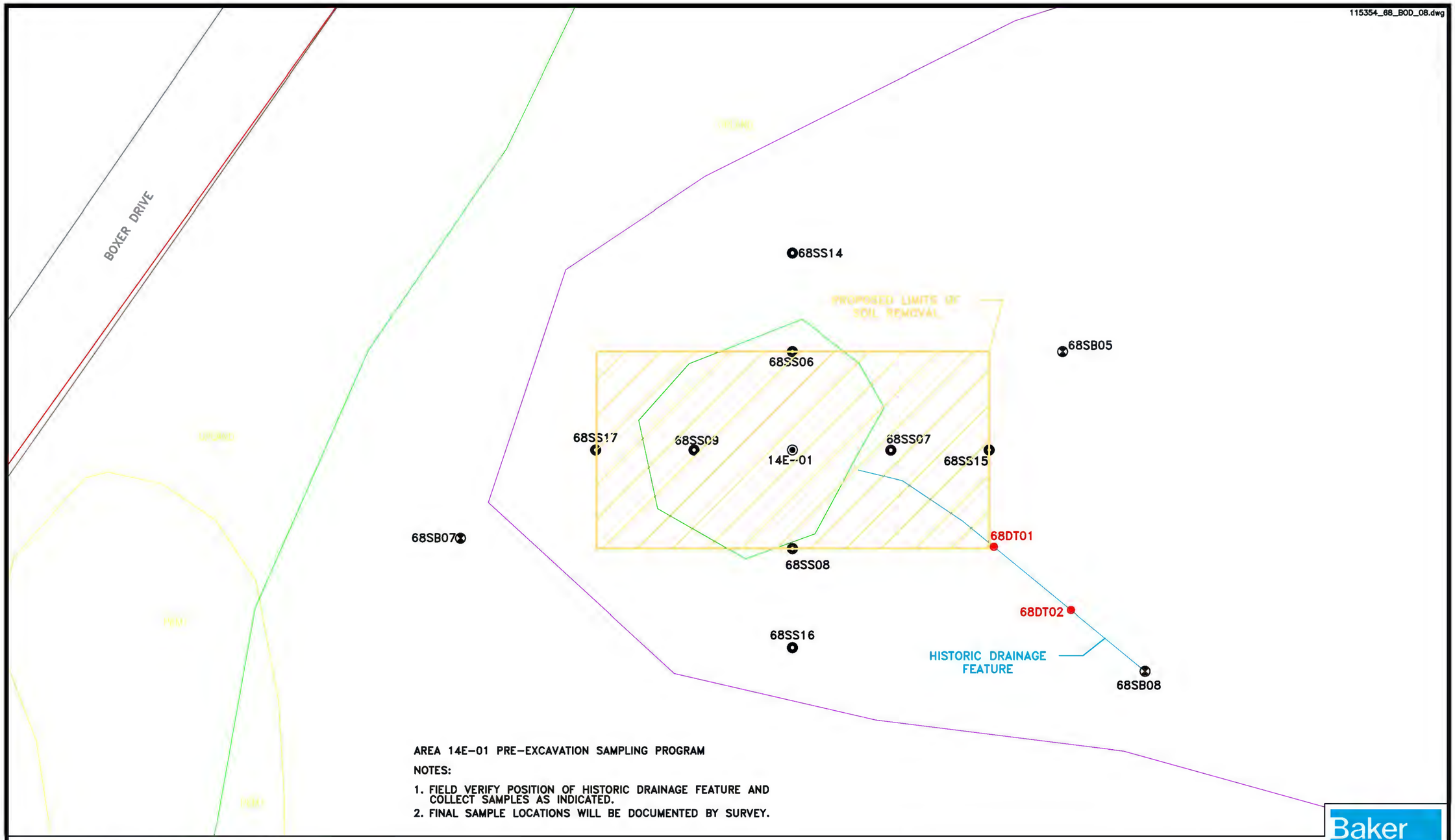

AREA 14E-01 PRE-EXCAVATION SAMPLING PROGRAM

NOTES:

1. FIELD VERIFY POSITION OF HISTORIC DRAINAGE FEATURE AND COLLECT SAMPLES AS INDICATED.
2. FINAL SAMPLE LOCATIONS WILL BE DOCUMENTED BY SURVEY.

SOURCE: GEO-MARINE, INC., SEPTEMBER 6, 2000.

LEGEND

- SURFACE AND SUBSURFACE SOIL SAMPLE LOCATION (PHASE II ECP INVESTIGATION)
- SURFACE AND SUBSURFACE SOIL AND GROUNDWATER SAMPLE LOCATION (PHASE I RFI NOV. 06)
- SURFACE AND SUBSURFACE SOIL SAMPLE LOCATION (PHASE I RFI NOV. 06)
- SURFACE SOIL (PHASE I RFI SEPT. AND OCT. 07)
- 1961 POLYGON FEATURE
- 1964 POLYGON FEATURE
- APPROXIMATE SURFACE SOIL SAMPLE LOCATION
- 1961 DRAINAGE
- ECP SITE BOUNDARY
- WETLANDS DELINEATION
- PEM1 – WETLANDS DELINEATION IDENTIFICATION CODES

25 0 12.5 25

1 inch = 25 ft.

FIGURE 2-3
HISTORIC DRAINAGE FEATURE SAMPLE LOCATION POINTS
SWMU 68-FORMER SOUTHERN FIRE TRAINING AREA
BASIS OF DESIGN
NAVAL ACTIVITY PUERTO RICO
CEIBA, PUERTO RICO

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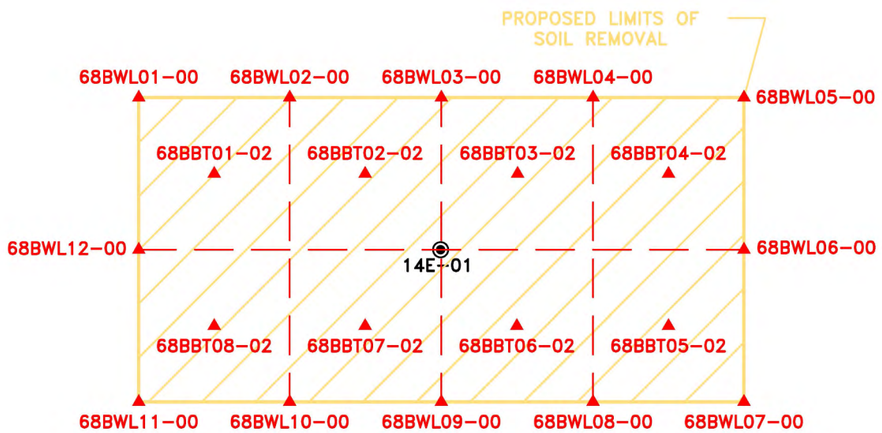
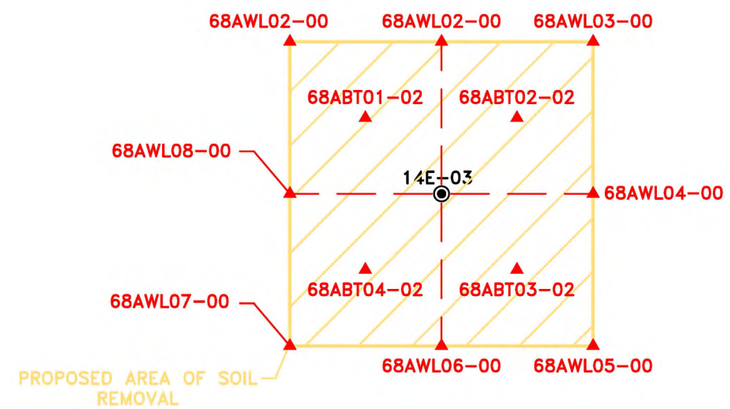


AREA 14E-01



AREA 14E-03

NOTES:

1. CONFIRMATORY SAMPLE LOCATIONS TO BE FIELD ADJUSTED AS NEEDED BASED ON FINAL CONFIGURATION OF EXCAVATION.
2. FINAL CONFIRMATORY SAMPLE LOCATIONS WILL BE DOCUMENTED BY SURVEY.

Baker

SOURCE: GEO-MARINE, INC., SEPTEMBER 6, 2000.

LEGEND

- ◉ – SURFACE SOIL SAMPLE LOCATION (PHASE II ECP INVESTIGATION 2004)
- ▲ – APPROXIMATE LOCATION OF CONFIRMATORY SAMPLES
- ▨ – PROPOSED AREA OF SOIL REMOVAL

25 0 12.5 25

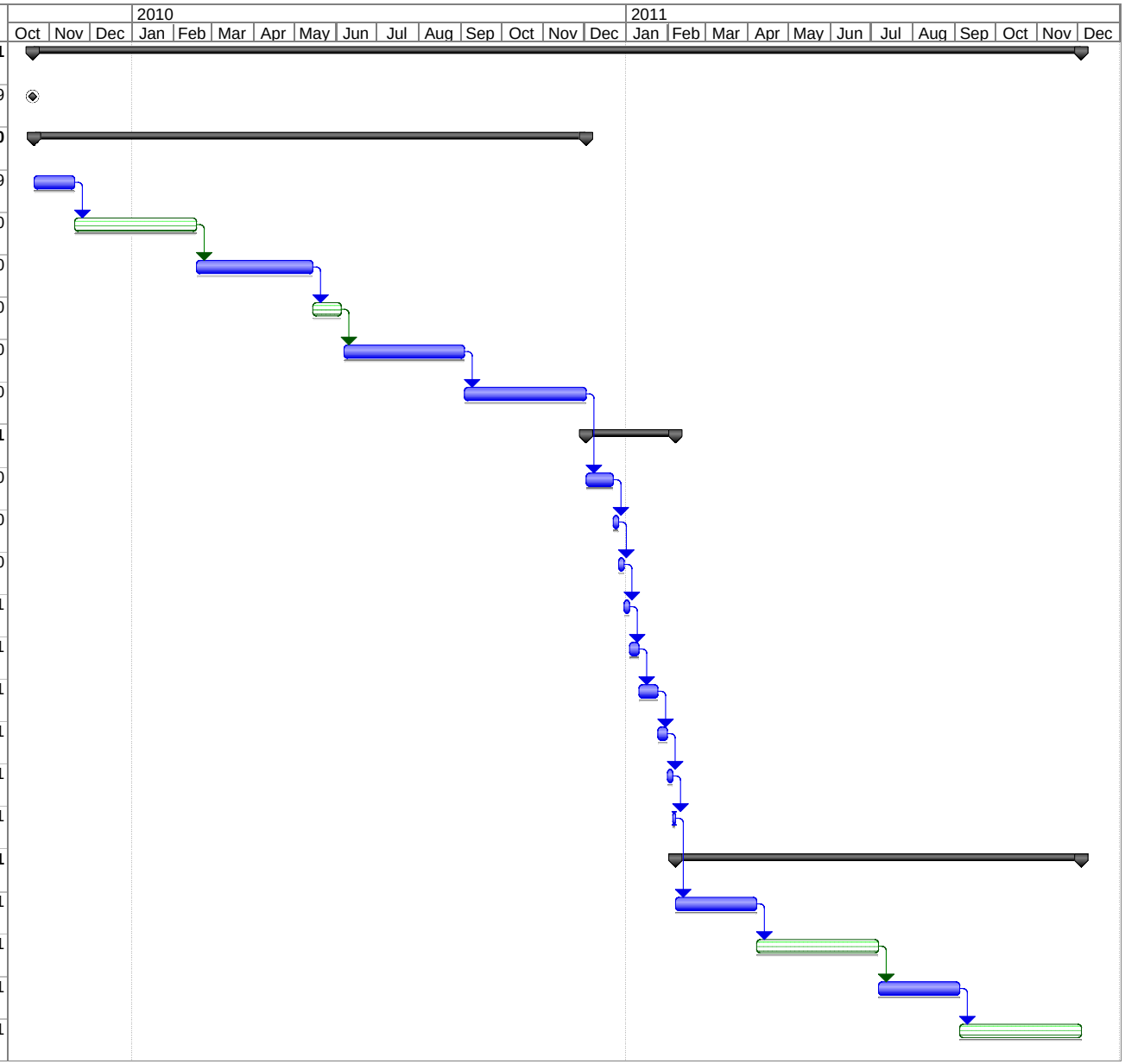
1 inch = 25 ft.

FIGURE 3-1
CONFIRMATORY SOIL SAMPLE POINTS
SWMU 68-FORMER SOUTHERN FIRE TRAINING AREA
BASIS OF DESIGN
NAVAL ACTIVITY PUERTO RICO
CEIBA, PUERTO RICO

APPENDIX A
CONSTRUCTION SCHEDULE

APPENDIX A
CONSTRUCTION SCHEDULE
SWMU 68 - FORMER SOUTHERN FIRE TRAINING AREA
BASIS OF DESIGN
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

ID	Task Name	Duration	Start	Finish
1	**SWMU 68 - CMI**	**554 days**	**10/20/09**	**12/3/11**
2	Notice to Proceed	1 eday	10/20/09	10/21/09
3	**CMI Design Package and Project Plans**	**292 days**	**10/20/09**	**12/2/10**
4	Draft Documents	30 edays	10/20/09	11/19/09
5	Regulator Review	90 edays	11/19/09	2/17/10
6	Final Documents	86 edays	2/17/10	5/14/10
7	Regulator Review	21 edays	5/14/10	6/4/10
8	Revised Final Documents	65 days	6/7/10	9/3/10
9	Regulator Review and Approval	90 edays	9/3/10	12/2/10
10	**Corrective Action**	**46 days**	**12/2/10**	**2/6/11**
11	Mobilization	20 edays	12/2/10	12/22/10
12	Wetland Delineation	4 edays	12/22/10	12/26/10
13	Field Staking of Contaminated Areas	4 days	12/27/10	12/30/10
14	ROICC/NTR Approval of Field Staked Areas	2 days	12/31/10	1/3/11
15	Excavation and Staging	7 edays	1/3/11	1/10/11
16	Confirmation and Characterization Sampling and Analysis	14 edays	1/10/11	1/24/11
17	Transportation and Off-Site Disposal	7 edays	1/24/11	1/31/11
18	Backfill and Revegetation	4 edays	1/31/11	2/4/11
19	Demobilization	2 edays	2/4/11	2/6/11
20	**CMI Closeout Report**	**215 days**	**2/6/11**	**12/3/11**
21	Draft Closeout Report	60 edays	2/6/11	4/7/11
22	Regulator Review	90 edays	4/7/11	7/6/11
23	Final Closeout Report	60 edays	7/6/11	9/4/11
24	Regualtor Review and Approval	90 edays	9/4/11	12/3/11



APPENDIX B
SUPPORTING CALCULATIONS

S.O. No. 115354

Subject: SWMU 68 - Volume to Be Removed Calc.

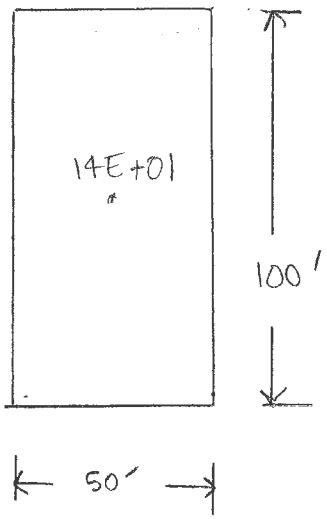
Sheet No. 1 of 1

Drawing No.

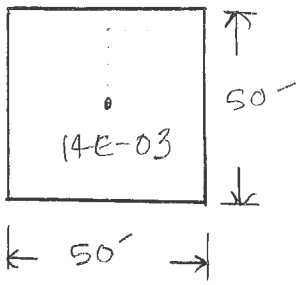
Computed by LGS Checked By Date July 31, 2009

Baker

Area 1



Area 2



Area 1

$100' \times 50' \times 2' = 10{,}000\ CF$

$\frac{10{,}000\ CF}{27\ CF/cy} = 370\ cy$

Area 2

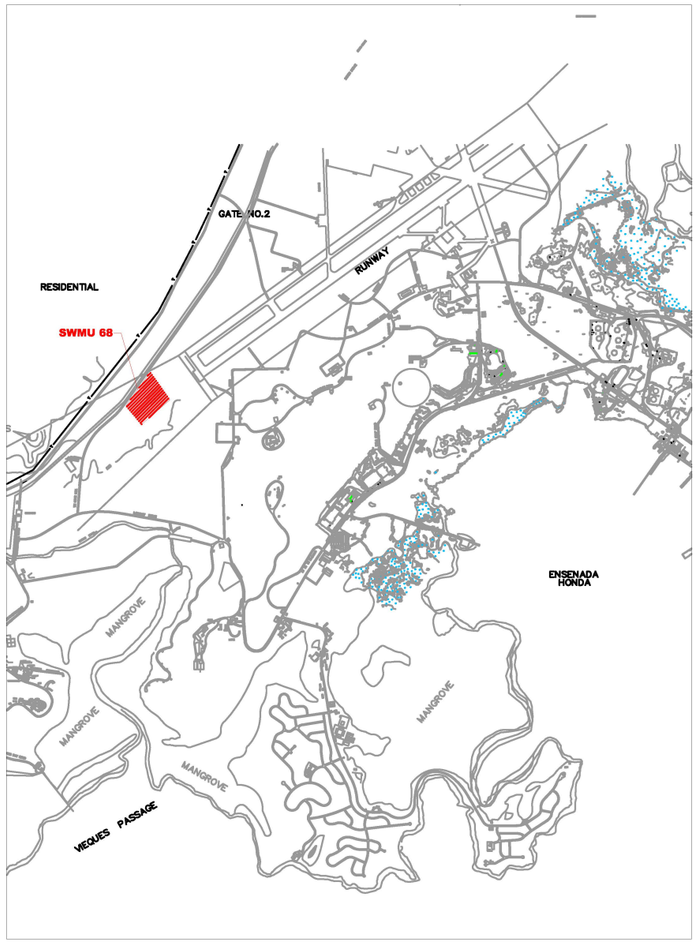
$50' \times 50' \times 2' = 5{,}000\ CF$

$\frac{5{,}000\ CF}{27\ CF/cy} = 185\ cy$

total volume to be removed: $185\ cy + 370\ cy = \underline{\underline{555\ cy}}$

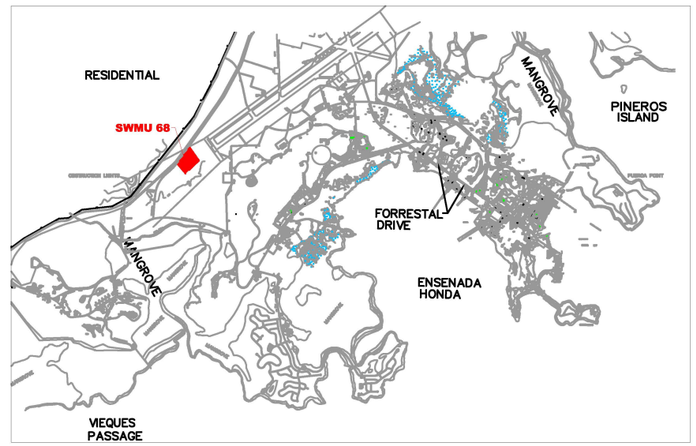
SCALE: 1" = 50'

CORRECTIVE MEASURES IMPLEMENTATION
REMEDIAL DESIGN FOR SOIL REMEDIATION
SWMU 68–FORMER SOUTHERN FIRE TRAINING AREA
NAVAL ACTIVITY PUERTO RICO (NAPR)
CEIBA, PUERTO RICO



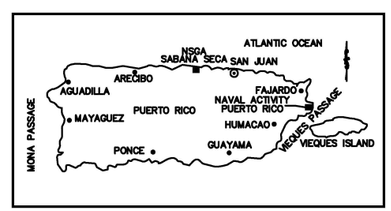
LOCATION MAP

1"=2000' 0' 2000' 4000' 6000' 8000' 10000'



VICINITY MAP

1"=4000'



INDEX OF SHEETS

SHEET NO.	TITLE
T–1	COVER SHEET AND GENERAL NOTES
C–1	EXISTING CONDITIONS PLAN
C–2	REMOVAL ACTION PLAN
C–3	GRADING PLAN
C–4	CIVIL DETAILS

ABBREVIATIONS

BGS	BELOW GROUND SURFACE
BLDG.	BUILDING
℄	CENTERLINE
CMI	CORRECTIVE MEASURES IMPLEMENTATION
E	EAST
EL.	ELEVATION
FT	FOOT OR FEET
INV.	INVERT ELEVATION
mg/kg	MILLIGRAMS PER KILOGRAM
MSL	MEAN SEA LEVEL
N	NORTH
NAD	NORTH AMERICAN DATUM
NAVD	NORTH AMERICAN VERTICAL DATUM
NAPR	NAVAL ACTIVITY PUERTO RICO
NTR	NAVY TECHNICAL REPRESENTATIVE
NTS	NOT TO SCALE
PPM	PARTS PER MILLION
S	SOUTH
SWMU	SOLID WASTE MANAGEMENT UNIT
TYP	TYPICAL

GENERAL NOTES

1. BASED UPON FIELD OBSERVATIONS, NO KNOWN UTILITIES ARE EXPECTED WITHIN THE EXCAVATION LIMITS IDENTIFIED ON THESE DRAWINGS UNLESS INDICATED. THE CONTRACTOR SHALL CONFIRM A UTILITY–FREE AREA PRIOR TO THE COMMENCEMENT OF ANY FIELD ACTIVITY. DAMAGE TO UTILITIES WILL BE REPAIRED AT NO EXPENSE TO THE GOVERNMENT, UNLESS OTHERWISE INDICATED.
2. THE CONTRACT DRAWINGS AND TECHNICAL SPECIFICATIONS ADDRESS THE MINIMUM EROSION AND SEDIMENT CONTROL REQUIREMENTS. THESE REQUIREMENTS SHALL BE ADAPTED AND MODIFIED TO BEST SUIT THE SEQUENCE OF CONSTRUCTION. THE CONTRACTOR SHALL DEVELOP AND IMPLEMENT AN EROSION AND SEDIMENT CONTROL PLAN IN ACCORDANCE WITH THE COMMONWEALTH OF PUERTO RICO'S EROSION CONTROL LAWS, REGULATIONS, AND HANDBOOKS, LATEST REVISION.
3. FIELD–STAKE THE LOCATION OF ALL AREAS TO BE DISTURBED PRIOR TO ACTUAL WORK. THESE LOCATIONS SHALL BE REVIEWED BY THE ROICC PRIOR TO CLEARING, GRUBBING, AND EXCAVATION ACTIVITIES.
4. LIMIT ALL WORK TO THE IMMEDIATE PROJECT AREA. RESTORE ALL DISTURBED AREAS THAT ARE OUTSIDE OF THE PROJECT LIMITS OF WORK TO THEIR ORIGINAL CONDITION.
5. SITE RESTORATION EFFORTS ARE NOT TO BE PERFORMED UNTIL CONFIRMATION OF CONTAMINANT REMOVAL HAS BEEN ACCOMPLISHED AND APPROVED BY THE ROICC.
6. COMPLY WITH ALL FEDERAL, STATE, AND LOCAL ORDINANCES UNLESS OTHERWISE NOTED IN THE CONTRACT DRAWINGS AND TECHNICAL SPECIFICATIONS.
7. INSPECT ALL TRUCK HAULING ROUTES PRIOR TO COMMENCEMENT OF HAULING ACTIVITIES TO ENSURE THAT THE PROPOSED ROUTES AND ASSOCIATED FACILITIES (E.G. ROAD SURFACES, BRIDGES, CULVERTS, UTILITIES) WILL SUSTAIN THE ADDITIONAL TRAFFIC AND LOADS.

QUALITY CONTROL REVIEW

SIGNATURE: Mark E. Kimes DATE: MAY 2010

SOURCE: ICF KAISER.

REVISIONS

DESCRIPTION	DATE	APPROVED

MICHAEL BAKER JR., INC. MOON TOWNSHIP, PENNSYLVANIA

A/E CONTRACT NO. N69450–08–C–0093

DEPARTMENT OF THE NAVY — NAVAL FACILITIES ENGINEERING COMMAND SOUTHEAST, CHARLESTON, S.C

SWMU 68 — CMI REMEDIAL DESIGN FOR SOIL REMEDIATION FOR SWMU 68 — NAPR, CEIBA, PUERTO RICO

COVER SHEET AND GENERAL NOTES

CODE ID. NO. 80091 SIZE D

SCALE: AS SHOWN

EFD NO.

STA. PROJ. NO.

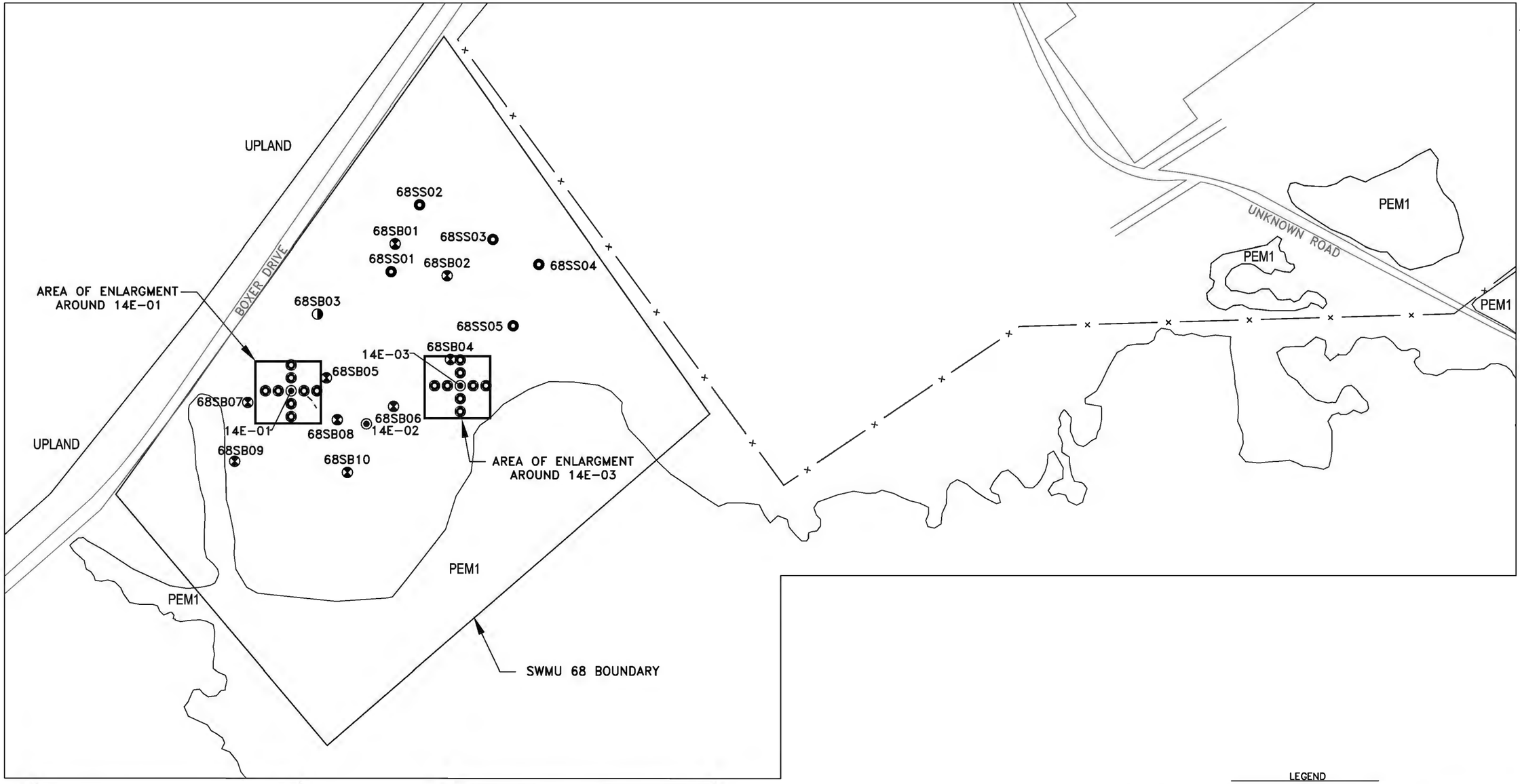
SPEC. NO.

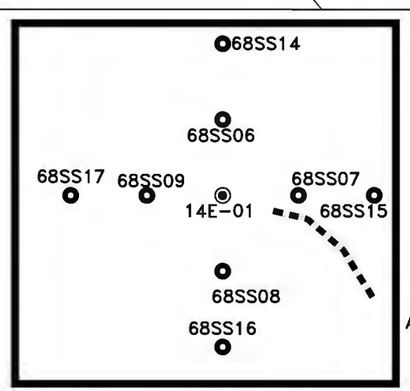
CONSTR. CONTR. NO.

NAVFAC DRAWING NO.

SHEET 1 OF 5

T–1



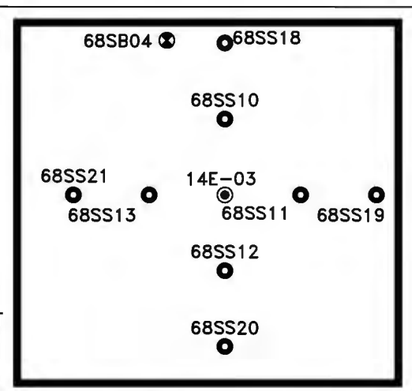


AREA OF ENLARGMENT AROUND 14E-01

AREA OF ENLARGMENT SCALE

0 25 50

1 inch = 50 ft.



AREA OF ENLARGMENT AROUND 14E-03

LEGEND

	EXISTING	REMOVE	NEW
SURFACE AND SUBSURFACE SOIL SAMPLE LOCATION (PHASE II ECP INVESTIGATION 2004)	◉		
SURFACE AND SUBSURFACE SOIL AND GROUNDWATER SAMPLE LOCATION (PHASE I RFI NOV. 06)	⊗		
SURFACE AND SUBSURFACE SOIL SAMPLE LOCATION (PHASE I RFI NOV. 06)	◑		
SURFACE SOIL (PHASE I RFI SEPT. AND OCT. 07) SAMPLE LOCATIONS	⊙		
DELINEATION SAMPLES – SURFACE SOIL	⊙		
PROPOSED AREA OF SOIL REMOVAL			▨
WETLAND DELINEATION	▭		
WETLAND DELINEATION IDENTIFICATION CODES	PEM1		
1961 DRAINAGE DITCH	—		
SAFETY FENCE			—SF—
SILT FENCE			—SC—
PROPOSED LIMITS OF EXCAVATION			—
CONTRACTOR AREAS			▭

100 0 50 100 200 0 100 200

1 inch = 100 ft. FULL SIZE

1 inch = 200 ft. HALF SIZE

115354_68_CMI_01.DWG

SYMBOL	DESCRIPTION	DATE	APPROVED BY

REVISIONS

JJE — DESIGN
MEK — DRAWN
RRR — REVIEW
LS — CHIEF ARCH/ENGR
PROJECT MANAGER
FIELD PROJECTION
QUALITY CONTROL
BRANCH MANAGER
DIVISION DIRECTOR

Baker

MICHAEL BAKER JR., INC.
MOON TOWNSHIP, PENNSYLVANIA

A/E CONTRACT NO. N69450-08-C-0093

ACTIVITY – SATISFACTORY TO: DATE:

RFA FOR INC. COMMENTS ONLY

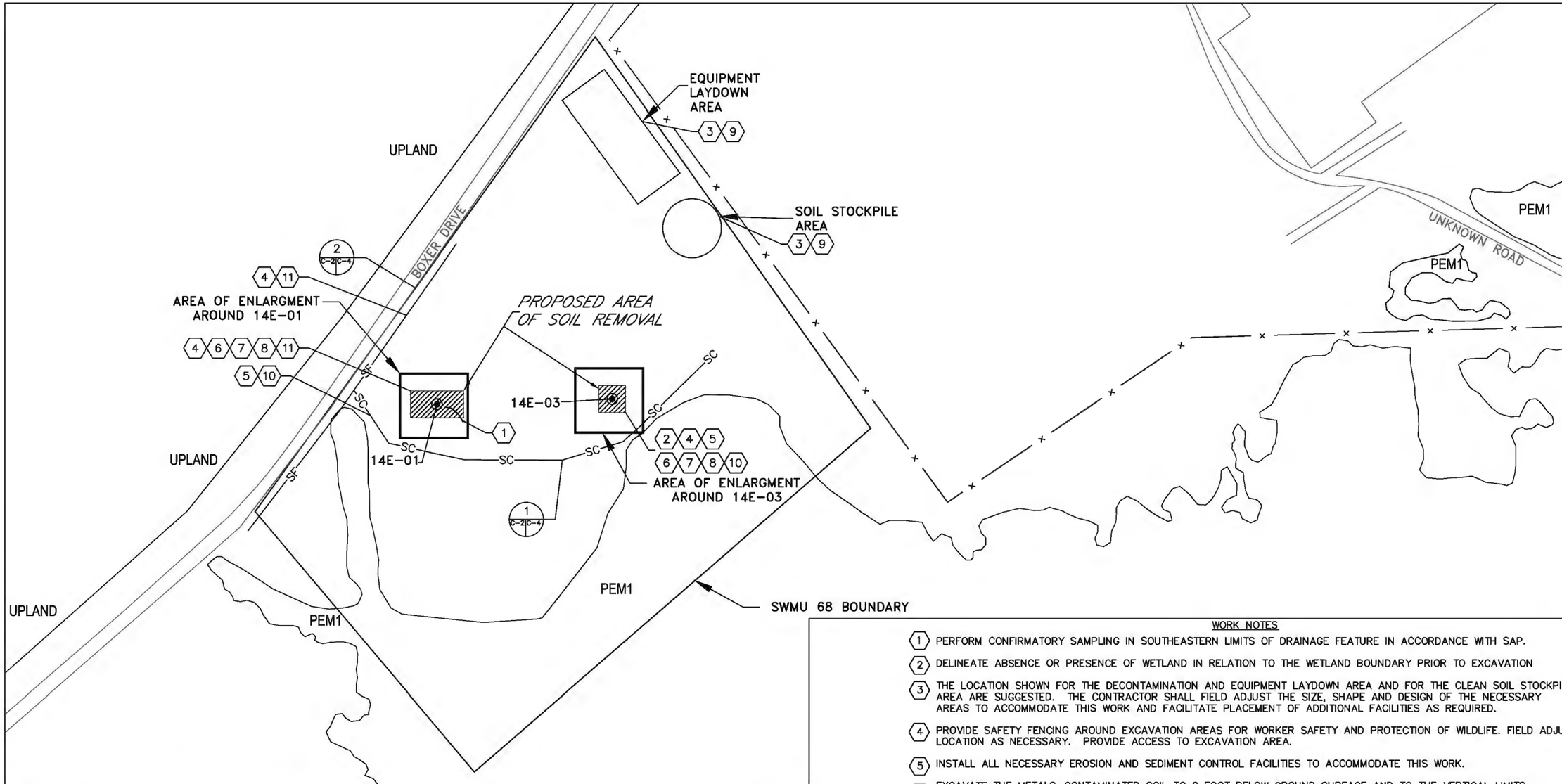
DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND SOUTHEAST
NAVAL STATION CHARLESTON, S.C
SWMU 68 NAPR, CEIBA, PUERTO RICO

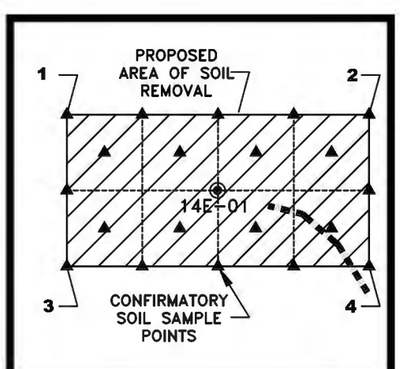
CMI REMEDIAL DESIGN FOR SOIL REMEDIATION FOR SWMU 68

EXISTING CONDITIONS PLAN

CODE ID. NO. 80091 SIZE D
SCALE: 1" = 100'
EFD NO.
STA. PROJ. NO.
SPEC. NO.
CONSTR. CONTR. NO.
NAVFAC DRAWING NO.
SHEET 2 OF 5

C-1





AREA OF ENLARGMENT AROUND 14E-01

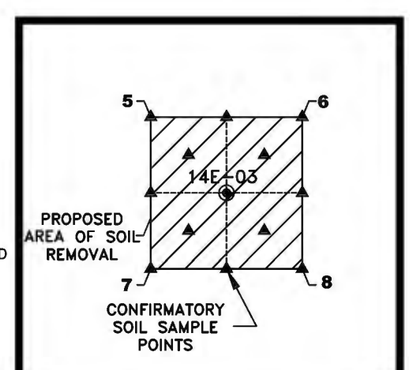
ID	EAST	NORTH
1	924061.280	802437.450
2	924161.020	802437.450
3	924061.280	802387.450
4	924161.020	924161.020
5	924414.970	802447.310
6	924464.970	802447.310
7	924414.970	802397.310
8	924464.970	802397.310

COORDINATES WERE COLLECTED IN PUERTO RICO AND VIRGIN ISLANDS NAD83 US FOOT

AREA OF ENLARGMENT SCALE

0 25 50

1 inch = 50 ft.



AREA OF ENLARGMENT AROUND 14E-03

WORK NOTES

1. PERFORM CONFIRMATORY SAMPLING IN SOUTHEASTERN LIMITS OF DRAINAGE FEATURE IN ACCORDANCE WITH SAP.
2. DELINEATE ABSENCE OR PRESENCE OF WETLAND IN RELATION TO THE WETLAND BOUNDARY PRIOR TO EXCAVATION
3. THE LOCATION SHOWN FOR THE DECONTAMINATION AND EQUIPMENT LAYDOWN AREA AND FOR THE CLEAN SOIL STOCKPILE AREA ARE SUGGESTED. THE CONTRACTOR SHALL FIELD ADJUST THE SIZE, SHAPE AND DESIGN OF THE NECESSARY AREAS TO ACCOMMODATE THIS WORK AND FACILITATE PLACEMENT OF ADDITIONAL FACILITIES AS REQUIRED.
4. PROVIDE SAFETY FENCING AROUND EXCAVATION AREAS FOR WORKER SAFETY AND PROTECTION OF WILDLIFE. FIELD ADJUST LOCATION AS NECESSARY. PROVIDE ACCESS TO EXCAVATION AREA.
5. INSTALL ALL NECESSARY EROSION AND SEDIMENT CONTROL FACILITIES TO ACCOMMODATE THIS WORK.
6. EXCAVATE THE METALS-CONTAMINATED SOIL TO 2 FOOT BELOW GROUND SURFACE AND TO THE VERTICAL LIMITS INDICATED
7. FOLLOWING EXCAVATION TO THE INDICATED LIMITS, THE NAVY'S ON-SITE REPRESENTATIVE WILL CONDUCT CONFIRMATORY SAMPLING AS SPECIFIED TO VERIFY THE REMOVAL OF METALS-CONTAMINATED SOILS FROM THE SITE. EXCAVATION WILL CONTINUE UNTIL THE REMOVAL GOALS ARE MET AS FOLLOWS:

Chemical of Concern	Surface Soil CAO Level
	mg/kg
Copper	168
Lead	87
Zinc	120

8. UPON APPROVAL FROM THE NAVY, BACKFILL THE EXCAVATION AREAS AS SPECIFIED WITH MATERIAL. PLACE 6 INCHES OF COMPACTED TOP SOIL UPON BACKFILL AND VEGETATE AS SPECIFIED.
9. REMOVE THE DECONTAMINATION AND EQUIPMENT LAYDOWN AREA AND THE CLEAN SOIL STOCKPILE AREA. REVEGETATE DISTRUBED AREAS AS SPECIFIED.
10. UPON THE RE-ESTABLISHMENT OF VEGETATION AND APPROVAL FROM THE NAVY, REMOVE ALL EROSION AND SEDIMENTATION CONTROL FACILITIES. REVEGETATE AS SPECIFIED.
11. REMOVE CAUTION TAPE AND SAFETY FENCING UPON COMPLETION OF WORK.
12. APPROXIMATE LOCATION OF CONFIRMATORY SAMPLES. FINAL SAMPLE LOCATIONS AND ID WILL BE DOCUMENTED BY SURVEY.

100 0 50 100 200 — 1 inch = 100 ft. FULL SIZE
0 100 200 300 — 1 inch = 200 ft. HALF SIZE

115354_SS_CMI_02.DWG

SYMBOL	DESCRIPTION	DATE	APPROVED BY
	REVISIONS		

A/E MEK DESIGN; RBB DRAWN; LS REVIEW; CHIEF ARCH/ENGR; PROJECT MANAGER; FIELD PROJECTION; QUALITY CONTROL; BRANCH MANAGER; DIVISION DIRECTOR

Baker

MICHAEL BAKER JR., INC.
MOON TOWNSHIP, PENNSYLVANIA

A/E CONTRACT NO. N69450-08-C-0093

ACTIVITY – SATISFACTORY YES: DATE:

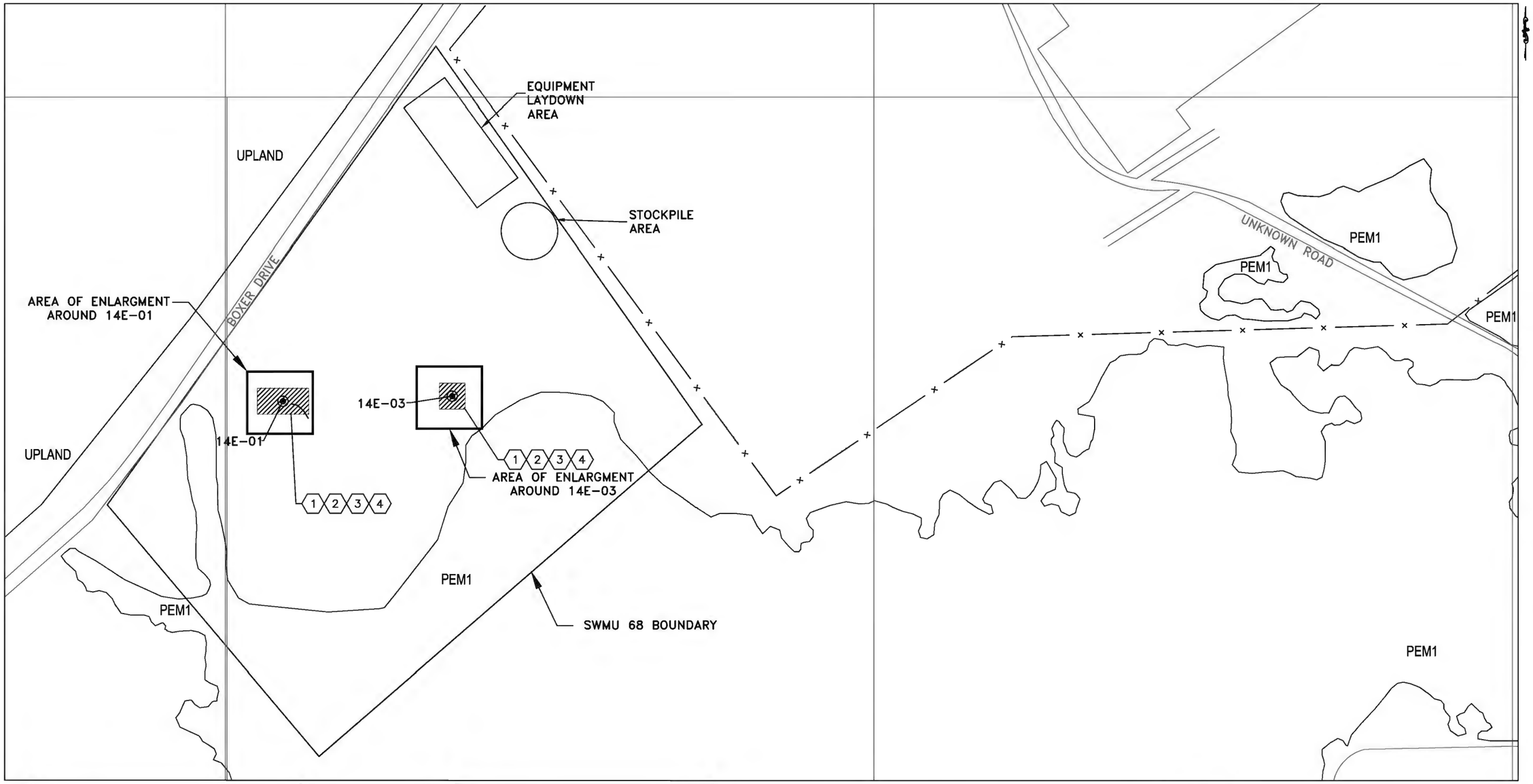
REG. FOR INC. EXAM. COMMISSION EXPIRAC: DATE:

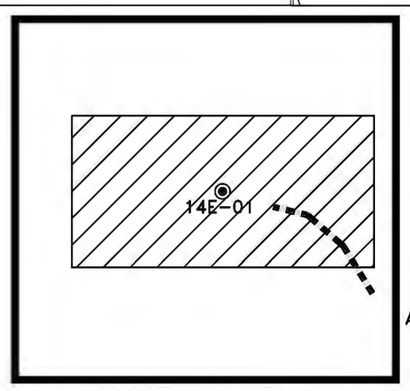
DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
SOUTHEAST
NAVAL STATION CHARLESTON, S.C
SWMU 68 NAPR, CEIBA, PUERTO RICO

CMI REMEDIAL DESIGN FOR SOIL REMEDIATION FOR SWMU 68

REMOVAL ACTION PLAN

CODE ID. NO. 80091 SIZE D
SCALE: 1" = 100'
EFD NO.
STA. PROJ. NO.
SPEC. NO.
CONSTR. CONTR. NO.
NAVFAC DRAWING NO.
SHEET 3 OF 5
C-2



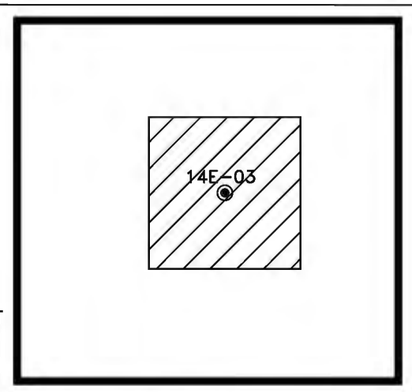


AREA OF ENLARGMENT AROUND 14E-01

AREA OF ENLARGMENT SCALE

0 25 50

1 inch = 50 ft.



AREA OF ENLARGMENT AROUND 14E-03

WORK NOTES

1. LIMIT OF EXCAVATION OF METALS-CONTAMINATED SOIL IS SUBJECT TO CHANGE PENDING RESULTS OF CONFIRMATORY SAMPLING.
2. LIMIT OF DISTURBANCE IS SUBJECT TO CHANGE PENDING RESULTS OF CONFIRMATORY SAMPLING.
3. GRADE AREA TO MEET EXISTING GRADES. FINAL GRADE SHOULD INCORPORATE PLACEMENT OF 6 INCHES OF TOPSOIL. REVEGETATE AS SPECIFIED.
4. DO NOT DISTURB AREAS OUTSIDE THOSE SPECIFIED WITHOUT APPROVAL OF THE NAVY.

100 0 50 100 200 — 1 inch = 100 ft. FULL SIZE

0 100 200 — 1 inch = 200 ft. HALF SIZE

115354_68_C48_03.DWG

SYMBOL	DESCRIPTION	DATE	APPROVED BY
	REVISIONS		

A/E DESIGN: MEK
DRAWN: RRR
REVIEW: LS
PROJECT MANAGER:
PRE PRODUCTION:
QUALITY CONTROL:
BRANCH MANAGER:
DIVISION DIRECTOR:

Baker

MICHAEL BAKER JR., INC.
MOON TOWNSHIP, PENNSYLVANIA

A/E CONTRACT NO. N69450-08-C-0093

ACTIVITY - SATISFACTORY TO: DATE:

RFA FOR INC COMMISSION ACTIVITY: DATE:

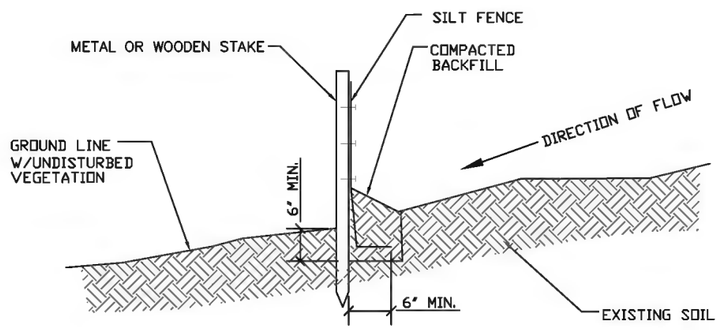
DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
SOUTHEAST
NAVAL STATION CHARLESTON, S.C
SWMU 68 NAPR, CEIBA, PUERTO RICO

CMI REMEDIAL DESIGN FOR SOIL REMEDIATION FOR SWMU 68

GRADING PLAN

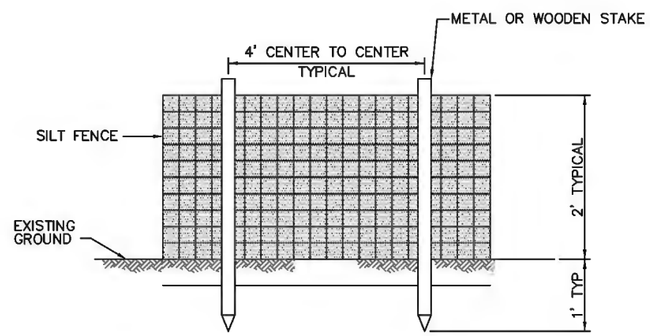
CODE ID. NO. 80091 SIZE D
SCALE: 1" = 100'
EFD NO.
STA. PROJ. NO.
SPEC. NO.
CONSTR. CONTR. NO.
NAVFAC DRAWING NO.
SHEET 4 OF 5

C-3



SILT FENCE ANCHOR DETAIL

1 C-2|C-4 NOT TO SCALE



SILT FENCE

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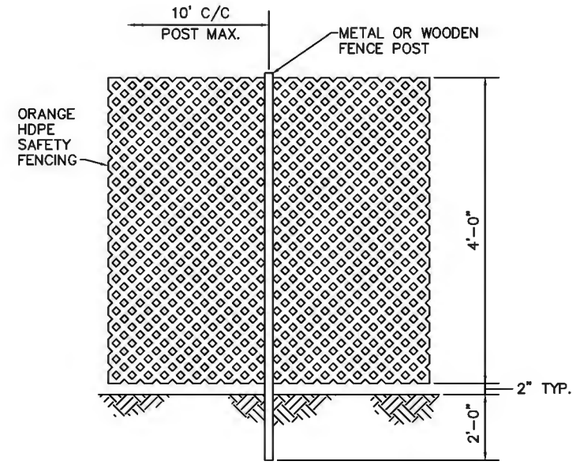

2 C-2|C-4 SAFETY FENCE

NOT TO SCALE

SYMBOL	DESCRIPTION	DATE	APPROVED BY

REVISIONS

DESIGN: MEK
DRAWN: RRR
REVIEW: LS
PROJECT MANAGER
PROJECT ENGINEER
QUALITY CONTROL
BRANCH MANAGER
BRANCH DIRECTOR

Baker

MICHAEL BAKER JR., INC.
MOON TOWNSHIP, PENNSYLVANIA

A/E CONTRACT NO. N69450-08-C-0093

ACTIVITY - SATISFACTORY NO. _____ DATE _____

FOR USE ON CONSTRUCTION SURVEYS

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
SOUTHEAST
NAVAL STATION CHARLESTON, S.C
SWMU 68 NAPR, CEIBA, PUERTO RICO
CMI REMEDIAL DESIGN FOR SOIL REMEDIATION FOR SWMU 68

CIVIL DETAILS

CODE ID. NO. 80091 SIZE D
SCALE: 1" = 100'
EFD NO.
STA. PROJ. NO.
SPEC. NO.
CONSTR. CONTR. NO.
NAVFAC DRAWING NO.
SHEET 5 OF 5

C-4

115354_68_CMI_04.DWG

REVISED FINAL TECHNICAL SPECIFICATIONS FOR CORRECTIVE MEASURES IMPLEMENTATION - SWMU 68

For:

NAVAL ACTIVITY PUERTO RICO
EPA I.D. No. PR2170027203
CEIBA, PUERTO RICO

Prepared for:

Department of the Navy
NAVFAC SOUTHEAST
North Charleston, South Carolina

Contract No. N69450-08-C-0093

September 3, 2010

Prepared by:

Right Way Environmental Contractors, Inc.
Naranjito, Puerto Rico

Corrective Action for SWMUs 14, 56, 68, and 69,
Naval Activity Puerto Rico, Ceiba, Puerto Rico

REVISED FINAL
TECHNICAL SPECIFICATIONS
SWMU 68

NAVAL ACTIVITY PUERTO RICO
EPA I.D. NO. PR2170027203
CEIBA, PUERTO RICO

SEPTEMBER 3, 2010

Prepared for:

DEPARTMENT OF THE NAVY
NAVFAC SOUTHEAST
North Charleston, SC

Under:

Contract No. N69450-08-R-0093

Prepared by:

RIGHT WAY ENVIRONMENTAL CONTRACTORS, INC.
Navanjito, Puerto Rico 00719

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02 61 13 EXCAVATION AND HANDLING OF CONTAMINATED MATERIAL
02 81 00 TRANSPORTATION AND DISPOSAL OF HAZARDOUS MATERIALS

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31 11 00 CLEARING AND GRUBBING
31 23 00.00 20 EXCAVATION AND FILL

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-- End of Project Table of Contents --

SECTION 01 33 00

SUBMITTAL PROCEDURES
01/08

PART 1 GENERAL

The Contracting Officer may request submittals in addition to those specified when deemed necessary to adequately describe the work covered in the respective sections.

Units of weights and measures used on all submittals are to be the same as those used in the contract drawings.

Each submittal is to be complete and in sufficient detail to allow ready determination of compliance with contract requirements.

Contractor's Quality Control (CQC) System Manager and the Designer of Record, if applicable, to check and approve all items prior to submittal and stamp, sign, and date indicating action taken. Proposed deviations from the contract requirements are to be clearly identified. Include within submittals items such as: Contractor's, manufacturer's, or fabricator's drawings; descriptive literature including (but not limited to) catalog cuts, diagrams, operating charts or curves; test reports; test cylinders; samples; O&M manuals (including parts list); certifications; warranties; and other such required submittals.

Submittals requiring Government approval are to be scheduled and made prior to the acquisition of the material or equipment covered thereby. Picked up and disposed of in accordance with manufacturer's Material Safety Data Sheets (MSDS) and in compliance with existing laws and regulations samples remaining upon completion of the work.

1.1 DEFINITIONS

1.1.1 Submittal Descriptions (SD)

Submittals requirements are specified in the technical sections. Submittals are identified by Submittal Description (SD) numbers and titles as follows:

SD-01 Preconstruction Submittals

Submittals which are required prior to a notice to proceed commencing work on site. Submittals required prior to the start of the next major phase of the construction on a multi-phase contract. Schedules or tabular list of data or tabular list including location, features, or other pertinent information regarding products, materials, equipment, or components to be used in the work, submitted prior to contract notice to proceed or next major phase of construction.

Certificates of insurance
Surety bonds
List of proposed subcontractors
List of proposed products
Construction Progress Schedule
Network Analysis Schedule (NAS)
Submittal register

Schedule of prices
Health and safety plan
Work plan
Quality control(QC) plan
Environmental protection plan

SD-02 Shop Drawings

Drawings, diagrams and schedules specifically prepared to illustrate some portion of the work.

Diagrams and instructions from a manufacturer or fabricator for use in producing the product and as aids to the Contractor for integrating the product or system into the project.

Drawings prepared by or for the Contractor to show how multiple systems and interdisciplinary work will be coordinated.

SD-03 Product Data

Catalog cuts, illustrations, schedules, diagrams, performance charts, instructions and brochures illustrating size, physical appearance and other characteristics of materials, systems or equipment for some portion of the work.

Samples of warranty language when the contract requires extended product warranties.

SD-04 Samples

Fabricated or unfabricated physical examples of materials, equipment or workmanship that illustrate functional and aesthetic characteristics of a material or product and establish standards by which the work can be judged.

Color samples from the manufacturer's standard line (or custom color samples if specified) to be used in selecting or approving colors for the project.

Field samples and mock-ups constructed on the project site establish standards by which the ensuring work can be judged. Includes assemblies or portions of assemblies which are to be incorporated into the project and those which will be removed at conclusion of the work.

SD-06 Test Reports

Report signed by authorized official of testing laboratory that a material, product or system identical to the material, product or system to be provided has been tested in accord with specified requirements. (Testing must have been within three years of date of contract award for the project.)

Report which includes findings of a test required to be performed by the Contractor on an actual portion of the work or prototype prepared for the project before shipment to job site.

Report which includes finding of a test made at the job site or on sample taken from the job site, on portion of work during or after installation.

Investigation reports.

Daily logs and checklists.

Final acceptance test and operational test procedure.

SD-07 Certificates

Statements printed on the manufacturer's letterhead and signed by responsible officials of manufacturer of product, system or material attesting that product, system or material meets specification requirements. Must be dated after award of project contract and clearly name the project.

Document required of Contractor, or of a manufacturer, supplier, installer or subcontractor through Contractor, the purpose of which is to further quality of orderly progression of a portion of the work by documenting procedures, acceptability of methods or personnel qualifications.

Confined space entry permits.

Text of posted operating instructions.

SD-08 Manufacturer's Instructions

Preprinted material describing installation of a product, system or material, including special notices and Material Safety Data sheets concerning impedances, hazards and safety precautions.

SD-11 Closeout Submittals

Documentation to record compliance with technical or administrative requirements or to establish an administrative mechanism.

Special requirements necessary to properly close out a construction contract. For example, Record Drawings and as-built drawings. Also, submittal requirements necessary to properly close out a major phase of construction on a multi-phase contract.

1.1.2 Approving Authority

Office or designated person authorized to approve submittal.

1.1.3 Work

As used in this section, on- and off-site construction required by contract documents, including labor necessary to produce submittals, construction, materials, products, equipment, and systems incorporated or to be incorporated in such construction.

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor QC approval. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with this section.

SD-01 Preconstruction Submittals

Submittal register

1.3 SUBMITTAL CLASSIFICATION

Submittals are classified as follows:

1.3.1 Designer of Record Approved

Designer of Record approval is required for extensions of design, critical materials, any deviations from the solicitation, the accepted proposal, or the completed design, equipment whose compatibility with the entire system must be checked, and other items as designated by the Contracting Officer. Within the terms of the Contract Clause entitled "Specifications and Drawings for Construction," they are considered to be "shop drawings." Contractor to provide the Government with the number of copies designated hereinafter of all Designer of Record approved submittals. The Government may review any or all Designer of Record approved submittals for conformance to the Solicitation and Accepted Proposal. The Government will review all submittals designated as deviating from the Solicitation or Accepted Proposal, as described below. Generally, design submittals should be identified as SD-05 Design Data submittals.

1.3.2 Government Approved

Government approval is required for extensions of design, critical materials, deviations, equipment whose compatibility with the entire system must be checked, and other items as designated by the Contracting Officer. Government approval is required for any deviations from the Solicitation or Accepted Proposal and other items as designated by the Contracting Officer. Within the terms of the Contract Clause entitled "Specifications and Drawings for Construction," they are considered to be "shop drawings."

1.3.3 Information Only

Submittals not requiring Government approval will be for information only. For Design-build construction all submittals not requiring Designer of Record or Government approval will be for information only. They are not considered to be "shop drawings" within the terms of the Contract Clause referred to above.

1.4 FORWARDING SUBMITTALS REQUIRING GOVERNMENT APPROVAL

1.4.1 Submittals Required from the Contractor

As soon as practicable after award of contract, and before procurement of fabrication, forward to Mr. Mark E. Davidson, BRAC Program Management Office SE, 4130 Farber Place Drive, Suite 202, N. Charleston, SC 29406.Architect-Engineer: Baker Environmental, submittals required in the technical sections of this specification, including shop drawings, product data and samples. One copy of the transmittal form for all submittals shall be forwarded to the Resident Officer in Charge of Construction.

The Architect-Engineer for this project will review and approve for the Contracting Officer those submittals reserved for Contracting Officer approval to verify submittals comply with the contract requirements.

1.4.1.1 O&M Data

The Architect-Engineer for this project will review and approve for the Contracting Officer O&M Data to verify the submittals comply with the contract requirements; submit data specified for a given item within 30 calendar days after the item is delivered to the contract site.

a. In the event the Contractor fails to deliver O&M Data within the time limits specified, the Contracting Officer may withhold from progress payments 50 percent of the price of the item with which such O&M Data are applicable.

1.4.1.2 Overseas Shop Drawing Submittals

All submittals shall be sent via overnight express mail service. All costs associated with the overnight express mail service shall be borne by the construction Contractor. Costs associated with the overnight express mail of submittals related to proposed submittal variances of resubmittals necessary as a result of noncompliant or incomplete Contractor submittals shall be the responsibility of the Contractor.

1.5 PREPARATION

1.5.1 Transmittal Form

Use the attached sample transmittal form (ENG Form 4025) for submitting both Government approved and information only submittals in accordance with the instructions on the reverse side of the form. Properly complete this form by filling out all the heading blank spaces and identifying each item submitted. Exercise special care to ensure proper listing of the specification paragraph and sheet number of the contract drawings pertinent to the data submitted for each item.

1.5.2 Identifying Submittals

When submittals are provided by a lower tier contractor the Prime Contractor is to prepare, review and stamp with Contractor's approval all specified submittals prior to submitting for Government approval.

Identify submittals, except sample installations and sample panels, with the following information permanently adhered to or noted on each separate component of each submittal and noted on transmittal form. Mark each copy of each submittal identically, with the following:

a. Project title and location.

b. Construction contract number.

c. Date of the drawings and revisions.

d. Name, address, and telephone number of subcontractor, supplier, manufacturer and any other second tier Contractor associated with submittal.

e. Section number of the specification section by which submittal is required.

f. Submittal description (SD) number of each component of submittal.

g. When a resubmission, add alphabetic suffix on submittal description, for example, submittal 18 would become 18A, to indicate resubmission.

h. Product identification and location in project.

1.5.3 Format of SD-06 Test Reports and SD-09 Manufacturer's Field Reports

a. Provide reports on 8 1/2 by 11 inches paper in a complete bound volume.

b. Indicate by prominent notation, each report in the submittal. Indicate specification number and paragraph number to which it pertains.

1.5.4 Format of SD-01 Preconstruction Submittals and SD-11 Closeout Submittals

a. When submittal includes a document which is to be used in project or become part of project record, other than as a submittal, do not apply Contractor's approval stamp to document, but to a separate sheet accompanying document.

b. Provide all dimensions in administrative submittals in metric. Where data are included in preprinted material with English units only, submit metric dimensions on separate sheet.

1.6 INFORMATION ONLY SUBMITTALS

Normally submittals for information only will not be returned. Approval of the Contracting Officer is not required on information only submittals. The Government reserves the right to require the Contractor to resubmit any item found not to comply with the contract. This does not relieve the Contractor from the obligation to furnish material conforming to the plans and specifications; will not prevent the Contracting Officer from requiring removal and replacement of nonconforming material incorporated in the work; and does not relieve the Contractor of the requirement to furnish samples for testing by the Government laboratory or for check testing by the Government in those instances where the technical specifications so prescribe.

1.7 VARIATIONS / SUBSTITUTION REQUESTS

Variations from contract requirements require Government approval pursuant to contract Clause FAR 52.236-21 and will be considered where advantageous to Government.

1.7.1 Considering Variations

Discussion with Contracting Officer prior to submission, will help ensure functional and quality requirements are met and minimize rejections and re-submittals. When contemplating a variation which results in lower cost, consider submission of the variation as a Value Engineering Change Proposal (VECP).

Specifically point out variations from contract requirements in transmittal letters. Failure to point out deviations may result in the Government requiring rejection and removal of such work at no additional cost to the Government.

1.7.2 Proposing Variations

When proposing variation, deliver written request to the Contracting Officer, with documentation of the nature and features of the variation and why the variation is desirable and beneficial to Government. If lower cost is a benefit, also include an estimate of the cost savings. In addition to documentation required for variation, include the submittals required for the item. Clearly mark the proposed variation in all documentation.

Check the column "variation" of ENG Form 4025 for submittals which include proposed deviations requested by the Contractor. Set forth in writing the reason for any deviations and annotate such deviations on the submittal. The Government reserves the right to rescind inadvertent approval of submittals containing unnoted deviations.

1.7.3 Warranting That Variations Are Compatible

When delivering a variation for approval, Contractor warrants that this contract has been reviewed to establish that the variation, if incorporated, will be compatible with other elements of work.

1.7.4 Review Schedule Is Modified

In addition to normal submittal review period, a period of 10 working days will be allowed for consideration by the Government of submittals with variations.

1.8 SUBMITTAL REGISTER

The Designer of Record shall develop a complete list of submittals during design and identify required submittals in the specifications, and use the list to prepare the Submittal Register. The list may not be all inclusive and additional submittals may be required by other parts of the contract. The Contractor is required to complete the submittal register and submit it to the Contracting Officer for approval within 30 calendar days after Notice to Proceed. The approved submittal register will serve as a scheduling document for submittals and will be used to control submittal actions throughout the contract period. Coordinate the submit dates and need dates with dates in the Contractor prepared progress schedule. Submit monthly or until all submittals have been satisfactorily completed, updates to the submittal register showing the Contractor action codes and actual dates with Government action codes. Revise the submittal register when the progress schedule is revised and submit both for approval.

1.8.1 Use of Submittal Register

Submit submittal register with QC plan and project schedule. Verify that all submittals required for project are listed and add missing submittals. Coordinate and complete the following fields on the register submitted with the QC plan and the project schedule:

Column (a) Activity Number: Activity number from the project schedule.

Column (g) Contractor Submit Date: Scheduled date for approving authority to receive submittals.

Column (h) Contractor Approval Date: Date Contractor needs

approval of submittal.

Column (i) Contractor Material: Date that Contractor needs material delivered to Contractor control.

1.8.2 Contractor Use of Submittal Register

Update the following fields with each submittal throughout the length of the contract:

Column (b) Transmittal Number: Contractor assigned list of consecutive numbers.

Column (j) Action Code (k): Date of action used to record Contractor's review when forwarding submittals to QC.

Column (l) List date of submittal transmission.

Column (q) List date approval received.

1.8.3 Approving Authority Use of Submittal Register

Update the following fields.

Column (b) Transmittal Number: Contractor assigned list of consecutive numbers.

Column (l) List date of submittal receipt.

Column (m) through (p)List Date related to review actions.

Column (q) List date returned to Contractor.

1.8.4 Contractor Action Code and Action Code

Entries for columns (j) and (o), are to be used are as follows (others may be prescribed by Transmittal Form):

NR - Not Received

AN - Approved as noted

A - Approved

RR - Disapproved, Revise, and Resubmit

1.8.5 Copies Delivered to the Government

Deliver one copy of submittal register updated by Contractor to Government with each invoice request. Deliver in electronic format, unless a paper copy is requested by Contracting Officer.

1.9 SCHEDULING

Schedule and submit concurrently submittals covering component items forming a system or items that are interrelated. Include certifications to be submitted with the pertinent drawings at the same time. No delay damages or time extensions will be allowed for time lost in late submittals.

a. Coordinate scheduling, sequencing, preparing and processing of submittals with performance of work so that work will not be delayed by submittal processing. Allow for potential resubmittal of requirements.

b. Submittals called for by the contract documents will be listed on the register. If a submittal is called for but does not pertain to the contract work, the Contractor is to include the submittal in the register and annotate it "N/A" with a brief explanation. Approval by the Contracting Officer does not relieve the Contractor of supplying submittals required by the contract documents but which have been omitted from the register or marked "N/A".

c. Re-submit register and annotate monthly by the Contractor with actual submission and approval dates. When all items on the register have been fully approved, no further re-submittal is required.

d. Carefully control procurement operations to ensure that each individual submittal is made on or before the Contractor scheduled submittal date shown on the approved "Submittal Register."

e. Except as specified otherwise, allow review period, beginning with receipt by approving authority, that includes at least 15 working days for submittals for QC Manager approval and 20 working days for submittals for Contracting Officer approval. Period of review for submittals with Contracting Officer approval begins when Government receives submittal from QC organization.

f. For submittals requiring review by fire protection engineer, allow review period, beginning when Government receives submittal from QC organization, of 30 working days for return of submittal to the Contractor.

g. Period of review for each resubmittal is the same as for initial submittal.

Within 15 calendar days of notice to proceed, provide, for approval by the Contracting Officer, the following schedule of submittals:

a. A schedule of shop drawings and technical submittals required by the specifications and drawings. Indicate the specification or drawing reference requiring the submittal; the material, item, or process for which the submittal is required; the "SD" number and identifying title of the submittal; the Contractor's anticipated submission date and the approval need date.

b. A separate schedule of other submittals required under the contract but not listed in the specifications or drawings. Schedule will indicate the contract requirement reference; the type or title of the submittal; the Contractor's anticipated submission date and the approved need date (if approval is required).

1.9.1 Reviewing, Certifying, Approving Authority

The QC organization is responsible for reviewing and certifying that

submittals are in compliance with contract requirements. Approving authority on submittals is QC Manager unless otherwise specified for specific submittal. At each "Submittal" paragraph in individual specification sections, a notation "G," following a submittal item, indicates Contracting Officer is approving authority for that submittal item.

1.9.2 Constraints

a. Conform to provisions of this section, unless explicitly stated otherwise for submittals listed or specified in this contract.

b. Submit complete submittals for each definable feature of work. Submit at the same time components of definable feature interrelated as a system.

c. When acceptability of a submittal is dependent on conditions, items, or materials included in separate subsequent submittals, submittal will be returned without review.

d. Approval of a separate material, product, or component does not imply approval of assembly in which item functions.

1.9.3 QC Organization Responsibilities

a. Note date on which submittal was received from Contractor on each submittal.

b. Review each submittal; and check and coordinate each submittal with requirements of work and contract documents.

c. Review submittals for conformance with project design concepts and compliance with contract documents.

d. Act on submittals, determining appropriate action based on QC organization's review of submittal.

(1) When QC Manager is approving authority, take appropriate action on submittal from the possible actions defined in paragraph entitled, "Actions Possible."

(2) When Contracting Officer is approving authority or when variation has been proposed, forward submittal to Government with certifying statement or return submittal marked "not reviewed" or "revise and resubmit" as appropriate. The QC organization's review of submittal determines appropriate action.

e. Ensure that material is clearly legible.

f. Stamp each sheet of each submittal with QC certifying statement or approving statement, except that data submitted in bound volume or on one sheet printed on two sides may be stamped on the front of the first sheet only.

(1) When approving authority is Contracting Officer, QC organization will certify submittals forwarded to Contracting Officer with the following certifying statement:

"I hereby certify that the (equipment) (material) (article) shown and

marked in this submittal is that proposed to be incorporated with contract Number N69450-08-R-0093, is in compliance with the contract drawings and specification, can be installed in the allocated spaces, and is submitted for Government approval.

Certified by Submittal Reviewer _____, Date _____
(Signature when applicable)

Certified by QC Manager _____, Date _____"
(Signature)

(2) When approving authority is QC Manager, QC Manager will use the following approval statement when returning submittals to Contractor as "Approved" or "Approved as Noted."

"I hereby certify that the (material) (equipment) (article) shown and marked in this submittal and proposed to be incorporated with contract Number N69450-08-R-0093, is in compliance with the contract drawings and specification, can be installed in the allocated spaces, and is approved for use.

Certified by Submittal Reviewer _____, Date _____
(Signature when applicable)

Approved by QC Manager _____, Date _____"
(Signature)

g. Sign certifying statement or approval statement. The QC organization member designated in the approved QC plan is the person signing certifying statements. The use of original ink for signatures is required. Stamped signatures are not acceptable.

h. Update submittal register as submittal actions occur and maintain the submittal register at project site until final acceptance of all work by Contracting Officer.

i. Retain a copy of approved submittals at project site, including Contractor's copy of approved samples.

1.9.4 Government Reviewed Design or Extension of Design

The Government will review all design submittals for conformance with the technical requirements of the solicitation. Government review is required for extension of design construction submittals, used to define contract conformity, and for deviation from the completed design. Review will be only for conformance with the contract requirements. Included are only those construction submittals for which the Designer of Record design documents do not include enough detail to ascertain contract compliance. The Government may, but is not required, to review extensions of design such as structural steel or reinforcement shop drawings.

1.10 GOVERNMENT APPROVING AUTHORITY

When approving authority is Contracting Officer, the Government will:

a. Note date on which submittal was received from QC Manager.

b. Review submittals for approval within scheduling period specified and only for conformance with project design concepts and

compliance with contract documents.

c. Identify returned submittals with one of the actions defined in paragraph entitled "Review Notations" and with markings appropriate for action indicated.

Upon completion of review of submittals requiring Government approval, stamp and date approved submittals. One copies of the approved submittal will be retained by the Contracting Officer and two copies of the submittal will be returned to the Contractor. If the Government performs a conformance review of other Designer of Record approved submittals, the submittals will be so identified and returned, as described above.

1.10.1 Review Notations

Contracting Officer review will be completed within 15 calendar days after date of submission. Submittals will be returned to the Contractor with the following notations:

a. Submittals marked "approved" or "accepted" authorize the Contractor to proceed with the work covered.

b. Submittals marked "approved as noted" "or approved except as noted, resubmittal not required," authorize the Contractor to proceed with the work covered provided he takes no exception to the corrections.

c. Submittals marked "not approved" or "disapproved," or "revise and resubmit," indicate noncompliance with the contract requirements or design concept, or that submittal is incomplete. Resubmit with appropriate changes. No work shall proceed for this item until resubmittal is approved.

d. Submittals marked "not reviewed" will indicate submittal has been previously reviewed and approved, is not required , does not have evidence of being reviewed and approved by Contractor, or is not complete. A submittal marked "not reviewed" will be returned with an explanation of the reason it is not reviewed. Resubmit submittals returned for lack of review by Contractor or for being incomplete, with appropriate action, coordination, or change.

1.11 DISAPPROVED OR REJECTED SUBMITTALS

Contractor shall make corrections required by the Contracting Officer. If the Contractor considers any correction or notation on the returned submittals to constitute a change to the contract drawings or specifications; notice as required under the clause entitled, "Changes" is to be given to the Contracting Officer. Contractor is responsible for the dimensions and design of connection details and construction of work. Failure to point out deviations may result in the Government requiring rejection and removal of such work at the Contractor's expense.

If changes are necessary to submittals, the Contractor shall make such revisions and submission of the submittals in accordance with the procedures above. No item of work requiring a submittal change is to be accomplished until the changed submittals are approved.

1.12 APPROVED/ACCEPTED SUBMITTALS

The Contracting Officer's approval or acceptance of submittals is not be construed as a complete check, and indicates only that the general method of construction, materials, detailing and other information are satisfactory design, general method of construction, materials, detailing and other information appear to meet the Solicitation and Accepted Proposal. Approval or acceptance will not relieve the Contractor of the responsibility for any error which may exist, as the Contractor under the Contractor Quality Control (CQC) requirements of this contract is responsible for dimensions, the design of adequate connections and details, and the satisfactory construction of all work. After submittals have been approved or accepted by the Contracting Officer, no resubmittal for the purpose of substituting materials or equipment will be considered unless accompanied by an explanation of why a substitution is necessary.

1.13 APPROVED SAMPLES

Approval of a sample is only for the characteristics or use named in such approval and is not be construed to change or modify any contract requirements. Before submitting samples, the Contractor to assure that the materials or equipment will be available in quantities required in the project. No change or substitution will be permitted after a sample has been approved.

Match the approved samples for Materials and equipment incorporated in the work. If requested, approved samples, including those which may be damaged in testing, will be returned to the Contractor, at his expense, upon completion of the contract. Samples not approved will also be returned to the Contractor at its expense, if so requested.

Failure of any materials to pass the specified tests will be sufficient cause for refusal to consider, under this contract, any further samples of the same brand or make of that material. Government reserves the right to disapproved any material or equipment which previously has proved unsatisfactory in service.

Samples of various materials or equipment delivered on the site or in place may be taken by the Contracting Officer for testing. Samples failing to meet contract requirements will automatically void previous approvals. Contractor to replace such materials or equipment to meet contract requirements.

Approval of the Contractor's samples by the Contracting Officer does not relieve the Contractor of his responsibilities under the contract.

1.14 WITHHOLDING OF PAYMENT

Payment for materials incorporated in the work will not be made if required approvals have not been obtained. No payment for materials incorporated in the work will be made if all required Designer of Record or required Government approvals have not been obtained. No payment will be made for any materials incorporated into the work for any conformance review submittals or information only submittals found to contain errors or deviations from the Solicitation or Accepted Proposal.

1.15 PROGRESS SCHEDULE

1.15.1 Bar Chart

a. Submit the progress chart, for approval by the Contracting Officer in one reproducible and 4 copies.

b. Prepare the progress chart in the form of a bar chart utilizing form "Construction Progress Chart" or comparable format acceptable to the Contracting Officer.

c. Include no less than the following information on the progress chart:

(1) Break out by major headings for primary work activity.

(2) A line item break out under each major heading sufficient to track the progress of the work.

(3) A line item showing contract finalization task which includes punch list, clean-up and demolition, and final construction drawings.

(4) A materials bar and a separate labor bar for each line item. Both bars will show the scheduled percentage complete for any given date within the contract performance period. Labor bar will also show the number of men (man-load) expected to be working on any given date within the contract performance period.

(5) The estimated cost and percentage weight of total contract cost for each materials and labor bar on the chart.

(6) Separate line items for mobilization and drawing submittal and approval. (These items are to show no associated costs.)

d. Update the progress schedule in one reproduction and 4 copies every 30 calendar days throughout the contract performance period.

1.15.2 Project Network Analysis

Submit the initial progress schedule within 21 calendar days of notice to proceed. Schedule is to be updated and resubmitted monthly beginning 7 calendar days after return of the approved initial schedule. Updating to entail complete revision of the graphic and data displays incorporating changes in scheduled dates and performance periods. Redlined updates will only be acceptable for use as weekly status reviews.

Contractor to provide a single point contact from his on-site organization as his Schedule Specialist. Schedule Specialist is to have the responsibility of updating and coordinating the schedule with actual job conditions. Schedule Specialist to participate in weekly status meetings and present current information on the status of purchase orders, shop drawings, off-site fabrication, materials deliveries, Subcontractor activities, anticipated needs for Government furnished equipment, and any problem which may impact the contract performance period.

Include the following in the project network analysis:

a. Graphically display with the standard network or arrow diagram

capable of illustrating the required data. Drafting to be computer generated on standard 24 by 36 inch (nominal size) drafting sheets or on small (11 by 17 inch minimum) sheets with separate overview and detail breakouts. Provide a project network analysis that is legible with a clear, consistent method for continuations and detail referencing. Clearly delineate the critical path on the display. Clearly indicate the contract milestone date on the project network analysis graphic display.

b. Data is to be presented as a separate printout on paper or, where feasible, may be printed on the same sheet as the graphic display. Data is to be organized in a logical coherent display capable of periodic updating.

c. Include within the data verbal activity descriptions with a numerical ordering system cross referenced to the graphic display. Additionally, costs (broken down into separate materials and costs), duration, early start date, early finish date, late start date, late finish date, and float are to be detailed for each activity. A running total of the percent completion based on completed activity costs versus total contract cost is to be indicated. A system for indicating scheduled versus actual activity dates and durations is also to be provided.

d. Sufficient detail to facilitate the Contractor's control of the job and to allow the Contracting Officer to readily follow progress for portions of the work should be shown within the schedule.

1.16 STATUS REPORT ON MATERIALS ORDERS

Within 15 calendar days after notice to proceed, submit, for approval by the Contracting Officer, an initial material status report on all materials orders. This report will be updated and re-submitted every 15 calendar days as the status on material orders changes.

Report to include list, in chronological order by need date, materials orders necessary for completion of the contract. The following information will be required for each material order listed:

a. Material name, supplier, and invoice number.

b. Bar chart line item or CPM activity number affected by the order.

c. Delivery date needed to allow directly and indirectly related work to be completed within the contract performance period.

d. Current delivery date agreed on by supplier.

e. When item d exceeds item c, the effect that delayed delivery date will have on contract completion date.

f. When item d exceeds item c, a summary of efforts made by the Contractor to expedite the delayed delivery date to bring it in line with the needed delivery date, including efforts made to place the order (or subcontract) with other suppliers.

1.17 STAMPS

Stamps used by the Contractor on the submittal data to certify that the submittal meets contract requirements is to be similar to the following:

CONTRACTOR

(Firm Name)

_____ Approved

_____ Approved with corrections as noted on submittal data and/or attached sheets(s)

SIGNATURE: _____

TITLE: _____

DATE: _____

For design-build construction, both the Contractor Quality Control System Manager and the Designer of Record are to stamp and sign to certify that the submittal meets contract requirements.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

-- End of Section --

SECTION 01 35 45.00 10

CHEMICAL DATA QUALITY CONTROL
09/10

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

U.S. ENVIRONMENTAL PROTECTION AGENCY (EPA)

EPA 540/R 04-004	(2004) USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review

1.2 ACRONYMS

The definition of acronyms used by the Contractor that pertain to chemical data quality control shall be clearly defined for all contract related products and communications.

1.3 MEASUREMENT AND PAYMENT

Separate payment will not be made for providing and maintaining the chemical data quality requirements including the chemical data quality management, chemical data validation, minimum chemical data reporting requirements, and chemical data quality submittal requirements; these costs shall be included in the applicable unit prices or lump sum prices contained in the bidding schedule.

1.4 CHEMISTRY REQUIREMENTS

Chemical Data Quality Control (CDQC) shall be as defined in ER 1110-1-263; this ER, which integrates USACE guidance on the subject, shall be supplemented by EM 200-1-6 for detail technical guidance on CDQC. Tables and charts defining Design Analysis (DA), ROD, and remedial technology specific chemistry shall be according to or consistent with EM 200-1-3.

1.4.1 Site History

1.4.1.1 SWMU 68

SWMU 68 (also known as Environmental Condition of Property (ECP) Site 14) is located at the southwest end of the Ofstie Airfield within a flat lying open area surrounded by secondary growth vegetation. It is suspected that this area was used in the 1950s and 1960s for fire training exercises. A physical site inspection conducted during the ECP assessment observed a disturbed circular area consistent with that of a fire training area, but no stressed vegetation or stained soils were visible.
The former southern fire training area is currently not used. The area consists of a limited vegetative circular area which was formerly bisected by a road running generally east to west.

1.4.2 Data Quality Objectives (DQO)

Sample acquisition, chemical analysis and chemical parameter measurements shall be performed so that the resulting data meet and support data use requirements. The chemical data shall be acquired, documented, verified and reported to ensure that the specified precision, accuracy, representativeness, comparability, completeness and sensitivity requirements are achieved.

1.4.3 Sampling, Analysis and Measurement

Supply all personnel, equipment, and facilities to collect and analyze the environmental samples required to characterize waste.

1.4.3.1 Soil Samples

Soil samples shall be collected and analyzed and/or shipped to a primary laboratory by the Navy's designated representative.

1.4.3.2 Borrow or Fill Material Samples

Borrow or fill material samples shall be collected and analyzed according to Section 31 23 00.00 20.

1.4.3.3 Investigation Derived Waste Samples

Investigation derived waste (IDW) samples shall be collected and analyzed according to Sections 1.4.3.1 and 1.4.3.2 of these specifications.

1.4.3.4 Manifesting Samples

Material shipping manifesting shall be in accordance with 40 CFR 261, 40 CFR 262, 40 CFR 268, 49 CFR 172, and 49 CFR 178.

1.4.3.5 Real-Time Instrumental Measurement Samples

Real-time instrumental measurements shall be analyzed onsite for chemical parameters.

1.4.3.6 Perimeter Air Monitoring Samples

Perimeter air monitoring samples shall be analyzed.

1.4.3.7 Compatibility Field Testing for Bulking Operations

The Contractor shall use appropriate compatibility field tests before any bulking operations. The compatibility testing system shall include procedures for: 1) tests conducted prior to drum opening; 2) tests conducted at the drum head; 3) sample acquisition; 4) compatibility tests on collected samples; 5) sample compositing; 6) bulking; and 7) limitations.

1.4.3.8 Demolition Samples

Sampling and analysis for demolition shall be according to USACHPPM Protocol.

1.4.3.9 Field Screening

Field screening shall be performed by the Contractor.

1.5 SUBMITTALS

The following shall be submitted in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-03 Product Data

Sampling and Analysis Plan; G,

The SAP including the Field Sampling Plan (FSP) and the Quality Assurance Project Plan (QAPP), no later than 10 days after receipt of notice to proceed.

SD-06 Test Reports

QA Sample Collection and Analysis

The QA Laboratory Advance Notification (QALAN) shall be provided to the QA laboratory at least 10 business days before the initial shipment of samples.

Chemistry Data Package

The chemistry data package shall be provided to the QA lab.

Chemical Data Final Report; G,

The CDFR, within 30 days of completing work at the site, before final payment. Each report shall be labeled with the contract number, project name and location.

1.6 QUALITY ASSURANCE ELEMENTS

The Contractor shall be responsible for the following QA elements necessary to monitor and ensure the quality of chemical data produced.

1.6.1 Laboratory Validation Requirements

attain or have attained U.S. Army Corps of Engineers (USACE) validation in accordance with EM 200-1-1 and consistent with contract required chemical data quality. The Contractor shall identify all proposed project laboratories no later than the coordination meeting. If a proposed analytical laboratory cannot meet specified analytical requirements or achieve the required validation, the Contractor shall select another laboratory. If not currently validated, the USACE laboratory validation process requires a nominal 120 day process.

1.6.2 QA Sample Collection and Analysis

The Contractor shall be responsible for collection and transportation of QA samples to the QA laboratory. Samples for all analyses (except volatiles) shall be taken as splits of homogenized samples. Samples for volatiles shall be collected as discrete duplicates/triplicates. Samples shall be collected at a rate of 10percent per matrix per analysis per sampling event.

a. The Contractor shall submit the QA Laboratory Advance Notification (QALAN) to the QA laboratory. The QALAN shall include a list of laboratory-related DQO. The DQO shall include, but shall not be limited to, identification of extraction and analysis method

numbers, a list of analytes with required limits, estimated number of tests, approximate sampling dates, and requested completion date for QA testing. The Contractor shall notify the Contracting Officer (CO) and the QA laboratory immediately of any changes.

b. The Contractor shall provide all labor and field supplies, including sample containers and shipping coolers, for collecting and shipping samples for QA testing. The Contractor shall, in the presence of the CO, properly collect, label, and package the QA samples, fill out all chain-of-custody forms, and ship the samples by one-day delivery service to the designated QA laboratory for analysis. The Contractor shall notify the laboratory when all sampling is completed and shall clearly mark the chain-of-custody form accompanying the final shipment "FINAL" in 1 inch high lettering.

c. The Contractor shall allow 60 calendar days for laboratory analysis of QA samples, data review, and submission of the Government chemical quality assurance report. The elapsed time shall begin when the Contractor's last sample arrives at the QA laboratory, provided that the Contractor's completed chemistry data package is received within 30 calendar days thereafter. Otherwise, the Contractor shall allow 30 calendar days from the date the completed chemistry data package is received at the laboratory. The Contractor may, as an option, continue activities based on initial sampling and QC results, before receipt of QA test results. Where QA results are unacceptable due to Contractor negligence (e.g. improper sample collection and/or handling by the Contractor), or where QA sample results conflict with the Contractor's primary sample results, further sampling and testing shall be performed as directed by the CO. All costs for such additional sampling and testing due to Contractor negligence, including both QC and QA testing and analysis, and for any required remedial actions in the work, shall be borne by the Contractor. USACE acceptance of final disposition of any excavated soil shall not occur until the Contractor's sampling and QC results have been confirmed by QA results. This includes all final stockpiling, wasting, backfilling, and related construction. No payment will be made for laboratory sampling and testing before receipt and acceptance by the Government of the QA samples and the completed Chemical Data Final Report (CDFR), properly formulated according to these specifications.

1.6.3 Single or Double Blind Performance Evaluation Samples

The Contractor shall submit certified soil Performance Evaluation (PE) samples. The PE samples shall contain the site specific contaminants of concern. The analytes shall be contained in the PE samples at the site specific action levels for each target analyte.

1.6.4 Review of Primary Laboratory Data

The Contractor shall be responsible for the independent data review of the entire primary data set.

1.6.5 Validation of Data

The Contractor shall be responsible for validating 10 percent of the data in accordance with EPA 540/R 04-004. The data validation strategy shall be

established at the beginning of the project to be consistent with project DQO.

1.6.6 Electronic Tape Audits

The Contractor shall perform an electronic tape audit on 10 percent of project sample results. The raw data from a given batch shall be re-calculated and compared to the results reported by the laboratory. The data quality shall be measured by laboratory compliance with the required methods and acceptable practices for analysis and data reduction.

1.7 QUALIFICATIONS

1.7.1 Chemical Quality Control Officer

As a minimum, the Contractor's Chemical Quality Control Officer shall have: Five years of experience related to investigations, studies, design and remedial actions at HTRW sites; and two field seasons (or one continuous calendar year experience) in calibration and operation of various field monitoring devices as well as standard analytical chemistry methods common for analyzing soil, water, air and other materials for chemical contamination assessment, including hazardous waste manifesting. The Chemical Quality Control Officer shall ensure that all chemistry related objectives including responsibilities for DQO definitions, sampling and analysis, project requirements for data documentation and validation, and final project reports are attained. The Chemical Quality Control officer need not be present onsite during routine sampling, but shall be available for consultation with Government and Contractor personnel.

1.7.2 Environmental Sampler

As a minimum, the Contractor's Environmental Sampler shall have: a degree in Chemistry, Environmental Science, Engineering, Geology, Hydrology, or a related field; three years of experience in the development and preparation of SAP and work plans; three years of experience in and knowledge of EPA methods for collecting environmental and hazardous waste samples; three years of experience in operation of field screening equipment (e.g. PID, FID, infrared spectrometer, immunoassay, etc.); and two field seasons of experience with the particular field screening techniques for use on this project. The Environmental Sampler shall collect all onsite samples and perform all field screening tests. The Environmental Sampler shall review the sampling results, and provide recommendations for the Contractor's sampling program. The Environmental Sampler shall be onsite during excavation and stockpiling operations involving contaminated soil or soil to be checked for contamination.

1.8 COORDINATION MEETING

After the preconstruction conference, before any sampling or testing, the Contractor and the Contracting Officer or his designated representative will meet to discuss the CQC Plan and the SAP. A list of definable features that involve chemical measurements shall be agreed upon. At a minimum, each matrix (soil, water, stockpiled wastes) shall be a definable work feature. Management of the chemical data quality system including project DQO, project submittals, chemical data documentation, chemical data assessment, required sampling and analysis protocols, and minimum data reporting requirements shall be agreed upon. The meeting will serve to establish an interrelationship between the Contractor's chemical data quality management and Government chemical quality assurance requirements.

Minutes of the meeting will be documented by the Government and shall be signed by both the Contractor and the Contracting Officer. The minutes will include any or all unresolved chemical issues along with the conditions for resolution and will become a part of the contract file.

PART 2 PRODUCTS (NOT APPLICABLE)

PART 3 EXECUTION

3.1 GENERAL REQUIREMENTS

The Contractor shall be responsible for chemical sample acquisition for predisposal characterization sampling, backfill material characterization, and waste characterization sampling, sample analysis, instrumental measurements of chemical parameters and for chemical data quality control. An effective chemical data quality control system shall be established that meets the requirements for the chemical measurement DQO applicable to the project. The system shall cover chemical measurements pertaining to and required for Contractor and subcontractor produced chemical data. The Contractor shall control field screening, sampling, and testing in conjunction with remedial activities to meet all DQO; minimize the amount of excavated material requiring temporary storage; prevent dilution of contaminated soils with clean soils; and ensure completion of work within the required time.

Supply all personnel, equipment, and facilities to collect and analyze the environmental samples required to characterize the wastes.

3.1.1 Confirmation Samples

Confirmation samples shall be collected by the Navy's designated representative from the bottom and walls of the open excavations for the purpose of determining if all contaminated soils above the remediation goals have been removed from the excavation. Three soil samples from the bottom of each open excavation area at SWMU 68 and one sample every 25 linear feet, or fraction thereof, of soil along the walls of the excavations at SWMU 68.

At a minimum, the confirmation samples shall be analyzed for the following parameters:

Lead (Method 6010)
Copper (Method 6010)
Zinc (Method 6010)

A maximum turnaround time of 24 hours for sample analyses for confirmation samples shall be required.

3.1.2 Waste Characterization Samples

Waste characterization samples shall be collected for the purpose of determining handling, transportation, and disposal requirements and for determining personal and environmental protection and monitoring requirements.

Collect soil characterization samples from each excavation area. One thoroughly mixed composite sample shall be collected for every 25 cubic yards or fraction thereof of material. The composite sample shall consist of six (6) grab samples representative of the material being sampled. The

grab samples shall thoroughly mixed to obtain a relatively homogeneous mixture.

At a minimum, the characterization samples shall be analyzed for the following parameters (additional analyses may be required by the disposal facility):

1. TCLP Metals - EPA Methods 7060, 7080, 7130, 7190, 7420, 7470, 7760, 7741
2. TCLP Volatiles - EPA Method 8240
3. TCLP Semi-Volatiles - EPA Method 8270
4. Pesticides/PCBs - EPA Method 8081/8082
5. RCRA Characteristics - SW-84 9010, 1010, 9012, 9030

The soil shall contain no free liquid as demonstrated by EPA SW-846 Method 9095, paint filter liquids test.

In addition to the above analyses, the Contractor shall be responsible for performing any additional analyses required by the off-site soil disposal facility. These additional analyses shall be identified in the Contractor's Sampling and Analysis Plan.

3.1.3 Incidental Waste Samples

Collect samples from incidental wastes generated by the Contractor during normal construction activities (except general refuse) to determine applicable transportation and disposal requirements. Also included under this category is all water generated during the remedial action including, but not limited to, water from decontamination of personnel and equipment, water from decontamination of drainage ditch, groundwater encountered during excavation, and rainfall and surface water runoff accumulated in the open excavations. Analyze incidental waste samples for the following parameters and any additional analyses required by the off-site disposal facility:

1. TCLP Metals - EPA Methods 7060, 7080, 7130, 7190, 7420, 7470, 7741, 7760
2. TCLP VOAs - EPA Method 8240

3.1.4 Sample Handling

Sampling, sample handling, and sampling containers must be consistent with the chemicals expected, the matrix of the sample, and planned analytical procedures. Precleaned glass sample containers with teflon lids are required for soil samples.

The Contractor shall describe in the Sampling and Analysis Plan strict chain-of-custody procedures to be used during collection, transport, and analysis of all samples.

3.1.5 Sampling Documentation

Maintain a sample log containing, at a minimum, the following information:

a. Date and Time of Sampling

b. Sample Locations

c. Sample Matrix

d. Sample Identification Number

e. QA/QC Sample Identification

f. Analyses to be Performed

g. Type and Number of Sample Containers

h. Signatures of Individuals Performing Sampling

3.2 QUALITY CONTROL PLAN

3.2.1 Additional Requirements

The CQC Plan shall incorporate the qualifications, authority and responsibilities of all chemical quality management and support personnel. Chemical measurements including sampling and/or chemical parameter measurement will not be permitted to begin until after production and acceptance of the CQC Plan, and Government approval of the SAP.

-- End of Section --

SECTION 01 57 19.00 20

TEMPORARY ENVIRONMENTAL CONTROLS
04/08

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

U.S. ENVIRONMENTAL PROTECTION AGENCY (EPA)

EPA 530/F-93/004	(1993; Rev O; Updates I, II, IIA, IIB, and III) Test Methods for Evaluating Solid Waste (Vol IA, IB, IC, and II) (SW-846)

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

29 CFR 1910.120	Hazardous Waste Operations and Emergency Response
40 CFR 112	Oil Pollution Prevention
40 CFR 241	Guidelines for Disposal of Solid Waste
40 CFR 243	Guidelines for the Storage and Collection of Residential, Commercial, and Institutional Solid Waste
40 CFR 260	Hazardous Waste Management System: General
40 CFR 261	Identification and Listing of Hazardous Waste
40 CFR 262	Standards Applicable to Generators of Hazardous Waste
40 CFR 263	Standards Applicable to Transporters of Hazardous Waste
40 CFR 264	Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities
40 CFR 265	Interim Status Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities
49 CFR 171	General Information, Regulations, and Definitions
49 CFR 172	Hazardous Materials Table, Special Provisions, Hazardous Materials Communications, Emergency Response Information, and Training Requirements

49 CFR 178 Specifications for Packagings

1.2 DEFINITIONS

1.2.1 Sediment

Soil and other debris that have eroded and have been transported by runoff water or wind.

1.2.2 Solid Waste

Garbage, refuse, debris, sludge, or other discharged material, including solid, liquid, semisolid, or contained gaseous materials resulting from domestic, industrial, commercial, mining, or agricultural operations. Types of solid waste typically generated at construction sites may include:

a. Green waste: The vegetative matter from landscaping, land clearing and grubbing, including, but not limited to, grass, bushes, scrubs, small trees and saplings, tree stumps and plant roots. Marketable trees, grasses and plants that are indicated to remain, be re-located, or be re-used are not included.

b. Surplus soil: Existing soil that is in excess of what is required for this work, including aggregates intended, but not used, for on-site mixing of concrete, mortars and paving. Contaminated soil meeting the definition of hazardous material or hazardous waste is not included.

c. Debris: Non-hazardous solid material generated during the construction, demolition, or renovation of a structure which exceeds 2.5 inch particle size that is: a manufactured object; plant or animal matter; or natural geologic material (e.g. cobbles and boulders), broken or removed concrete, masonry, and rock asphalt paving; ceramics; roofing paper and shingles. A mixture of debris and other material such as soil or sludge is also subject to regulation as debris if the mixture is comprised primarily of debris by volume, based on visual inspection.

d. Wood: Dimension and non-dimension lumber, plywood, chipboard, hardboard. Treated and/or painted wood that meets the definition of lead contaminated or lead based contaminated paint is not included.

e. Scrap metal: Scrap and excess ferrous and non-ferrous metals such as reinforcing steel, structural shapes, pipe and wire that are recovered or collected and disposed of as scrap. Scrap metal meeting the definition of hazardous material or hazardous waste is not included.

f. Paint cans: Metal cans that are empty of paints, solvents, thinners and adhesives. If permitted by the paint can label, a thin dry film may remain in the can.

g. Recyclables: Materials, equipment and assemblies such as doors, windows, door and window frames, plumbing fixtures, glazing and mirrors that are recovered and sold as recyclable. Metal meeting the definition of lead contaminated or lead based paint contaminated may not be included as recyclable if sold to a scrap

metal company. Paint cans may not be included as recyclable if sold to a scrap metal company.

h. Hazardous Waste: By definition, to be a hazardous waste a material must first meet the definition of a solid waste. Hazardous waste and hazardous debris are special cases of solid waste. They have additional regulatory controls and must be handled separately. They are thus defined separately in this document.

Material not regulated as solid waste are: nuclear source or byproduct materials regulated under the Federal Atomic Energy Act of 1954 as amended; suspended or dissolved materials in domestic sewage effluent or irrigation return flows, or other regulated point source discharges; regulated air emissions; and fluids or wastes associated with natural gas or crude oil exploration or production.

1.2.3 Hazardous Debris

As defined in Solid Waste paragraph, debris that contains listed hazardous waste (either on the debris surface, or in its interstices, such as pore structure) per 40 CFR 261; or debris that exhibits a characteristic of hazardous waste per 40 CFR 261.

1.2.4 Chemical Wastes

This includes salts, acids, alkalizes, herbicides, pesticides, and organic chemicals.

1.2.5 Garbage

Refuse and scraps resulting from preparation, cooking, dispensing, and consumption of food.

1.2.6 Hazardous Waste

Any discarded material, liquid, solid, or gas, which meets the definition of hazardous material or is designated hazardous waste by the Environmental Protection Agency or State Hazardous Control Authority as defined in 40 CFR 260, 40 CFR 261, 40 CFR 262, 40 CFR 263, 40 CFR 264, 40 CFR 265, 40 CFR 266, 40 CFR 268, 40 CFR 270, 40 CFR 271, 40 CFR 272, 40 CFR 273, 40 CFR 279, and 40 CFR 280.

1.2.7 Hazardous Materials

Hazardous materials as defined in 49 CFR 171 and listed in 49 CFR 172.

Hazardous material is any material that:

a. Is regulated as a hazardous material per 49 CFR 173, or

b. Requires a Material Safety Data Sheet (MSDS) per 29 CFR 1910.120, or

c. During end use, treatment, handling, packaging, storage, transpiration, or disposal meets or has components that meet or have potential to meet the definition of a hazardous waste as defined by 40 CFR 261 Subparts A, B, C, or D.

Designation of a material by this definition, when separately regulated or controlled by other instructions or directives, does not eliminate the need for adherence to that hazard-specific guidance which takes precedence over this instruction for "control" purposes. Such material include ammunition, weapons, explosive actuated devices, propellants, pyrotechnics, chemical and biological warfare materials, medical and pharmaceutical supplies, medical waste and infectious materials, bulk fuels, radioactive materials, and other materials such as asbestos, mercury, and polychlorinated biphenyls (PCBs). Nonetheless, the exposure may occur incident to manufacture, storage, use and demilitarization of these items.

1.2.8 Waste Hazardous Material (WHM)

Any waste material which because of its quantity, concentration, or physical, chemical, or infectious characteristics may pose a substantial hazard to human health or the environment and which has been so designated. Used oil not containing any hazardous waste, as defined above, falls under this definition.

1.2.9 Oily Waste

Those materials which are, or were, mixed with used oil and have become separated from that used oil. Oily wastes also means materials, including wastewaters, centrifuge solids, filter residues or sludges, bottom sediments, tank bottoms, and sorbents which have come into contact with and have been contaminated by, used oil and may be appropriately tested and discarded in a manner which is in compliance with other State and local requirements.

This definition includes materials such as oily rags, "kitty litter" sorbent clay and organic sorbent material. These materials may be land filled provided that:

a. It is not prohibited in other State regulations or local ordinances

b. The amount generated is "de minimus" (a small amount)

c. It is the result of minor leaks or spills resulting from normal process operations

d. All free-flowing oil has been removed to the practical extent possible

Large quantities of this material, generated as a result of a major spill or in lieu of proper maintenance of the processing equipment, are a solid waste. As a solid waste, a hazardous waste determination must be performed prior to disposal. As this can be an expensive process, it is recommended that this type of waste be minimized through good housekeeping practices and employee education.

1.2.10 Regulated Waste

Those solid waste that have specific additional Federal, state, or local controls for handling, storage, or disposal.

1.2.11 Class I Ozone Depleting Substance (ODS)

Class I ODS is defined in Section 602(a) of The Clean Air Act and includes the following chemicals:

chlorofluorocarbon-11 (CFC-11)
chlorofluorocarbon-12 (CFC-12)
chlorofluorocarbon-13 (CFC-13)
chlorofluorocarbon-111 (CFC-111)
chlorofluorocarbon-112 (CFC-112)
chlorofluorocarbon-113 (CFC-113)
chlorofluorocarbon-114 (CFC-114)
chlorofluorocarbon-115 (CFC-115)
chlorofluorocarbon-211 (CFC-211)
chlorofluorocarbon-212 (CFC-212)
chlorofluorocarbon-213 (CFC-213)
chlorofluorocarbon-214 (CFC-214)
chlorofluorocarbon-215 (CFC-215)
chlorofluorocarbon-216 (CFC-216)
chlorofluorocarbon-217 (CFC-217)
chlorofluorocarbon-500 (CFC-500)
chlorofluorocarbon-502 (CFC-502)
chlorofluorocarbon-503 (CFC-503)
halon-1211
halon-1301
halon-2402
carbon tetrachloride
methyl bromide
methyl chloroform

Class II ODS is defined in Section 602(s) of The Clean Air Act and includes the following chemicals:

hydrochlorofluorocarbon-21 (HCFC-21)
hydrochlorofluorocarbon-22 (HCFC-22)
hydrochlorofluorocarbon-31 (HCFC-31)
hydrochlorofluorocarbon-121 (HCFC-121)
hydrochlorofluorocarbon-122 (HCFC-122)
hydrochlorofluorocarbon-123 (HCFC-123)
hydrochlorofluorocarbon-124 (HCFC-124)
hydrochlorofluorocarbon-131 (HCFC-131)
hydrochlorofluorocarbon-132 (HCFC-132)
hydrochlorofluorocarbon-133 (HCFC-133)
hydrochlorofluorocarbon-141 (HCFC-141)
hydrochlorofluorocarbon-142 (HCFC-142)
hydrochlorofluorocarbon-221 (HCFC-221)
hydrochlorofluorocarbon-222 (HCFC-222)
hydrochlorofluorocarbon-223 (HCFC-223)
hydrochlorofluorocarbon-224 (HCFC-224)
hydrochlorofluorocarbon-225 (HCFC-225)
hydrochlorofluorocarbon-226 (HCFC-226)
hydrochlorofluorocarbon-231 (HCFC-231)
hydrochlorofluorocarbon-232 (HCFC-232)
hydrochlorofluorocarbon-233 (HCFC-233)
hydrochlorofluorocarbon-234 (HCFC-234)
hydrochlorofluorocarbon-235 (HCFC-235)
hydrochlorofluorocarbon-241 (HCFC-241)
hydrochlorofluorocarbon-242 (HCFC-242)
hydrochlorofluorocarbon-243 (HCFC-243)

hydrochlorofluorocarbon-244 (HCFC-244)
hydrochlorofluorocarbon-251 (HCFC-251)
hydrochlorofluorocarbon-252 (HCFC-252)
hydrochlorofluorocarbon-253 (HCFC-253)
hydrochlorofluorocarbon-261 (HCFC-261)
hydrochlorofluorocarbon-262 (HCFC-262)
hydrochlorofluorocarbon-271 (HCFC-271)

1.3 SUBMITTALS

The following shall be submitted in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Preconstruction Survey; G

Solid Waste Management Plan and Permit; G

Regulatory Notifications; G

Environmental Management Plan; G

Storm Water Pollution Prevention Plan; G

Storm Water Notice of Intent (for NPDES coverage under the general permit for construction activities); G

Dirt and Dust Control Plan; G

Contractor Hazardous Material Inventory Log; G

ECATTS list of Contractor and Subcontractor company names; G

SD-06 Test Reports

Laboratory Analysis

Disposal Requirements

Erosion and Sediment Control Inspection Reports

Storm Water Inspection Reports for General Permit

Contractor 40 CFR employee training records

Solid Waste Management Report; G

SD-11 Closeout Submittals

Some of the records listed below are also required as part of other submittals. For the "Records" submittal, maintain on-site a separate three-ring Environmental Records binder and submit at the completion of the project. Make separate parts to the binder corresponding to each of the applicable sub items listed below.

Storm Water Pollution Prevention Plan compliance notebook; G

Waste Determination Documentation

Disposal Documentation for Hazardous and Regulated Waste

Contractor 40 CFR Employee Training Records

Solid Waste Management Permit

Solid Waste Management Report

Contractor Hazardous Material Inventory Log; G

Hazardous Waste/Debris Management

Regulatory Notifications

1.4 ENVIRONMENTAL PROTECTION REQUIREMENTS

Provide and maintain, during the life of the contract, environmental protection as defined. Plan for and provide environmental protective measures to control pollution that develops during normal construction practice. Plan for and provide environmental protective measures required to correct conditions that develop during the construction of permanent or temporary environmental features associated with the project. Comply with Federal, State, and local regulations pertaining to the environment, including water, air, solid waste, hazardous waste and substances, oily substances, and noise pollution.

The Contractor may be required to promptly conduct tests and procedures for the purpose of assessing whether construction operations are in compliance with Applicable Environmental Laws. Analytical work shall be done by qualified laboratories; and where required by law, the laboratories shall be certified.

1.4.1 Environmental Compliance Assessment Training and Tracking System (ECATTS)

Submit a ECATTS list of Contractor and Subcontractor company names for each Contractor and Sub-contractor performing construction work on this project that has completed the required "Environmental Compliance Assessment Training and Tracking System (ECATTS)" training. This training is web-based and can be accessed from any computer with Internet access using the following instructions. NOTE: Prior to registration and completion of training the Contractor or Sub-Contractor Company Name and Contract Number must be in the training database. Submit Contractor and Subcontractor company names list for ECATTS for all sub-contractors doing work on this Contract Number to the Contracting Officer immediately after award of a contract. This list shall be updated and re-submitted as sub-contracts are awarded. Register for NAVFAC Environmental Compliance Assessment Training and Tracking System, by logging on to http://navfac.ecatts.com/. Obtain the password for registration from the Contracting Officer.

Personnel in the positions listed below shall complete ECATTS Training prior to starting their respective portions of on-site work under this contract. If personnel changes occur for any of these positions after starting work, replacement personnel shall complete ECATTS training within 14 days of assignment to the project.

Prime Contractor
Project Manager

Project Superintendent
Quality Control Manager
Environmental Manager (as specified in this specification)

Sub-Contractors
Project Manager (or equivalent office person)
Superintendent (or equivalent job-site person)

This training has been structured to allow contractors to receive credit under this contract and also to carry forward credit to future contracts. Contractors or sub-contractors shall ensure that all personnel review their training plans for new modules or updated training requirements prior to beginning work. Some training modules are tailored for specific State regulatory requirements, therefore, Contractors working in multiple states will be required to re-take modules tailored to the state where the contract work is being performed.

1.4.2 Conformance with the Environmental Management System

The Contractor shall perform work under this contract consistent with the policy and objectives identified in the installation's Environmental Management System (EMS). The Contractor shall perform work in a manner that conforms to objectives and targets, environmental programs and operational controls identified by the EMS. The Contractor will provide monitoring and measurement information as necessary to address environmental performance relative to environmental, energy, and transportation management goals. In the event an EMS nonconformance or environmental noncompliance associated with the contracted services, tasks, or actions occurs, the Contractor shall take corrective and/or preventative actions. In addition, the Contractor shall ensure that its employees are aware of their roles and responsibilities under the EMS and how these EMS roles and responsibilities affect work performed under the contract.

The Contractor is responsible for ensuring that their employees receive applicable environmental and occupational health and safety training, and keep up to date on regulatory required specific training for the type of work to be conducted onsite. All on-site Contractor personnel, and their subcontractor personnel, performing tasks that have the potential to cause a significant environmental impact shall be competent on the basis of appropriate education, training or experience. Upon contract award, the Contracting Officer's Representative will notify the installation's EMS coordinator to arrange EMS training. Refer to Section 01 57 19.01 20, Supplemental Temporary Environmental Controls for additional site specific EMS requirements related to construction. The installation's EMS coordinator shall identify training needs associated with environmental aspects and the EMS, and arrange training or take other action to meet these needs. The Contractor shall provide training documentation to the Contracting Officer. The EMS coordinator shall retain associated records.

1.5 QUALITY ASSURANCE

1.5.1 Preconstruction Survey

Perform a Preconstruction Survey of the project site with the Contracting Officer, and take photographs showing existing environmental conditions in and adjacent to the site. Submit a report for the record.

1.5.2 Regulatory Notifications

The Contractor is responsible for all regulatory notification requirements in accordance with Federal, State and local regulations. In cases where the Navy must also provide public notification (such as stormwater permitting), the Contractor must coordinate with the Contracting Officer. The Contractor shall submit copies of all regulatory notifications to the Contracting Officer prior to commencement of work activities. Typically, regulatory notifications must be provided for the following (this listing is not all inclusive): demolition, renovation, NPDES defined site work, remediation of controlled substances (asbestos, hazardous waste, lead paint).

1.5.3 Environmental Brief

Attend an environmental brief to be included in the preconstruction meeting. Provide the following information: types, quantities, and use of hazardous materials that will be brought onto the activity; types and quantities of wastes/wastewater that may be generated during the contract. Discuss the results of the Preconstruction Survey at this time.

Prior to initiating any work on site, meet with the Contracting Officer and activity environmental staff to discuss the proposed Environmental Management Plan. Develop a mutual understanding relative to the details of environmental protection, including measures for protecting natural resources, required reports, required permits, permit requirements, and other measures to be taken.

1.5.4 Environmental Manager

Appoint in writing an Environmental Manager for the project site. The Environmental Manager will be directly responsible for coordinating contractor compliance with Federal, State, local, and station requirements. The Environmental Manager will ensure compliance with Hazardous Waste Program requirements (including hazardous waste handling, storage, manifesting, and disposal); implement the Environmental Management Plan; ensure that all environmental permits are obtained, maintained, and closed out; ensure compliance with Storm Water Program Management requirements; ensure compliance with Hazardous Materials (storage, handling, and reporting) requirements; and coordinate any remediation of regulated substances (lead, asbestos, PCB transformers). This can be a collateral position; however the person in this position must be trained to adequately accomplish the following duties: ensure waste segregation and storage compatibility requirements are met; inspect and manage Satellite Accumulation areas; ensure only authorized personnel add wastes to containers; ensure all Contractor personnel are trained in 40 CFR requirements in accordance with their position requirements; coordinate removal of waste containers; and maintain the Environmental Records binder and required documentation, including environmental permits compliance and close-out.

1.5.5 Contractor 40 CFR Employee Training Records

Prepare and maintain employee training records throughout the term of the contract meeting applicable 40 CFR requirements. The Contractor will ensure every employee completes a program of classroom instruction or on-the-job training that teaches them to perform their duties in a way that ensures compliance with Federal, State and local regulatory requirements for RCRA Large Quantity Generator. The Contractor will provide a Position

Description for each employee, by subcontractor, based on the Davis-Bacon Wage Rate designation or other equivalent method, evaluating the employee's association with hazardous and regulated wastes. This Position Description will include training requirements as defined in 40 CFR 265 for a Large Quantity Generator facility. Submit these training records to the Contracting Officer at the conclusion of the project, unless otherwise directed.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

3.1 ENVIRONMENTAL MANAGEMENT PLAN

Prior to initiating any work on site, the Contractor will meet with the Contracting Officer to discuss the proposed Environmental Protection Plan and develop a mutual understanding relative to the details of environmental protection, including measures for protecting natural resources, required reports, and other measures to be taken. The Contractor's Environmental Plan shall incorporate construction related objectives and targets from the installation's Environmental Management System. The Environmental Management Plan will be submitted in the following format and shall include the elements specified below.

a. Description of the Environmental Management Plan

(1) General overview and purpose

(a). A brief description of each specific plan required by environmental permit or elsewhere in this contract.

(b). The duties and level of authority assigned to the person(s) on the job site that oversee environmental compliance.

(c). A copy of any standard or project specific operating procedures that will be used to effectively manage and protect the environment on the project site.

(d). Communication and training procedures that will be used to convey environmental management requirements to contractor employees and subcontractors.

(e). Emergency contact information contact information (office phone number, cell phone number, and e-mail address).

(2) General site information

(3) A letter signed by an officer of the firm appointing the Environmental Manager and stating that he/she is responsible for managing and implementing the Environmental Program as described in this contract. Include in this letter the Environmental Manager's authority to direct the removal and replacement of non-conforming work.

b. Management of Natural Resources

(1) Land resources

(2) Tree protection

(3) Replacement of damaged landscape features

(4) Temporary construction

(5) Stream crossings

(6) Fish and wildlife resources

(7) Wetland areas

c. Protection of Historical and Archaeological Resources

(1) Objectives

(2) Methods

d. Storm Water Management and Control

(1) Ground cover

(2) Erodible soils

(3) Temporary measures

(a) Mechanical retardation and control of runoff

(b) Vegetation and mulch

(4) Effective selection, implementation and maintenance of Best Management Practices (BMPs).

e. Protection of the Environment from Waste Derived from Contractor Operations

(1) Control and disposal of solid and sanitary waste. If Section 01 74 19.05 20 is included in the contract, submit the plan required by that section as part of the Environmental Management Plan.

(2) Control and disposal of hazardous waste (Hazardous Waste Management Section)

This item will consist of the management procedures for all hazardous waste to be generated. The elements of those procedures will coincide with the Activity Hazardous Waste Management Plan. A copy of the Activity Hazardous Waste Management Plan will be provided by the Contracting Officer. As a minimum, include the following:

(a) Procedures to be employed to ensure a written waste determination is made for appropriate wastes which are to be generated;

(b) Sampling/analysis plan;

(c) Methods of hazardous waste accumulation/storage (i.e., in

tanks and/or containers);

(d) Management procedures for storage, labeling, transportation, and disposal of waste (treatment of waste is not allowed unless specifically noted);

(e) Management procedures and regulatory documentation ensuring disposal of hazardous waste complies with Land Disposal Restrictions (40 CFR 268);

(f) Management procedures for recyclable hazardous materials such as lead-acid batteries, used oil, and the like;

(g) Used oil management procedures in accordance with 40 CFR 279;

(h) Pollution prevention\hazardous waste minimization procedures;

(i) Plans for the disposal of hazardous waste by permitted facilities;

(j) Procedures to be employed to ensure all required employee training records are maintained.

f. Prevention of Releases to the Environment

(1) Procedures to prevent releases to the environment

(2) Notifications in the event of a release to the environment

g. Regulatory Notification and Permits

(1) List what notifications and permit applications must be made. Demonstrate that those permits have been obtained by including copies of all applicable, environmental permits.

3.1.1 Environmental Protection Plan Review

Within thirty days after the Contract award date, submit the proposed Environmental Management Plan for further discussion, review, and approval. Commencement of work will not begin until the environmental management plan has been approved.

3.1.2 Licenses and Permits

The following permits will be obtained by the Contracting Officer:

The Contractor is advised the work under this contract will require obtaining certain permits from the local Environmental Quality Board (EQB). These permits may include a (1) Solid Waste Generating Activity Permit (D:-3), (2) Permit to Construct an Emission Source, (3) Permit to Operated an emission Source, (4) Asbestos Removal Permit, and (5) Erosion and Sedimentation Control Plan (CESI Plan). Obtaining of these permits from the EQB will require a Preliminary Environmental Assessment (PEA). The PRA will be on file at the office of the Officer in Charge of Construction, Puerto Rico Area and may be obtained therefrom. If needed for the project, the PEA will be provided to the Contractor at the preconstruction conference. Obtaining of require permits will be necessary

prior to beginning any construction.

Where required by the State regulatory authority, the inspections and certifications will be provided through the services of a Professional Engineer (PE). As a part of the quality control plan, which is required to be submitted for approval by the quality control section, provide a sub item containing the name, appropriate professional registration or licence number, address, and telephone number of the professionals or other qualified persons who will be performing the inspections and certifications for each permit.

3.2 PROTECTION OF NATURAL RESOURCES

Preserve the natural resources within the project boundaries and outside the limits of permanent work. Restore to an equivalent or improved condition upon completion of work. Confine construction activities to within the limits of the work indicated or specified. If the work is near streams, lakes, or other waterways, conform to the national permitting requirements of the Clean Water Act.

Do not disturb fish and wildlife. Do not alter water flows or otherwise significantly disturb the native habitat adjacent to the project and critical to the survival of fish and wildlife, except as indicated or specified.

Except in areas to be cleared, do not remove, cut, deface, injure, or destroy trees or shrubs without the Contracting Officer's permission. Do not fasten or attach ropes, cables, or guys to existing nearby trees for anchorages unless authorized by the Contracting Officer. Where such use of attached ropes, cables, or guys is authorized, the Contractor will be responsible for any resultant damage.

Protect existing trees which are to remain and which may be injured, bruised, defaced, or otherwise damaged by construction operations. Remove displaced rocks from uncleared areas. By approved excavation, remove trees with 30 percent or more of their root systems destroyed. Remove trees and other landscape features scarred or damaged by equipment operations, and replace with equivalent, undamaged trees and landscape features. Obtain Contracting Officer's approval before replacement.

The Contracting Officer's approval is required before any equipment will be permitted to ford live streams. In areas where frequent crossings are required, install temporary culverts or bridges. Obtain Contracting Officer's approval prior to installation. Remove temporary culverts or bridges upon completion of work, and repair the area to its original condition unless otherwise required by the Contracting Officer.

3.2.1 Erosion and Sediment Control Measures

3.2.1.1 Burnoff

Burnoff of the ground cover is not permitted.

3.2.1.2 Protection of Erodible Soils

Immediately finish the earthwork brought to a final grade, as indicated or specified. Immediately protect the side slopes and back slopes upon completion of rough grading. Plan and conduct earthwork to minimize the duration of exposure of unprotected soils.

3.2.1.3 Temporary Protection of Erodible Soils

Use the following methods to prevent erosion and control sedimentation:

a. Mechanical Retardation and Control of Runoff

(1) Mechanically retard and control the rate of runoff from the construction site. This includes construction of diversion ditches, benches, berms, and use of silt fences and straw bales to retard and divert runoff to protected drainage courses.

b. Sediment Basins

(1) Trap sediment in temporary sediment basins. Select a basin size to accommodate the runoff of a local 10-year storm. Pump dry and remove the accumulated sediment, after each storm. Use a paved weir or vertical overflow pipe for overflow. Remove collected sediment from the site. Institute effluent quality monitoring programs.

(2) Install, inspect, and maintain best management practices (BMPs) as required by the general permit. Prepare BMP Inspection Reports as required by the general permit. If required by the permit, include those inspection reports.

c. Vegetation and Mulch

(1) Provide temporary protection on sides and back slopes as soon as rough grading is completed or sufficient soil is exposed to require erosion protection. Protect slopes by accelerated growth of permanent vegetation, temporary vegetation, mulching, or netting. Stabilize slopes by hydroseeding, anchoring mulch in place, covering with anchored netting, sodding, or such combination of these and other methods necessary for effective erosion control.

(2) Seeding: Provide new seeding where ground is disturbed. Include topsoil or nutriment during the seeding operation necessary to establish or reestablish a suitable stand of grass. The seeding operation will be as specified in Section 32 92 19, Seeding.

3.2.2 Stormwater Drainage and Construction Dewatering

There will be no discharge of excavation ground water to the sanitary sewer, storm drains, or to the river without prior specific authorization of the Environmental Division in writing. Discharge of hazardous substances will not be permitted under any circumstances.

Construction site runoff will be prevented from entering any storm drain or the river directly by the use of straw bales or other method suitable to the Environmental Division. Contractor will provide erosion protection of the surrounding soils.

Construction Dewatering shall not be discharged to the sanitary sewer. If the construction dewatering is noted or suspected of being contaminated, it may only be released to the storm drain system if the discharge is specifically permitted. Authorization for any contaminated groundwater

release shall be obtained in advance from the base Environmental Officer. Discharge of hazardous substances will not be permitted under any circumstances.

3.3 HISTORICAL AND ARCHAEOLOGICAL RESOURCES

Carefully protect in-place and report immediately to the Contracting Officer historical and archaeological items or human skeletal remains discovered in the course of work. Upon discovery, notify the Contracting Officer. Stop work in the immediate area of the discovery until directed by the Contracting Officer to resume work. The Government retains ownership and control over historical and archaeological resources.

3.4 SOLID WASTE MANAGEMENT PLAN and PERMIT

Provide to the contracting officer written notification of the quantity of solid waste/debris that is anticipated to be generated by construction. Include in the report the locations where various types of waste will be disposed or recycled. Include letters of acceptance or as applicable, submit one copy of a State and local Solid Waste Management Permit or license showing such agency's approval of the disposal plan before transporting wastes off Government property.

3.4.1 Solid Waste Management Report

Monthly, submit a solid waste disposal report to the Contracting Officer. For each waste, the report will state the classification (using the definitions provided in this section), amount, location, and name of the business receiving the solid waste.

The Contractor will include copies of the waste handling facilities' weight tickets, receipts, bills of sale, and other sales documentation. In lieu of sales documentation, the Contractor may submit a statement indicating the disposal location for the solid waste which is signed by an officer of the Contractor firm authorized to legally obligate or bind the firm. The sales documentation or Contractor certification will include the receiver's tax identification number and business, EPA or State registration number, along with the receiver's delivery and business addresses and telephone numbers. For each solid waste retained by the Contractor for his own use, the Contractor will submit on the solid waste disposal report the information previously described in this paragraph. Prices paid or received will not be reported to the Contracting Officer unless required by other provisions or specifications of this Contract or public law.

3.4.2 Control and Management of Solid Wastes

Pick up solid wastes, and place in covered containers which are regularly emptied. Do not prepare or cook food on the project site. Prevent contamination of the site or other areas when handling and disposing of wastes. At project completion, leave the areas clean. Recycling is encouraged and can be coordinated with the Contracting Officer and the activity recycling coordinator. Remove all solid waste (including non-hazardous debris) from Government property and dispose off-site at an approved landfill. Solid waste disposal off-site must comply with most stringent local, State, and Federal requirements including 40 CFR 241, 40 CFR 243, and 40 CFR 258.

Manage spent hazardous material used in construction, including but not limited to, aerosol cans, waste paint, cleaning solvents, contaminated

brushes, and used rags, as per environmental law.

3.4.2.1 Dumpsters

Equip dumpsters with a secure cover. Keep cover closed at all times, except when being loaded with trash and debris. Locate dumpsters behind the construction fence or out of the public view. Empty site dumpsters at least once a week. or as needed to keep the site free of debris and trash. If necessary, provide 55 gallon trash containers to collect debris in the construction site area. Locate the trash containers behind the construction fence or out of the public view. Empty trash containers at least once a day. For large demolitions, large dumpsters without lids are acceptable but should not have debris higher than the sides before emptying.

3.5 WASTE DETERMINATION DOCUMENTATION

Complete a Waste Determination form for all contractor derived wastes to be generated. Base the waste determination upon either a constituent listing from the manufacturer used in conjunction with consideration of the process by which the waste was generated, EPA approved analytical data, or laboratory analysis (Material Safety Data Sheets (MSDS) by themselves are not adequate). Attach all support documentation to the Waste Determination form. At a minimum, a Waste Determination form must be provided for the following wastes (this listing is not all inclusive): oil and latex based painting and caulking products, solvents, adhesives, aerosols, petroleum products, and all containers of the original materials.

3.6 CONTRACTOR HAZARDOUS MATERIAL INVENTORY LOG

Submit the "Contractor Hazardous Material Inventory Log"(found at: http://www.wbdg.org/ccb/NAVGRAPH/graphtoc_log.pdf), which provides information required by (EPCRA Sections 312 and 313) along with corresponding Material Safety Data Sheets (MSDS) to the Contracting Officer at the start and at the end of construction (30 days from final acceptance), and update no later than January 31 of each calendar year during the life of the contract. Documentation for any spills/releases, environmental reports or off-site transfers may be requested by the Contracting Officer.

3.6.1 Disposal Documentation for Hazardous and Regulated Waste

Manifest, pack, ship and dispose of hazardous or toxic waste and universal waste that is generated as a result of construction in accordance with the generating facilities generator status under the Recourse Conservation and Recovery Act. Contact the Contracting Officer for the facility RCRA identification number that is to be used on each manifest.

Submit a copy of the applicable EPA and or State permit(s), manifest(s), or license(s) for transportation, treatment, storage, and disposal of hazardous and regulated waste by permitted facilities. Hazardous or toxic waste manifest must be reviewed, signed, and approved by the Navy before the Contractor may ship waste. To obtain specific disposal instructions the Contractor must coordinate with the Activity environmental office. Refer to Section 01 57 19.01 20 for the Activity Point of Contact information.

3.7 POLLUTION PREVENTION/HAZARDOUS WASTE MINIMIZATION

Minimize the use of hazardous materials and the generation of hazardous

waste. Include procedures for pollution prevention/ hazardous waste minimization in the Hazardous Waste Management Section of the Environmental Management Plan. Consult with the activity Environmental Office for suggestions and to obtain a copy of the installation's pollution prevention/hazardous waste minimization plan for reference material when preparing this part of the plan. If no written plan exists, obtain information by contacting the Contracting Officer. Describe the types of the hazardous materials expected to be used in the construction when requesting information.

3.8 WHM/HW MATERIALS PROHIBITION

No waste hazardous material or hazardous waste shall be disposed of on government property. No hazardous material shall be brought onto government property that does not directly relate to requirements for the performance of this contract. The government is not responsible for disposal of Contractor's waste material brought on the job site and not required in the performance of this contract. The intent of this provision is to dispose of that waste identified as waste hazardous material/hazardous waste as defined herein that was generated as part of this contract and existed within the boundary of the Contract limits and not brought in from offsite by the Contractor. Incidental materials used to support the contract including, but not limited to aerosol cans, waste paint, cleaning solvents, contaminated brushes, rags, clothing, etc. are the responsibility of the Contractor. The list is illustrative rather than inclusive. The Contractor is not authorized to discharge any materials to sanitary sewer, storm drain, or to the river or conduct waste treatment or disposal on government property without written approval of the Contracting Officer.

3.9 HAZARDOUS MATERIAL MANAGEMENT

No hazardous material shall be brought onto government property that does not directly relate to requirements for the performance of this contract.

Include hazardous material control procedures in the Safety Plan. Address procedures and proper handling of hazardous materials, including the appropriate transportation requirements. Submit a MSDS and estimated quantities to be used for each hazardous material to the Contracting Officer prior to bringing the material on base. Typical materials requiring MSDS and quantity reporting include, but are not limited to, oil and latex based painting and caulking products, solvents, adhesives, aerosol, and petroleum products. At the end of the project, provide the Contracting Officer with the maximum quantity of each material that was present at the site at any one time, the dates the material was present, the amount of each material that was used during the project, and how the material was used. Ensure that hazardous materials are utilized in a manner that will minimize the amount of hazardous waste that is generated. Ensure that all containers of hazardous materials have NFPA labels or their equivalent. Keep copies of the MSDS for hazardous materials on site at all times and provide them to the Contracting Officer at the end of the project. Certify that all hazardous materials removed from the site are hazardous materials and do not meet the definition of hazardous waste per 40 CFR 261.

3.10 PETROLEUM PRODUCTS AND REFUELING

Conduct the fueling and lubricating of equipment and motor vehicles in a manner that protects against spills and evaporation. Manage all used oil

generated on site in accordance with 40 CFR 279. Determine if any used oil generated while on-site exhibits a characteristic of hazardous waste. Used oil containing 1000 parts per million of solvents will be considered a hazardous waste and disposed of at Contractor's expense. Used oil mixed with a hazardous waste will also be considered a hazardous waste.

3.10.1 Oily and Hazardous Substances

Prevent oil or hazardous substances from entering the ground, drainage areas, or navigable waters. In accordance with 40 CFR 112, surround all temporary fuel oil or petroleum storage tanks with a temporary berm or containment of sufficient size and strength to contain the contents of the tanks, plus 10 percent freeboard for precipitation. The berm will be impervious to oil for 72 hours and be constructed so that any discharge will not permeate, drain, infiltrate, or otherwise escape before cleanup occurs.

3.10.2 Inadvertent Discovery of Petroleum Contaminated Soil or Hazardous Wastes

If petroleum contaminated soil or suspected hazardous waste is found during construction that was not identified in the contract documents, the contractor shall immediately notify the contracting officer. The contractor shall not disturb this material until authorized by the contracting officer.

3.11 FUEL TANKS

Petroleum products and lubricants required to sustain up to 30 days of construction activity may be kept on site. Storage and refilling practices shall comply with 40 CFR Part 112. Secondary containment shall be provided and be no less than 110 percent of the tank volume plus five inches of free-board. If a secondary berm is used for containment then the berm shall be impervious to oil for 72 hours and be constructed so that any discharge will not permeate, drain, infiltrate, or otherwise escape before cleanup occurs. Drips pans are required and the tanks must be covered during inclement weather.

3.12 RELEASES/SPILLS OF OIL AND HAZARDOUS SUBSTANCES

Exercise due diligence to prevent, contain, and respond to spills of hazardous material, hazardous substances, hazardous waste, sewage, regulated gas, petroleum, lubrication oil, and other substances regulated by environmental law. Maintain spill cleanup equipment and materials at the work site. In the event of a spill, take prompt, effective action to stop, contain, curtail, or otherwise limit the amount, duration, and severity of the spill/release. In the event of any releases of oil and hazardous substances, chemicals, or gases; immediately (within 15 minutes) notify the Base or Activity Fire Department, the activity's Command Duty Officer, and the Contracting Officer. If the contractor's response is inadequate, the Navy may respond. If this should occur, the contractor will be required to reimburse the government for spill response assistance and analysis.

The Contractor is responsible for verbal and written notifications as required by the federal 40 CFR 355, local regulations and Navy Instructions. Spill response will be in accordance with 40 CFR 300 and applicable local regulations. Contain and clean up these spills without cost to the Government. If Government assistance is requested or required,

the Contractor will reimburse the Government for such assistance. Provide copies of the written notification and documentation that a verbal notification was made within 20 days.

Maintain spill cleanup equipment and materials at the work site. Clean up all hazardous and non-hazardous (WHM) waste spills. The Contractor shall reimburse the government for all material, equipment, and clothing generated during any spill cleanup. The Contractor shall reimburse the government for all costs incurred including sample analysis materials, equipment, and labor if the government must initiate its own spill cleanup procedures, for Contractor responsible spills, when:

a. The Contractor has not begun spill cleanup procedure within one hour of spill discovery/occurrence, or

b. If, in the government's judgment, the Contractor's spill cleanup is not adequately abating life threatening situation and/or is a threat to any body of water or environmentally sensitive areas.

3.13 CONTROL AND MANAGEMENT OF HAZARDOUS WASTES

3.13.1 Facility Hazardous Waste Generator Status

Naval Activity Puerto Rico is designated as a Large Quantity Generator. All work conducted within the boundaries of this activity must meet the regulatory requirements of this generator designation. The Contractor will comply with all provisions of Federal, State and local regulatory requirements applicable to this generator status regarding training and storage, handling, and disposal of all construction derived wastes.

3.13.2 Hazardous Waste/Debris Management

Identify all construction activities which will generate hazardous waste/debris. Provide a documented waste determination for all resultant waste streams. Hazardous waste/debris will be identified, labeled, handled, stored, and disposed of in accordance with all Federal, State, and local regulations including 40 CFR 261, 40 CFR 262, 40 CFR 263, 40 CFR 264, 40 CFR 265, 40 CFR 266, and 40 CFR 268.

Hazardous waste will also be managed in accordance with the approved Hazardous Waste Management Section of the Environmental Protection Plan. Store hazardous wastes in approved containers in accordance with 49 CFR 173 and 49 CFR 178. Hazardous waste generated within the confines of Government facilities will be identified as being generated by the Government.

Prior to removal of any hazardous waste from Government property, all hazardous waste manifests must be signed by activity personnel from the Station Environmental Office. No hazardous waste will be brought onto Government property. Provide to the Contracting Officer a copy of waste determination documentation for any solid waste streams that have any potential to be hazardous waste or contain any chemical constituents listed in 40 CFR 372-SUBPART D. For hazardous wastes spills, verbally notify the Contracting Officer immediately.

3.13.2.1 Regulated Waste Storage/Satellite Accumulation/90 Day Storage Areas

If the work requires the temporary storage/collection of regulated or

hazardous wastes, the Contractor will request the establishment of a Regulated Waste Storage Area, a Satellite Accumulation Area, or a 90 Day Storage Area at the point of generation. The Contractor must submit a request in writing to the Contracting Officer providing the following information:

Contract Number	_____	Contractor	_____
Haz/Waste or Regulated Waste POC	_____	Phone Number	_____
Type of Waste	_____	Source of Waste	_____
Emergency POC	_____	Phone Number	_____

Location of the Site: _____
(Attach Site Plan to the Request)

Attach a waste determination form. Allow ten working days for processing this request. The designated area where waste is being stored shall be barricaded and a sign identifying as follows:

"DANGER - UNAUTHORIZED PERSONNEL KEEP OUT"

3.13.2.2 Sampling and Analysis of HW

a. Waste Sampling

Sample waste in accordance with EPA 530/F-93/004. Each sampled drum or container will be clearly marked with the Contractor's identification number and cross referenced to the chemical analysis performed.

b. Laboratory Analysis

Follow the analytical procedure and methods in accordance with the 40 CFR 261. The Contractor will provide all analytical results and reports performed to the Contracting Officer

c. Analysis Type

Identify waste hazardous material/hazardous waste by analyzing for the following properties as a minimum: ignitability, corrosiveness, total chlorides, BTU value, PCBs, TCLP for heavy metals, and cyanide.

3.13.2.3 Hazardous Waste Disposal

No hazardous, toxic, or universal waste shall be disposed or hazardous material abandoned on government property. And unless otherwise other wise noted in this contract, the government is not responsible for disposal of Contractor generated waste material. The disposal of incidental materials used to accomplish the work including, but not limited to aerosol cans, waste paint, cleaning solvents, contaminated brushes, rags, clothing, etc. are the responsibility of the Contractor. The list is illustrative rather than inclusive.

The Contractor is not authorized to discharge any materials to sanitary sewer, storm drain, or water way or conduct waste treatment or disposal on

government property without written approval of the Contracting Officer.

Control of stored waste, packaging, sampling, analysis, and disposal will be determined by the details in the contract. The requirements for jobs in the following paragraphs will be used as the guidelines for disposal of any hazardous waste generated.

a. Responsibilities for Contractor's Disposal

Contractor responsibilities include any generation of WHM/HW requiring Contractor disposal of solid waste or liquid.

(1) The Contractor agrees to provide all service necessary for the final treatment/disposal of the hazardous material/waste in accordance with all local, State and Federal laws and regulations, and the terms and conditions of the contract within sixty (60) days after the materials have been generated. These services will include all necessary personnel, labor, transportation, packaging, detailed analysis (if required for disposal, and/or transportation, including manifesting or completing waste profile sheets, equipment, and the compilation of all documentation is required).

(2) Contain all waste in accordance with 40 CFR 260, 40 CFR 261, 40 CFR 262, 40 CFR 263, 40 CFR 264, 40 CFR 265, 40 CFR 266, 40 CFR 268, 40 CFR 270, 40 CFR 272, 40 CFR 273, 40 CFR 279, 40 CFR 280, and 40 CFR 761.

(3) Obtaining a representative sample of the material generated for each job done to provide waste stream determination.

(4) Analyzing for each sample taken and providing analytical results to the Contracting Officer. Provide two copies of the results.

(5) Determine the DOT proper shipping names for all waste (each container requiring disposal) and will demonstrate how this determination is developed and supported by the sampling and analysis requirements contained herein to the Contracting Officer.

Contractor Disposal Turn-In Requirements

For any waste hazardous materials or hazardous waste generated which requires the Contractor to dispose of, the following conditions must be complied with in order to be acceptable for disposal:

1 Drums compatible with waste contents and drums meet DOT requirements for 49 CFR 173 for transportation of materials.

2 Drums banded to wooden pallets. No more than three (3) 55 gallon drums to a pallet, or two (2) 85 gallon over packs.

3 Band using 1-1/4 inch minimum band on upper third of drum.

4 Recovery materials label (provided by Code 106.321) located in middle of drum, filled out to indicate actual volume of material, name of material manufacturer, other vendor information as available.

5 Always have three (3) to five (5) inches of empty space above

volume of material. This space is called 'outage'.

3.13.3 Class I and II ODS Prohibition

Class I and II ODS as defined and identified herein will not be used in the performance of this contract, nor be provided as part of the equipment. This prohibition will be considered to prevail over any other provision, specification, drawing, or referenced documents. Regulations related to the protection of stratosphere ozone may be found in 40 CFR 82.

Heating and air conditioning technicians must be certified through an EPA-approved program. Copies of certifications shall be maintained at the employees' place of business and be carried as a wallet card by the technician, as provided by environmental law. Accidental venting of a refrigerant is a release and shall be reported to the Contracting Officer.

3.13.3.1 Universal Waste/e-Waste Management

Universal waste including but not limited to some mercury containing building products such florescent lamps, mercury vapor lamps, high pressure sodium lamps, CRTs, batteries, aerosol paint containers, electrical equipment containing PCBs, and consumed electronic devices, shall be managed in accordance with applicable environmental law and installation instructions.

3.14 DUST CONTROL

Keep dust down at all times, including during nonworking periods. Sprinkle or treat, with dust suppressants, the soil at the site, haul roads, and other areas disturbed by operations. Dry power brooming will not be permitted. Instead, use vacuuming, wet mopping, wet sweeping, or wet power brooming. Air blowing will be permitted only for cleaning nonparticulate debris such as steel reinforcing bars. Only wet cutting will be permitted for cutting concrete blocks, concrete, and bituminous concrete. Do not unnecessarily shake bags of cement, concrete mortar, or plaster.

3.14.1 Dirt and Dust Control Plan

Submit truck and material haul routes along with a plan for controlling dirt, debris, and dust on base roadways. As a minimum, identify in the plan the subcontractor and equipment for cleaning along the haul route and measures to reduce dirt, dust, and debris from roadways.

3.15 NOISE

Make the maximum use of low-noise emission products, as certified by the EPA. Blasting or use of explosives will not be permitted without written permission from the Contracting Officer, and then only during the designated times. Confine pile-driving operations to the period between 8 a.m. and 4 p.m., Monday through Friday, exclusive of holidays, unless otherwise specified.

3.16 MERCURY MATERIALS

Dumping of mercury-containing materials and devices such as mercury vapor lamps, fluorescent lamps, and mercury switches, in rubbish containers is prohibited. Remove without breaking, pack to prevent breakage, and transport out of the activity in an unbroken condition for disposal as directed. Immediately report to the Environmental Office and the

Contracting Officer instances of breakage or mercury spillage. Clean mercury spill area to the satisfaction of the Contracting Officer.

Cleanup of a mercury spill shall not be recycled and shall be managed as a hazardous waste for disposal.

-- End of Section --

SECTION 02 61 13

EXCAVATION AND HANDLING OF CONTAMINATED MATERIAL
09/10

PART 1 GENERAL

1.1 MEASUREMENT AND PAYMENT

1.1.1 Measurement

Measurement for excavation and on-site transportation shall be based on the actual number of cubic yards of contaminated material in-place prior to excavation. Determination of the volume of contaminated material excavated shall be based on cross-sectional volume determination reflecting the differential between the original elevations of the top of the contaminated material and the final elevations after removal of the contaminated material. Measurement for backfilling of excavated areas shall be based on in-place cubic yards of compacted fill. Measurement for construction of stockpile areas shall be based on the number of square yards of stockpile liner constructed.

1.1.2 Payment

1.1.2.1 Excavation and Transportation

Compensation for excavation and onsite transportation of contaminated material will be paid as a unit cost. This unit cost shall include any other items incidental to excavation and handling not defined as having a specific unit cost.

1.1.2.2 Backfilling

Compensation for backfill soil, transportation of backfill, backfill soil conditioning, backfilling, compaction, and geotechnical testing will be paid as a single unit cost.

1.1.2.3 Stockpiling

Compensation for construction of stockpile areas will be paid for as a unit cost. This unit cost shall include all aspects of grading, preparation, handling, placement, maintenance, removal, treatment, and disposal of stockpile cover materials and linear materials and all other items incidental to construction of stockpiles.

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Surveys; G

Separate cross-sections of each area before and after excavation and after backfilling.

SD-03 Product Data

Work Plan; G

Work Plan within 30 calendar days after notice to proceed. No work at the site, with the exception of site inspections and surveys, shall be performed until the Work Plan is approved. The Contractor shall allow 30 calendar days in the schedule for the Government's review. No adjustment for time or money will be made if resubmittals of the Work Plan are required due to deficiencies in the plan. At a minimum, the Work Plan shall include:

a. Schedule of activities.

b. Method of excavation and equipment to be used.

c. Shoring or side-wall slopes proposed.

d. Dewatering plan.

e. Storage methods and locations for liquid and solid contaminated material.

f. Borrow sources and haul routes.

g. Decontamination procedures.

h. Spill contingency plan.

Closure Report; G

Submit two copies of the Closure Report within 14 calendar days of work completion at the site.

SD-06 Test Reports

Backfill; G
Surveys; G
Confirmation Sampling and Analysis; G
Sampling of Stored Material; G
Sampling Liquid; G
Compaction; G
Test results.

1.3 SURVEYS

Surveys shall be performed immediately prior to and after excavation of contaminated material to determine the volume of contaminated material removed. Surveys shall also be performed immediately after backfill of each excavation. The Contractor shall provide cross-sections on 25 foot intervals and at break points for all excavated areas. Locations of confirmation samples shall also be surveyed and shown on the drawings.

1.4 REGULATORY REQUIREMENTS

1.4.1 Permits and Licenses

The Contractor shall obtain required federal, state, and local permits for excavation and storage of contaminated material. Permits shall be obtained at no additional cost to the Government.

1.4.2 Air Emissions

Air emissions shall be monitored and controlled in accordance with Section 01 57 19.00 20 TEMPORARY ENVIRONMENTAL CONTROLS.

1.5 DESCRIPTION OF WORK

The work shall consist of excavation and temporary storage of approximately 555 cubic yards of contaminated material. Approximate locations of contaminated material are shown on the drawings. Characterization data on the nature and extent of the contaminated material is shown on the contract drawings. The Contractor shall submit a Work Plan as specified in the Submittals paragraph. The Contracting Officer shall be notified within 24 hours, and before excavation, if contaminated material is discovered that has not been previously identified or if other discrepancies between data provided and actual field conditions are discovered. Backfill material is not available onsite. Ground water is approximately 6.69 to 14.65 feet below pre-excavation ground surface.

Excavation will not extend below 2 feet bgs, therefore groundwater should not be encountered. Should groundwater be encountered in the excavation, work will be stopped and specifications will be developed for dewatering, containerization, sampling, analysis, and disposal of the groundwater.

To avoid surface water contact with contaminated materials, the Contractor may employ devises such as water proof barriers or covers (plastic sheeting) or construct earthen berms to divert surface water away from construction areas. Excavated soil shall be deposited directly into appropriate waste storage containers with appropriate and adequate covers which will not be susceptible to collection of surface water.

1.6 CHEMICAL TESTING

Required sampling and chemical analysis shall be conducted in accordance with Section 01 35 45.00 10 CHEMICAL DATA QUALITY CONTROL.

1.7 SCHEDULING

The Contractor shall notify the Contracting Officer 10 calendar days prior to the start of excavation of contaminated material. The Contractor shall be responsible for contacting regulatory agencies in accordance with the applicable reporting requirements.

PART 2 PRODUCTS

2.1 BACKFILL

Backfill material shall be obtained from offsite sources approved by the Contracting Officer. Backfill shall be classified in accordance with ASTM D 2487 as GW, GP, GM, GC, SW, SP, SM, SC, and shall be free from roots and other organic matter, trash, debris, snow, ice or frozen materials.

Backfill material shall be tested for the parameters listed below at a frequency of once per 500 cubic yards. The material shall have a maximum ASTM D 4318 liquid limit of 35, maximum ASTM D 4318 plasticity index of 12 and maximum of 25 percent by weight passing ASTM 1140, No. 200 sieve. Backfill material shall be sampled at a frequency of one sample for every 3000 cubic yard of potential clean/backfill material.

2.2 SPILL RESPONSE MATERIALS

The Contractor shall provide appropriate spill response materials including, but not limited to the following: containers, adsorbents, shovels, and personal protective equipment. Spill response materials shall be available at all times when contaminated materials/wastes are being handled or transported. Spill response materials shall be compatible with the type of materials and contaminants being handled.

PART 3 EXECUTION

3.1 EXISTING STRUCTURES AND UTILITIES

No excavation shall be performed until site utilities have been field located. The Contractor shall take the necessary precautions to ensure no damage occurs to existing structures and utilities. Damage to existing structures and utilities resulting from the Contractor's operations shall be repaired at no additional cost to the Government. Utilities encountered that were not previously shown or otherwise located shall not be disturbed without approval from the Contracting Officer.

3.2 CLEARING

Clearing shall be performed to the limits shown on the drawings in accordance with Section 31 11 00 CLEARING AND GRUBBING.

3.3 CONTAMINATED MATERIAL REMOVAL

3.3.1 Excavation

Areas of contamination shall be excavated to the depth and extent shown on the drawings and not more than 0.2 feet beyond the depth and extent shown on the drawings unless directed by the Navy or his designated representative. Excavation shall be performed in a manner that will limit spills and the potential for contaminated material to be mixed with uncontaminated material. An excavation log describing visible signs of contamination encountered shall be maintained for each area of excavation. Excavation logs shall be prepared in accordance with ASTM D 5434.

3.3.2 Shoring

If workers must enter the excavation, it shall be evaluated, shored, sloped or braced as required by EM 385-1-1 and 29 CFR 1926 section 650.

3.3.3 Dewatering

Surface water shall be diverted to prevent entry into the excavation. Dewatering shall be limited to that necessary to assure adequate access, a safe excavation, prevent the spread of contamination, and to ensure that compaction requirements can be met. No dewatering shall be performed without prior approval of the Contracting Officer or his designated representative.

3.4 CONFIRMATION SAMPLING AND ANALYSIS

The Contracting Officer or his designated representative shall be present to inspect the removal of contaminated material from each site. After all material suspected of being contaminated has been removed, the excavation shall be examined for evidence of contamination. After all suspected contaminated material is removed, confirmation samples shall be collected and analyzed for the following contaminants:

Chemical Parameter	Action Level	Analytical Method
Copper	168 mg/kg	6010B (Inductively Coupled Plasma)
Lead	87 mg/kg	6010 (Inductively Coupled Plasma)
Zinc	120 mg/kg	6010 (Inductively Coupled Plasma)

Samples shall be collected at a frequency of one sample every 25 lineal feet from 0 to 2 ft. bgs. along each of the side walls or as directed by the Contracting Officer. A minimum of one sample shall be collected from the bottom and each side wall of the excavation. Based on test results, the Contractor shall propose any additional excavation which may be required to remove material which is contaminated above action levels. Additional excavation shall be subject to approval by the Contracting Officer or his designated representative. Locations of samples shall be marked in the field and documented on the as-built drawings.

3.5 CONTAMINATED MATERIAL STORAGE

Material shall be stockpiled awaiting test results.

3.5.1 Stockpiles

Stockpiles shall be constructed to isolate stored contaminated material from the environment. The maximum stockpile size shall be 1,000 cubic yards. Stockpiles shall be constructed to include:

a. A chemically resistant geomembrane liner free of holes and other damage. Non-reinforced geomembrane liners shall have a minimum thickness of 20 mils. Scrim reinforced geomembrane liners shall have a minimum weight of 40 lbs. per 1000 square feet. The ground surface on which the geomembrane is to be placed shall be free of rocks greater than 0.5 inches in diameter and any other object which could damage the membrane.

b. Berms surrounding the stockpile, a minimum of 12 inches in height. Vehicle access points shall also be bermed.

c. The liner system shall be sloped to allow collection of leachate. Storage and removal of liquid which collects in the stockpile, in accordance with paragraph Liquid Storage.

3.5.2 Liquid Storage

Liquid collected from excavations and stockpiles shall be temporarily stored in 55 gallon barrels or 500 gallon tanks.

3.6 SAMPLING

3.6.1 Sampling of Stored Material

Waste characterization samples shall be collected for the purpose of determining handling, transportation, and disposal requirements and for determining personal and environmental protection and monitoring requirements.

Collect soil characterization samples from each excavation area. One thoroughly mixed composite sample shall be collected for every 25 cubic yards or fraction thereof of material. The composite sample shall consist of six (6) grab samples representative of the material being sampled. The grab samples shall thoroughly mixed to obtain a relatively homogeneous mixture.

At a minimum, the characterization samples shall be analyzed for the following parameters (additional analyses may be required by the disposal facility):

1. TCLP Metals EPA Methods 7060, 7080, 7130, 7190, 7420, 7470, 7760, 7741

2. TCLP Volatiles - EPA Methods 8240

3. RCRA Characteristics - SW-846 9010, 1010, 9012, 9030

The soil shall contain no free liquid as demonstrated by EPA SW-846 Method 9095, plant filter liquids test.

3.7 SPILLS

In the event of a spill or release of a hazardous substance (as designated in 40 CFR 302), pollutant, contaminant, or oil (as governed by the Oil Pollution Act (OPA), 33 U.S.C. 2701 et seq.), the Contractor shall notify the Contracting Officer immediately. If the spill exceeds the reporting threshold, the Contractor shall follow the pre-established procedures as described in the Base Wide Contingency Plan for immediate reporting and containment. Immediate containment actions shall be taken to minimize the effect of any spill or leak. Cleanup shall be in accordance with applicable federal, state, and local regulations. As directed by the Contracting Officer, additional sampling and testing shall be performed to verify spills have been cleaned up. Spill cleanup and testing shall be done at no additional cost to the Government.

3.8 BACKFILLING

3.8.1 Confirmation Test Results

Excavations shall be backfilled immediately after all contaminated materials have been removed and confirmation test results have been approved. Backfill shall be placed and compacted to the lines and grades shown on the drawings.

3.8.2 Compaction

Approved backfill shall be placed in lifts with a maximum loose thickness of 6 inches. Soil shall be compacted to 85 percent of ASTM D 698 maximum dry density. Density tests shall be performed at a frequency of once per 2500

square feet per lift. A minimum of one density test shall be performed on each lift of backfill placed. Field in-place dry density shall be determined in accordance with ASTM D 1556.

3.9 DISPOSAL REQUIREMENTS

Offsite disposal of contaminated material shall be in accordance with Section 02 81 00 TRANSPORTATION AND DISPOSAL OF HAZARDOUS MATERIALS.

3.10 CLOSURE REPORT

Five copies of a Draft Closure Report shall be prepared and submitted within 45 calendar days of completing work at the site. The report shall be labeled with the contract number, project name, location, date, name of general Contractor, and the Corps of Engineers District contracting for the work. The Closure Report shall include the following information as a minimum:

a. A cover letter signed by a responsible company official certifies that all services involved have been performed in accordance with the terms and conditions of the contract documents and regulatory requirements.

b. A narrative report including, but not limited to, the following:

(1) site conditions, ground water elevation, and cleanup criteria;

(2) excavation logs;

(3) field screening readings;

(4) quantity of materials removed from each area of contamination;

(5) quantity of water/product removed during dewatering;

(6) sampling locations and sampling methods;

(7) sample collection data such as time of collection and method of preservation;

(8) sample chain-of-custody forms; and

(9) source of backfill.

c. Copies of all chemical and physical test results.

d. Copies of all manifests and land disposal restriction notifications.

e. Copies of all certifications of final disposal signed by the responsible disposal facility official.

f. Waste profile sheets.

g. Scale drawings showing limits of each excavation, limits of contamination, known underground utilities within 50 feet of

excavation, sample locations, and sample identification numbers. On-site stockpile, storage, treatment, loading, and disposal areas shall also be shown on the drawings.

h. Progress Photographs. Color photographs shall be used to document progress of the work. A minimum of four views of the site showing the location of the area of contamination, entrance/exit road, and any other notable site conditions shall be taken before work begins. After work has been started, activities at each work location shall be photographically recorded daily . Photographs shall be a minimum of 3 x 5 inches and shall include:

(1) Soil removal and sampling.

(2) Dewatering operations.

(3) Unanticipated events such as spills and the discovery of additional contaminated material.

(4) Contaminated material/water storage, handling, treatment, and transport.

(5) Site or task-specific employee respiratory and personal protection.

(6) Fill placement and grading.

(7) Post-construction photographs. After completion of work at each site, the Contractor shall take a minimum of four views of each excavation site.

A digital version of all photos shown in the report shall be included with the Closure Report. Photographs shall be a minimum of 3 inches by 5 inches and shall be mounted back-to-back in double face plastic sleeves punched to fit standard three ring binders. Each print shall have an information box attached. The box shall be typewritten and arranged as follows:

Project Name:	Direction of View:
Location:	Date/Time:
Photograph No.:	Description of View:

-- End of Section --

SECTION 02 81 00

TRANSPORTATION AND DISPOSAL OF HAZARDOUS MATERIALS
04/06

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.Publications are referenced in the text by basic designation only.

INTERNATIONAL AIR TRANSPORT ASSOCIATION (IATA)

IATA DGR	(2004) Dangerous Goods Regulations

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

40 CFR 261	Identification and Listing of Hazardous Waste
40 CFR 262	Standards Applicable to Generators of Hazardous Waste
40 CFR 263	Standards Applicable to Transporters of Hazardous Waste
40 CFR 264	Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities
40 CFR 265	Interim Status Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities
40 CFR 268	Land Disposal Restrictions
40 CFR 270	EPA Administered Permit Programs: The Hazardous Waste Permit Program
40 CFR 279	Standards for the Management of Used Oil
40 CFR 300	National Oil and Hazardous Substances Pollution Contingency Plan
40 CFR 302	Designation, Reportable Quantities, and Notification
49 CFR 107	Hazardous Materials Program Procedures
49 CFR 172	Hazardous Materials Table, Special Provisions, Hazardous Materials Communications, Emergency Response Information, and Training Requirements

49 CFR 173	Shippers - General Requirements for Shipments and Packagings
49 CFR 178	Specifications for Packagings

1.2 DEFINITIONS

1.2.1 Hazardous Material

A substance or material which has been determined by the Secretary of Transportation to be capable of posing an unreasonable risk to health, safety, and property when transported in commerce, and which has been so designated pursuant to the Hazardous Materials Transportation Act, 49 U.S.C. Appendix Section 1801 et seq. The term includes materials designated as hazardous materials under the provisions of 49 CFR 172, Sections .101 and .102 and materials which meet the defining criteria for hazard classes and divisions in 49 CFR 173. EPA designated hazardous wastes are also hazardous materials.

1.2.2 Hazardous Waste

A waste which meets criteria established in RCRA or specified by the EPA in 40 CFR 261 or which has been designated as hazardous by a RCRA authorized state program.

1.3 SUBMITTALS

The following shall be submitted in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-03 Product Data

On-site Hazardous Waste Management; G

Prior to start of work, a plan detailing the manner in which hazardous wastes shall be managed. Written documentation of weekly hazardous waste inspections shall be submitted on a monthly basis.

Notices of Non-Compliance and Notices of Violation

Notices of non-compliance or notices of violation, as specified.

SD-06 Test Reports

Recordkeeping; G

Information necessary to file state annual or EPA biennial reports for all hazardous waste transported, treated, stored, or disposed of under this contract. The Contractor shall not forward these data directly to the regulatory agency but to the Contracting Officer at the specified time. The submittal shall contain all the information necessary for filing of the formal reports in the form and format required by the governing Federal or state regulatory agency. A cover letter shall accompany the data to include the contract number, Contractor name, and project location.

Spill Response

In the event of a spill or release of a hazardous substance (as designated in 40 CFR 302), or pollutant or contaminant, or oil (as governed by the Oil Pollution Act (OPA), 33 U.S.C. 2701 et seq.), the Contractor shall notify the Contracting Officer immediately. If the spill exceeds a reporting threshold, the Contractor shall follow the pre-established procedures for immediate reporting to the Contracting Officer.

Exception Reports; G

In the event that a manifest copy documenting receipt of hazardous waste at the treatment, storage, and disposal facility is not received within 35 days of shipment initiation, the Contractor shall prepare and submit an exception report to the Contracting Officer within 37 days of shipment initiation. In the event that a manifest copy documenting receipt of PCB waste at the designated facility is not received within 35 days of shipment initiation, the Contractor shall prepare and submit an exception report to the Contracting Officer within 37 days of shipment initiation.

Packaging Notifications

In accordance with 49 CFR 178.2(c), the Contractor shall acquire the appropriate notifications from the package manufacturers or any other persons certifying compliance with the packaging provisions and provide these to the Government.

SD-07 Certificates

Certification

Copies of the current certificates of registration required by 49 CFR 107, Subpart G issued to the Contractor and/or subcontractors or written statements certifying exemption from these requirements.

Training; G

Documentation that employees preparing or transporting hazardous materials have been trained, tested, and certified per 49 CFR 172, Subpart H, including general security awareness requirements and where applicable, site-specific security plan requirements.

EPA Off-Site Policy

A letter certifying that EPA considers the facilities to be used for all off-site disposal to be acceptable in accordance with the Off-Site policy in 40 CFR 300, Section .440. This certification shall be provided for wastes from Resource Conservation and Recovery Act (RCRA), 42 U.S.C. 6901 et seq., sites as well as from Comprehensive Environmental Response Compensation and Liability Act (CERCLA), 42 U.S.C. 9601 et seq., responses. See Attachment A, sample certification, at the end of this section.

Certificates of Disposal

Certificates documenting the ultimate disposal, within 180

days of initial shipment. Receipt of these certificates will be required for final payment.

Shipping Documents and Packagings Certification; G

All transportation related shipping documents to the Contracting Officer or his designated representative, including draft hazardous waste manifests, for review a minimum of 14 days prior to anticipated pickup. Packaging assurances shall be furnished prior to transporting hazardous material; shall be furnished when shipments are originated; and "receipt copies" of hazardous waste manifests, PCB manifests and asbestos waste shipment records at the designated disposal facility shall be furnished not later than 35 days after acceptance of the shipment.

Waste Minimization; G

Written certification that waste minimization efforts have been undertaken to reduce the volume and toxicity of waste to the degree economically practicable and that the method of treatment, storage, or disposal selected minimizes threats to human health and the environment.

1.4 QUALIFICATIONS

1.4.1 Transportation and Disposal Coordinator

The Contractor shall designate, by position and title, one person to act as the Transportation and Disposal Coordinator (TDC) for this contract. The TDC shall serve as the single point of contact for all environmental regulatory matters and shall have overall responsibility for total environmental compliance at the site including, but not limited to, accurate identification and classification of hazardous waste and hazardous materials; determination of proper shipping names; identification of marking, labeling, packaging and placarding requirements; completion of waste profiles, hazardous waste manifests, asbestos waste shipment records, PCB manifests, bill of ladings, exception and discrepancy reports; and all other environmental documentation. The TDC shall have, at a minimum, one year of specialized experience in the management and transportation of hazardous waste and have been Department of Transportation certified under 49 CFR 172, Subpart H.

1.4.2 Training

The Contractor's hazardous materials employees shall be trained, tested, and certified to safely and effectively carry out their assigned duties in accordance with Section 01 35 29.13 HEALTH, SAFETY, AND EMERGENCY RESPONSE PROCEDURES FOR CONTAMINATED SITES. The Contractor's employees transporting hazardous materials or preparing hazardous materials for transportation, including samples, shall be trained, tested, and certified in accordance with 49 CFR 172, Subpart H, including security awareness and any applicable security plans. Where shipment of hazardous materials by air may be occurring, such as for sample shipments, the Contractor's hazardous material employees shall also be trained on IATA DGR. Contractor employees making determinations that shipments do not constitute DOT regulated hazardous materials shall also be trained, tested, and certified in accordance with 49 CFR 172, Subpart H.

1.4.3 Certification

The Contractor and/or subcontractors transporting hazardous materials shall possess a current certificate of registration issued by the Research and Special Programs Administration (RSPA), U.S. Department of Transportation, when required by 49 CFR 107, Subpart G.

1.5 LAWS AND REGULATIONS REQUIREMENTS

Work shall meet or exceed the minimum requirements established by Federal, state, and local laws and regulations which are applicable. These requirements are amended frequently and the Contractor shall be responsible for complying with amendments as they become effective. In the event that compliance exceeds the scope of work or conflicts with specific requirements of the contract, the Contractor shall notify the Contracting Officer immediately.

PART 2 PRODUCTS

2.1 MATERIALS

The Contractor shall provide all of the materials required for the packaging, labeling, marking, placarding and transportation of hazardous wastes and hazardous materials in conformance with Department of Transportation standards andand all applicable Federal, State, and local requirements. Details in this specification shall not be construed as establishing the limits of the Contractor's responsibility.

2.1.1 Packagings

The Contractor shall provide bulk and non-bulk containers for packaging hazardous materials/wastes consistent with the authorizations referenced in the Hazardous Materials Table in 49 CFR 172, Section .101, Column 8. Bulk and non-bulk packaging shall meet the corresponding specifications in 49 CFR 173 referenced in the Hazardous Materials Table, 49 CFR 172, Section .101. Each packaging shall conform to the general packaging requirements of Subpart B of 49 CFR 173, to the requirements of 49 CFR 178 at the specified packing group performance level, to the requirements of special provisions of column 7 of the Hazardous Materials Table in 49 CFR 172, Section .101, and shall be compatible with the material to be packaged as required by 40 CFR 262.

2.1.2 Markings

The Contractor shall provide markings for each hazardous material/waste package, freight container, and transport vehicle consistent with the requirements of 49 CFR 172, Subpart D and 40 CFR 262, Section .32 (for hazardous waste). Markings shall be capable of withstanding, without deterioration or substantial color change, a 180 day exposure to conditions reasonably expected to be encountered during container storage and transportation.

2.1.3 Labeling

The Contractor shall provide primary and subsidiary labels for hazardous materials/wastes consistent with the requirements in the Hazardous Materials Table in 49 CFR 172, Section .101, Column 6. Labels shall meet design specifications required by 49 CFR 172, Subpart E including size, shape, color, printing, and symbol requirements. Labels shall be durable

and weather resistant and capable of withstanding, without deterioration or substantial color change, a 180 day exposure to conditions reasonably expected to be encountered during container storage and transportation.

2.1.4 Placards

For each off-site shipment of hazardous material/waste, the Contractor shall provide primary and subsidiary placards consistent with the requirements of 49 CFR 172, Subpart F. Placards shall be provided for each side and each end of bulk packaging, freight containers, transport vehicles, and rail cars requiring such placarding. Placards may be plastic, metal, or other material capable of withstanding, without deterioration, a 30 day exposure to open weather conditions and shall meet design requirements specified in 49 CFR 172, Subpart F.

2.1.5 Spill Response Materials

The Contractor shall provide spill response materials including, but not limited to, containers, adsorbent, shovels, and personal protective equipment. Spill response materials shall be available at all times in which hazardous materials/wastes are being handled or transported. Spill response materials shall be compatible with the type of material being handled.

2.2 EQUIPMENT AND TOOLS

The Contractor shall provide miscellaneous equipment and tools necessary to handle hazardous materials and hazardous wastes in a safe and environmentally sound manner.

PART 3 EXECUTION

3.1 ON-SITE HAZARDOUS WASTE MANAGEMENT

These paragraphs apply to Government owned waste only. Contractors are prohibited by 10 U.S.C. 2692 from storing Contractor owned waste on site for any length of time. The Contractor shall be responsible for ensuring compliance with all Federal, state, and local hazardous waste laws and regulations and shall verify those requirements when preparing reports, waste shipment records, hazardous waste manifests, or other documents. The Contractor shall identify hazardous wastes using criteria set forth in 40 CFR 261 or all applicable state and local laws, regulations, and ordinances. When accumulating hazardous waste on-site, the Contractor shall comply with generator requirements in 40 CFR 262 and any applicable state or local law or regulations. On-site accumulation times shall be restricted to applicable time frames referenced in 40 CFR 262, Section .34 and any applicable state or local law or regulation. Accumulation start dates shall commence when waste is first generated (i.e. containerized or otherwise collected for discard). The Contractor shall only use containers in good condition and compatible with the waste to be stored. The Contractor shall be responsible for ensuring containers are closed except when adding or removing waste. The Contractor shall be responsible for immediately marking all hazardous waste containers with the words "hazardous waste" and other information required by 40 CFR 262, Section .32 and any applicable state or local law or regulation as soon as the waste is containerized. An additional marking shall be placed on containers of "unknowns" designating the date sampled, and the suspected hazard. The Contractor shall be responsible for inspecting containers for signs of deterioration and shall be responsible for responding to any spills or

leaks. The Contractor shall inspect all hazardous waste areas weekly and shall provide written documentation of the inspection. Inspection logs shall contain date and time of inspection, name of individual conducting the inspection, problems noted, and corrective actions taken.

3.1.1 Hazardous Waste Classification

The Contractor, waste generator, shall identify all waste codes applicable to each hazardous waste stream based on requirements in 40 CFR 261 or any applicable state or local law or regulation. The Contractor shall also identify all applicable treatment standards in 40 CFR 268 and state land disposal restrictions and shall make a determination as to whether or not the waste meets or exceeds the standards. Waste profiles, analyses, classification and treatment standards information shall be submitted to Contracting Officer for review and approval.

3.1.2 Management Plan

The Contractor shall prepare a plan detailing the manner in which hazardous wastes will be managed and describing the types and volumes of hazardous wastes anticipated to be managed as well as the management practices to be utilized. The plan shall identify the method to be used to ensure accurate piece counts and/or weights of shipments; shall identify waste minimization methods; shall propose facilities to be utilized for treatment, storage, and/or disposal; shall identify areas on-site where hazardous wastes are to be handled; shall identify whether transfer facilities are to be utilized; and if so, how the wastes will be tracked to ultimate disposal.

3.2 OFF-SITE HAZARDOUS WASTE MANAGEMENT

The Contractor shall use RCRA Subtitle C permitted facilities which meet the requirements of 40 CFR 264 or facilities operating under interim status which meet the requirements of 40 CFR 265. Off-site treatment, storage, and/or disposal facilities with significant RCRA violations or compliance problems (such as facilities known to be releasing hazardous constituents into ground water, surface water, soil, or air) shall not be used. The Contractor shall submit Notices of Non-Compliance and Notices of Violation by a Federal, state, or local regulatory agency issued to the Contractor in relation to any work performed under this contract. The Contractor shall immediately provide copies of such notices to the Contracting Officer. The Contractor shall also furnish all relevant documents regarding the incident and any information requested by the Contracting Officer, and shall coordinate its response to the notice with the Contracting Officer or his designated representative prior to submission to the notifying authority. The Contractor shall also furnish a copy to the Contracting Officer of all documents submitted to the regulatory authority, including the final reply to the notice, and all other materials, until the matter is resolved.

3.2.1 Treatment, Storage, and/or Disposal Facility and Transporter

The Contractor shall provide the Contracting Officer with EPA ID numbers, names, locations, and telephone numbers of TSD facilities and transporters. This information shall be contained in the Hazardous Waste Management Plan and shall be approved by the Contracting Officer prior to waste disposal.

3.2.2 Status of the Facility

Facilities receiving hazardous waste must be permitted in accordance with

40 CFR 270 or operating under interim status in accordance with 40 CFR 265 requirements, or must be permitted by a state authorized by the Environmental Protection Agency to administer the RCRA permit program. Additionally, prior to using a TSD Facility, the Contractor shall contact the EPA Regional Off-site Coordinator specified in 40 CFR 300, Section .440, to determine the facility's status, and document all information necessary to satisfy the requirements of the EPA Off-Site policy and furnish this information to the Contracting Officer.

3.2.3 Shipping Documents and Packagings Certification

Prior to shipment of any hazardous material off-site, the Contractor's TDC shall provide written certification to the Contracting Officer that hazardous materials have been properly packaged, labeled, and marked in accordance with Department of Transportation and EPA requirements. The Contractor's TDC shall also provide written certification regarding waste minimization efforts documenting that efforts have been taken to reduce the volume and toxicity of waste to the degree economically practicable and that the method of treatment, storage, or disposal selected minimizes threats to human health and the environment.

3.2.4 Transportation

Prior to conducting hazardous materials activities, the Contractor responsible for pre-transportation activities shall either certify to the Government that a Security Plan is in place which meets the requirements of 49 CFR 172, Subpart I or in the event that the types or amounts of hazardous materials are excluded from the security planning requirements, a written statement to that effect detailing the basis for the exception. The Contractor shall use manifests for transporting hazardous wastes as required by 40 CFR 263 or any applicable state or local law or regulation. Transportation shall comply with all requirements in the Department of Transportation referenced regulations in the 49 CFR series. The Contractor shall prepare hazardous waste manifests for each shipment of hazardous waste shipped off-site. Manifests shall be completed using instructions in 40 CFR 262, Subpart B and any applicable state or local law or regulation. Manifests and waste profiles shall be submitted to Contracting Officer for review and approval. The Contractor shall prepare land disposal restriction notifications as required by 40 CFR 268 or any applicable state or local law or regulation for each shipment of hazardous waste. Notifications shall be submitted with the manifest to the Contracting Officer for review and approval.

3.2.5 Treatment and Disposal of Hazardous Wastes

The hazardous waste shall be transported to an approved hazardous waste treatment, storage, or disposal facility within 90 days of the accumulation start date on each container. The Contractor shall ship hazardous wastes only to facilities which are properly permitted to accept the hazardous waste or operating under interim status. The Contractor shall ensure wastes are treated to meet land disposal treatment standards in 40 CFR 268 prior to land disposal. The Contractor shall propose TSD facilities via submission of the Hazardous Waste Management Plan, subject to the approval of the Contracting Officer. The Contractor shall submit Certificates of Disposal as specified in the Submittals paragraph.

3.3 HAZARDOUS MATERIALS MANAGEMENT

The Contractor, in consultation with the generator , shall evaluate, prior

to shipment of any material off-site, whether the material is regulated as a hazardous waste in addition to being regulated as a hazardous material; this shall be done for the purpose of determining proper shipping descriptions, marking requirements, etc., as described below.

3.3.1 Identification of Proper Shipping Names

The Contractor shall use 49 CFR 172, Section .101 to identify proper shipping names for each hazardous material (including hazardous wastes) to be shipped off-site. Proper shipping names shall be submitted to the Contracting Officer in the form of draft shipping documents for review and approval.

3.3.2 Packaging, Labeling, and Marking

The Contractor shall package, label, and mark hazardous materials/wastes using the specified materials and in accordance with the referenced authorizations. The Contractor shall mark each container of hazardous waste of 110 gallons or less with the following:

"HAZARDOUS WASTE - Federal Law Prohibits Improper Disposal.
If found, contact the nearest police or public safety authority or the U.S. Environmental Protection Agency.
Generator's name _____
Manifest Document Number _____".

3.3.3 Shipping Documents

The Contractor shall ensure that each shipment of hazardous material sent off-site is accompanied by properly completed shipping documents. This includes shipments of samples that may potentially meet the definition of a Department of Transportation regulated hazardous material.

3.3.3.1 Other Hazardous Material Shipment Documents

The Contractor shall prepare a bill of lading for each shipment of hazardous material which is not accompanied by a hazardous waste manifest or asbestos waste shipment record which fulfills the shipping paper requirements. The bill of lading shall satisfy the requirements of 49 CFR 172, Subpart C, and 40 CFR 279 if shipping used oil and any applicable state or local law or regulation, and shall be submitted to the Contracting Officer for review and approval. For laboratory samples and treatability study samples, the Contractor shall prepare bills of lading and other documentation as necessary to satisfy conditions of the sample exclusions in 40 CFR 261, Section .4(d) and (e) and any applicable state or local law or regulation. Bill of ladings requiring shipper's certifications will be signed by the Government.

3.4 OBTAINING EPA ID NUMBERS

The Contractor shall complete EPA Form 8700-12, Notification of Hazardous Waste Activity, and submit to the Contracting Officer for review and approval. The Contractor shall allow a minimum of 30 days for processing the application and assigning the EPA ID number. Shipment shall be made not earlier than one week after receipt of the EPA ID number.

3.5 SPILL RESPONSE

The Contractor shall respond to any spills of hazardous material or

hazardous waste which are in the custody or care of the Contractor, pursuant to this contract. Any direction from the Contracting Officer concerning a spill or release shall not be considered a change under the contract. The Contractor shall comply with all applicable requirements of Federal, state, or local laws or regulations regarding any spill incident.

3.6 EMERGENCY CONTACTS

The Contractor shall be responsible for complying with the emergency contact provisions in 49 CFR 172, Section .604. Whenever the Contractor ships hazardous materials, the Contractor shall provide a 24 hr emergency response contact and phone number of a person knowledgeable about the hazardous materials being shipped and who has comprehensive emergency response and incident mitigation information for that material, or has immediate access to a person who possesses such knowledge and information. The phone must be monitored on a 24 hour basis at all times when the hazardous materials are in transportation, including during storage incidental to transportation. The Contractor shall ensure that information regarding this emergency contact and phone number are placed on all hazardous material shipping documents. The Contractor shall designate an emergency coordinator and post the following information at areas in which hazardous wastes are managed:

a. The name of the emergency coordinator.

b. Phone number through which the emergency coordinator can be contacted on a 24 hour basis.

c. The telephone number of the local fire department.

d. The location of fire extinguishers and spill control materials.

Attachment A

SAMPLE OFF-SITE POLICY CERTIFICATION MEMO

Project/Contract #:_____

Waste Stream:_____

Primary TSD Facility, EPA ID # and Location: _____

Alter. TSD Facility, EPA ID # and Location:_____

EPA Region	Contact
II	(212) 637-4130

EPA representative contacted: _____

EPA representative phone number: _____

Date contacted: _____

Comment: _____

The above EPA representative was contacted on _____. As of that date the above sites were considered acceptable in accordance with the Off-Site Policy in 40 CFR 300.440.

Signature: _____ Date: _____

Phone number: _____

-- End of Section --

SECTION 31 11 00

CLEARING AND GRUBBING
04/06

PART 1 GENERAL

1.1 SUBMITTALS

Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-03 Product Data

SD-04 Samples

Tree wound paint

Herbicide

Submit samples in cans with manufacturer's label.

1.2 DELIVERY, STORAGE, AND HANDLING

Deliver materials to, store at the site, and handle in a manner which will maintain the materials in their original manufactured or fabricated condition until ready for use.

PART 2 PRODUCTS

2.1 TREE WOUND PAINT

Bituminous based paint of standard manufacture specially formulated for tree wounds.

PART 3 EXECUTION

3.1 PROTECTION

3.1.1 Roads and Walks

Keep roads and walks free of dirt and debris at all times.

3.1.2 Trees, Shrubs, and Existing Facilities

Protection shall be in accordance with Section 01 57 19.00 20, TEMPORARY ENVIRONMENTAL CONTROLS.

3.1.3 Utility Lines

Protect existing utility lines that are indicated to remain from damage. Notify the Contracting Officer immediately of damage to or an encounter with an unknown existing utility line. The Contractor shall be responsible for the repairs of damage to existing utility lines that are indicated or made known to the Contractor prior to start of clearing and grubbing operations. When utility lines which are to be removed are encountered within the area of operations, the Contractor shall notify the Contracting

Officer in ample time to minimize interruption of the service. Refer to Section 01 57 19.00 20, TEMPORARY ENVIRONMENTAL CONTROLS for additional utility protection.

3.2 CLEARING

Clearing shall consist of the felling, trimming, and cutting of trees into sections and the satisfactory disposal of the trees and other vegetation designated for removal, including downed timber, snags, brush, and rubbish occurring within the areas to be cleared. Clearing shall also include the removal and disposal of structures that obtrude, encroach upon, or otherwise obstruct the work. Trees, stumps, roots, brush, and other vegetation in areas to be cleared shall be cut off flush with or below the original ground surface, except such trees and vegetation as may be indicated or directed to be left standing. Trees designated to be left standing within the cleared areas shall be trimmed of dead branches 1-1/2 inches or more in diameter and shall be trimmed of all branches the heights indicated or directed. Limbs and branches to be trimmed shall be neatly cut close to the bole of the tree or main branches. Cuts more than 1-1/2 inches in diameter shall be painted with an approved tree-wound paint.

3.3 TREE REMOVAL

Where indicated or directed, trees and stumps that are designated as trees shall be removed from areas outside those areas designated for clearing and grubbing.

3.4 GRUBBING

Grubbing shall consist of the removal and disposal of stumps, roots larger than 3 inches in diameter, and matted roots from the designated grubbing areas. Material to be grubbed, together with logs and other organic or metallic debris not suitable for foundation purposes, shall be removed to a depth of not less than 18 inches below the original surface level of the ground in areas indicated to be grubbed and in areas indicated as construction areas under this contract, such as areas for buildings, and areas to be paved. Depressions made by grubbing shall be filled with suitable material and compacted to make the surface conform with the original adjacent surface of the ground.

3.5 DISPOSAL OF MATERIALS

3.5.1 Nonsaleable Materials

Logs, stumps, roots, brush, rotten wood, and other refuse from the clearing and grubbing operations, except for salable timber, shall be disposed of at an off site Landfill.

-- End of Section --

SECTION 31 23 00.00 20

EXCAVATION AND FILL
04/06

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

ASTM INTERNATIONAL (ASTM)

ASTM C 136	(2006) Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates
ASTM C 33	(2003) Standard Specification for Concrete Aggregates
ASTM D 1140	(2000; R 2006) Amount of Material in Soils Finer than the No. 200 (75-micrometer) Sieve
ASTM D 1556	(2007) Density and Unit Weight of Soil in Place by the Sand-Cone Method
ASTM D 1557	(2007) Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3) (2700 kN-m/m3)
ASTM D 2487	(2006) Soils for Engineering Purposes (Unified Soil Classification System)
ASTM D 2922	(2005) Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)
ASTM D 3017	(2005) Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth)
ASTM D 698	(2007e1) Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/cu. ft. (600 kN-m/cu. m.))

U.S. ENVIRONMENTAL PROTECTION AGENCY (EPA)

EPA 530/F-93/004	(1993; Rev O; Updates I, II, IIA, IIB, and III) Test Methods for Evaluating Solid Waste (Vol IA, IB, IC, and II) (SW-846)
EPA 600/4-79/020	(1983) Methods for Chemical Analysis of Water and Wastes

1.2 DEFINITIONS

1.2.1 Degree of Compaction

Degree of compaction is expressed as a percentage of the maximum density obtained by the test procedure presented in ASTM D 698, for general soil types, abbreviated as percent laboratory maximum density.

1.2.2 Hard Materials

Weathered rock, dense consolidated deposits, or conglomerate materials which are not included in the definition of "rock" but which usually require the use of heavy excavation equipment, ripper teeth, or jack hammers for removal.

1.2.3 Rock

Solid homogeneous interlocking crystalline material with firmly cemented, laminated, or foliated masses or conglomerate deposits, neither of which can be removed without systematic drilling and blasting, drilling and the use of expansion jacks or feather wedges, or the use of backhoe-mounted pneumatic hole punchers or rock breakers; also large boulders, buried masonry, or concrete other than pavement exceeding 1/2 cubic yard in volume. Removal of hard material will not be considered rock excavation because of intermittent drilling and blasting that is performed merely to increase production.

1.3 SUBMITTALS

The following shall be submitted in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Shoring and Sheeting Plan

Dewatering work plan

Blasting work plan

Submit 15 days prior to starting work.

SD-06 Test Reports

Borrow Site Testing; G

Fill and backfill test

Select material test

Density tests

Copies of all laboratory and field test reports within 24 hours of the completion of the test.

1.4 DELIVERY, STORAGE, AND HANDLING

Perform in a manner to prevent contamination or segregation of materials.

1.5 CRITERIA FOR BIDDING

Base bids on the following criteria:

a. Surface elevations are as indicated.

b. Pipes or other artificial obstructions, except those indicated, will not be encountered.

c. Ground water elevations indicated by the boring log were those existing at the time subsurface investigations were made and do not necessarily represent ground water elevation at the time of construction.

d. Ground water elevation is approximately 6.69 to 14.65 feet below existing surface elevation.

   Excavation will not extend below 2 feet bgs, therefore groundwater should not be encountered. Should groundwater be encountered in the excavation, work will be stopped and specifications will be developed for dewatering, containerization, sampling, analysis, and disposal of the groundwater.

   To avoid surface water contact with contaminated materials, the Contractor may employ devises such as water proof barriers or covers (plastic sheeting) or construct earthen berms to divert surface water away from construction areas. Excavated soil shall be deposited directly into appropriate waste storage containers with appropriate and adequate covers which will not be susceptible to collection of surface water.

e. Material character is indicated by the boring logs.

f. Blasting will not be permitted. Remove material in an approved manner.

1.6 REQUIREMENTS FOR OFF SITE SOIL

Soils brought in from off site for use as backfill shall be tested for TPH, BTEX and full TCLP including ignitability, corrosivity and reactivity. Backfill shall contain less than 100 parts per million (ppm) of total petroleum hydrocarbons (TPH) and less than 15 ppm of the sum of Benzene, Toluene, Ethyl Benzene, and Xylene (BTEX) and shall not fail the TCLP test. TPH concentrations shall be determined by using EPA 600/4-79/020 Method 418.1. BTEX concentrations shall be determined by using EPA 530/F-93/004 Method 5030/8020. TCLP shall be performed in accordance with EPA 530/F-93/004 Method 1311. Provide Borrow Site Testing for TPH, BTEX and TCLP from a composite sample of material from the borrow site, with at least one test from each borrow site. Material shall not be brought on site until tests have been approved by the Contracting Officer.

1.7 QUALITY ASSURANCE

1.7.1 Shoring and Sheeting Plan

Provide shoring, bracing, cribbing, underpinning, and sheeting in accordance with COE EM-385-1-1, except that banks may only be sloped when approved by the Contracting Officer.

1.7.2 Dewatering Work Plan

Provide for the collection and disposal of surface and subsurface water encountered during construction.

PART 2 PRODUCTS

2.1 SOIL MATERIALS

2.1.1 Satisfactory Materials

Any materials classified by ASTM D 2487 as GW, GP, GM, GP-GM, GW-GM, GC, GP-GC, GM-GC, SW, SP, free of debris, roots, wood, scrap material, vegetation, refuse, soft unsound particles, and deleterious, or objectionable materials. Unless specified otherwise, the maximum particle diameter shall be one-half the lift thickness at the intended location.

2.1.2 Unsatisfactory Materials

Materials which do not comply with the requirements for satisfactory materials. Unsatisfactory materials also include man-made fills, trash, refuse, or backfills from previous construction. Unsatisfactory material also includes material classified as satisfactory which contains root and other organic matter, frozen material, and stones larger than 6 inches. The Contracting Officer shall be notified of any contaminated materials.

2.1.3 Common Fill

Approved, unclassified soil material with the characteristics required to compact to the soil density specified for the intended location.

2.1.4 Backfill and Fill Material

ASTM D 2487, classification GW, GP, GM, GC, SW, SP, SM, with a maximum ASTM D 4318 liquid limit of 35, maximum ASTM D 4318 plasticity index of 12, and a maximum of 25 percent by weight passing ASTM D 1140, No. 200 sieve.

2.1.5 Select Material

Test select material in accordance with ASTM C 136 for conformance to ASTM D 2487 gradation limits, ASTM 1140 for material finer than the No. 200 sieve; ASTM D 698 or ASTM D 1557 for moisture density relations, as applicable.

2.1.6 Topsoil

Natural, friable soil representative of productive, well-drained soils in the area, free of subsoil, stumps, rocks larger than one inch diameter, brush, weeds, toxic substances, and other material detrimental to plant growth. Amend topsoil pH range to obtain a pH of 5.5 to 7.

PART 3 EXECUTION

3.1 PROTECTION

3.1.1 Drainage and Dewatering

Provide for the collection and disposal of surface and subsurface water encountered during construction.

3.1.1.1 Drainage

So that construction operations progress successfully, completely drain construction site during periods of construction to keep soil materials sufficiently dry. The Contractor shall establish/construct storm drainage features at the earliest stages of site development, and throughout construction grade the construction area to provide positive surface water runoff away from the construction activity and/or provide temporary ditches, swales, and other drainage features and equipment as required to maintain dry soils, prevent erosion and undermining of foundations. When unsuitable working platforms for equipment operation and unsuitable soil support for subsequent construction features develop, remove unsuitable material and provide new soil material as specified herein. It is the responsibility of the Contractor to assess the soil and ground water conditions presented by the plans and specifications and to employ necessary measures to permit construction to proceed. Excavated slopes and backfill surfaces shall be protected to prevent erosion and sloughing. Excavation shall be performed so that the site, the area immediately surrounding the site, and the area affecting operations at the site shall be continually and effectively drained.

3.1.1.2 Dewatering

Groundwater flowing toward or into excavations shall be controlled to prevent sloughing of excavation slopes and walls, boils, uplift and heave in the excavation and to eliminate interference with orderly progress of construction. French drains, sumps, ditches or trenches will not be permitted within 3 feet of the foundation of any structure, except with specific written approval, and after specific contractual provisions for restoration of the foundation area have been made. Control measures shall be taken by the time the excavation reaches the water level in order to maintain the integrity of the in situ material.

Operate dewatering system continuously until construction work below existing water levels is complete. Submit performance records weekly. Measure and record performance of dewatering system at same time each day by use of observation wells or piezometers installed in conjunction with the dewatering system. Relieve hydrostatic head in previous zones below subgrade elevation in layered soils to prevent uplift.

3.1.2 Machinery and Equipment

Movement of construction machinery and equipment over pipes during construction shall be at the Contractor's risk. Repair, or remove and provide new pipe for existing or newly installed pipe that has been displaced or damaged.

3.2 SURFACE PREPARATION

3.2.1 Clearing and Grubbing

Execute as specified in Section 31 11 00.

3.2.2 Unsuitable Material

Remove vegetation, debris, decayed vegetable matter, sod, mulch, and rubbish underneath paved areas or concrete slabs.

3.3 EXCAVATION

Excavate to contours, elevation, and dimensions indicated. Keep excavations free from water. Excavate soil disturbed or weakened by Contractor's operations, soils softened or made unsuitable for subsequent construction due to exposure to weather. Refill with backfill and fill material and compact to 95 percent of ASTM D 698 maximum density. Unless specified otherwise, refill excavations cut below indicated depth with backfill and fill material and compact to 95 percent of ASTM D 698 maximum density.

3.4 FILLING AND BACKFILLING

Fill and backfill to contours, elevations, and dimensions indicated. Compact each lift before placing overlaying lift.

3.4.1 Common Fill Placement

Provide for general site. Place in 6 inch lifts. Compact areas not accessible to rollers or compactors with mechanical hand tampers. Aerate material excessively moistened by rain to a satisfactory moisture content. Finish to a smooth surface by blading, rolling with a smooth roller, or both.

3.4.2 Backfill and Fill Material Placement

Provide for paved areas and under concrete slabs, except where select material is provided. Place in 6 inch lifts.

3.4.3 Select Material Placement

Provide under structures not pile supported. Place in 6 inch lifts. Do not place over wet or frozen areas. Backfill adjacent to structures shall be placed as structural elements are completed and accepted. Backfill against concrete only when approved. Place and compact material to avoid loading upon or against structure.

3.5 COMPACTION

3.5.1 General Site

Compact underneath areas designated for vegetation and areas outside the 5 foot line of the paved area or structure to 85 percent of ASTM D 698.

3.5.2 Structures, Spread Footings, and Concrete Slabs

Compact top 12 inches of subgrades to 95 percent of ASTM D 698. Compact fill and backfill material to 95 percent of ASTM D 698.

3.5.3 Adjacent Area

Compact areas within 5 feet of structures to 85 percent of ASTM D 698.

3.6 FINISH OPERATIONS

3.6.1 Grading

Finish grades as indicated within one-tenth of one foot. Grade areas to drain water away from structures. Maintain areas free of trash and

debris. For existing grades that will remain but which were disturbed by Contractor's operations, grade as directed.

3.6.2 Seed

Provide as specified in Section 32 92 19 SEEDING.

3.6.3 Protection of Surfaces

Protect newly backfilled, graded, and topsoiled areas from traffic, erosion, and settlements that may occur. Repair or reestablish damaged grades, elevations, or slopes.

3.7 DISPOSITION OF SURPLUS MATERIAL

Remove from Government property surplus or other soil material not required or suitable for filling or backfilling, and brush, refuse, stumps, roots, and timber.

3.8 FIELD QUALITY CONTROL

3.8.1 Sampling

Take the number and size of samples required to perform the tests as described in the following paragraphs:.

3.8.2 Testing

Perform one of each of the following tests for each material used. Provide additional tests for each source change.

3.8.2.1 Fill and Backfill Material Testing

Test fill and backfill material in accordance with ASTM C 136 for conformance to ASTM D 2487 gradation limits; ASTM D 1140 for material finer than the No. 200 sieve; ASTM D 4318 for liquid limit and for plastic limit; ASTM D 698 or ASTM D 1557 for moisture density relations, as applicable.

3.8.2.2 Select Material Testing

Test select material in accordance with ASTM C 136 for conformance to ASTM D 2487 gradation limits; ASTM D 1140 for material finer than the No. 200 sieve; ASTM D 698 or ASTM D 1557 for moisture density relations, as applicable.

3.8.2.3 Porous Fill Testing

Test porous fill in accordance with ASTM C 136 for conformance to gradation specified in ASTM C 33.

3.8.2.4 Density Tests

Test density in accordance with ASTM D 1556, or ASTM D 2922 and ASTM D 3017. When ASTM D 2922 and ASTM D 3017 density tests are used, verify density test results by performing an ASTM D 1556 density test at a location already ASTM D 2922 and ASTM D 3017 tested as specified herein. Perform an ASTM D 1556 density test at the start of the job, and for every 10 ASTM D 2922 and ASTM D 3017 density tests thereafter. Test each lift at randomly selected locations every 2500 square feet of existing grade in

fills for structures and concrete slabs, and every 2500 square feet for other fill areas .

3.8.2.5 Moisture Content Tests

In the stockpile, excavation or borrow areas, a minimum of two tests per day per type of material or source of materials being placed is required during stable weather conditions. During unstable weather, tests shall be made as dictated by local conditions and approved moisture content shall be tested in accordance with ASTM D 2216. Include moisture content test results in daily report.

-- End of Section --

SECTION 32 92 19

SEEDING
10/06

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM INTERNATIONAL (ASTM)

ASTM D 4972	(2001; R 2007) pH of Soils

U.S. DEPARTMENT OF AGRICULTURE (USDA)

AMS Seed Act	(1940; R 1988; R 1998) Federal Seed Act
DOA SSIR 42	(1996) Soil Survey Investigation Report No. 42, Soil Survey Laboratory Methods Manual, Version 3.0

1.2 DEFINITIONS

1.2.1 Stand of Turf

95 percent ground cover of the established species.

1.3 SUBMITTALS

The following shall be submitted in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-03 Product Data

Wood cellulose fiber mulch

Fertilizer

Include physical characteristics, and recommendations.

SD-06 Test Reports

Topsoil composition tests (reports and recommendations).

SD-07 Certificates

State certification and approval for seed

SD-08 Manufacturer's Instructions

Erosion Control Materials

1.4 DELIVERY, STORAGE, AND HANDLING

1.4.1 Delivery

1.4.1.1 Seed Protection

Protect from drying out and from contamination during delivery, on-site storage, and handling.

1.4.1.2 Fertilizer Delivery

Deliver to the site in original, unopened containers bearing manufacturer's chemical analysis, name, trade name, trademark, and indication of conformance to state and federal laws. Instead of containers, fertilizer may be furnished in bulk with certificate indicating the above information.

1.4.2 Storage

1.4.2.1 Seed and Fertilizer Storage

Store in cool, dry locations away from contaminants.

1.4.2.2 Topsoil

Prior to stockpiling topsoil, treat growing vegetation with application of appropriate specified non-selective herbicide. Clear and grub existing vegetation three to four weeks prior to stockpiling topsoil.

1.4.2.3 Handling

Do not drop or dump materials from vehicles.

1.5 TIME RESTRICTIONS AND PLANTING CONDITIONS

1.5.1 Restrictions

Do not plant when the ground is muddy, or when air temperature exceeds 90 degrees Fahrenheit.

1.6 TIME LIMITATIONS

1.6.1 Seed

Apply seed within twenty four hours after seed bed preparation.

PART 2 PRODUCTS

2.1 SEED

2.1.1 Classification

Provide State-certified seed of the latest season's crop delivered in original sealed packages, bearing producer's guaranteed analysis for percentages of mixtures, purity, germination, weedseed content, and inert material. Label in conformance with AMS Seed Act and applicable state seed laws. Wet, moldy, or otherwise damaged seed will be rejected. Field mixes will be acceptable when field mix is performed on site in the presence of the Contracting Officer.

2.1.2 Seed Mixture by Weight

Planting Season	Variety	Percent (by Weight)
Spring/Summer	Common Bermuda	100
Fall/Winter	Common Bermuda	100

2.2 TOPSOIL

2.2.1 On-Site Topsoil

Surface soil stripped and stockpiled on site and modified as necessary to meet the requirements specified for topsoil in paragraph entitled "Composition." When available topsoil shall be existing surface soil stripped and stockpiled on-site in accordance with Section 31 23 00.00 20 EXCAVATION AND FILL.

2.2.2 Off-Site Topsoil

Conform to requirements specified in paragraph entitled "Composition." Additional topsoil shall be furnished by the Contractor.

2.2.3 Composition

Containing from 5 to 10 percent organic matter as determined by the topsoil composition tests of the Organic Carbon, 6A, Chemical Analysis Method described in DOA SSIR 42. Maximum particle size, 3/4 inch, with maximum 3 percent retained on 1/4 inch screen. The pH shall be tested in accordance with ASTM D 4972. Topsoil shall be free of sticks, stones, roots, and other debris and objectionable materials. Other components shall conform to the following limits:

Silt	25-50 percent
Clay	10-30 percent
Sand	20-35 percent
pH	5.5 to 7.0
Soluble Salts	600 ppm maximum

2.3 FERTILIZER

2.3.1 Granular Fertilizer

Granular controlled release fertilizer containing the following minimum percentages, by weight, of plant food nutrients:

16 percent available nitrogen
7 percent available phosphorus
12 percent available potassium

2 percent iron

2.4 SURFACE TOP DRESSING

Free from noxious weeds, mold, and other deleterious materials.

2.4.1 Hay

Air-dry condition and of proper consistency for placing with commercial

mulch blowing equipment. Hay shall be sterile, containing no fertile seed.

2.5 WATER

Source of water shall be approved by Contracting Officer and of suitable quality for irrigation, containing no elements toxic to plant life.

2.6 EROSION CONTROL MATERIALS

Erosion control material shall conform to the following:

2.6.1 Erosion Control Blanket

70 percent agricultural straw/30 percent coconut fiber matrix stitched with a degradable nettings, designed to degrade within 18 months.

2.6.2 Erosion Control Fabric

Fabric shall be knitted construction of polypropylene yarn with uniform mesh openings 3/4 to 1 inch square with strips of biodegradable paper. Filler paper strips shall have a minimum life of 6 months.

2.6.3 Erosion Control Net

Net shall be heavy, twisted jute mesh, weighing approximately 1.22 pounds per linear yard and 4 feet wide with mesh openings of approximately 1 inch square.

2.6.4 Erosion Control Material Anchors

Erosion control anchors shall be as recommended by the manufacturer.

PART 3 EXECUTION

3.1 PREPARATION

3.1.1 EXTENT OF WORK

Provide soil preparation (including soil conditioners as required), fertilizing, seeding, and surface topdressing of all newly graded finished earth surfaces, unless indicated otherwise, and at all areas inside or outside the limits of construction that are disturbed by the Contractor's operations.

3.1.1.1 Topsoil

Provide 6 inches of off-site topsoil to meet indicated finish grade. After areas have been brought to indicated finish grade, incorporate fertilizer into soil a minimum depth of 6 inches by disking, harrowing, tilling or other method approved by the Contracting Officer. Remove debris and stones larger than 3/4 inch in any dimension remaining on the surface after finish grading. Correct irregularities in finish surfaces to eliminate depressions. Protect finished topsoil areas from damage by vehicular or pedestrian traffic.

3.1.1.2 Fertilizer Application Rates

Apply fertilizer at rates as determined by laboratory soil analysis of the soils at the job site. For bidding purposes only apply at rates for the

following:

Organic Granular Fertilizer 400 pounds per acre.

3.2 SEEDING

3.2.1 Seed Application Seasons and Conditions

Immediately before seeding, restore soil to proper grade. Do not seed when ground is muddy or in an unsatisfactory condition for seeding. If special conditions exist that may warrant a variance in the above seeding dates or conditions, submit a written request to the Contracting Officer stating the special conditions and proposed variance. Apply seed within twenty four hours after seedbed preparation. Sow seed by approved sowing equipment. Sow one-half the seed in one direction, and sow remainder at right angles to the first sowing.

3.2.2 Broadcast and Drop Seeding

Use broadcast or drop seeders. Sow one-half the seed in one direction, and sow remainder at right angles to the first sowing. Cover seed uniformly to a maximum depth of 1/4 inch in clay soils and 1/2 inch in sandy soils by means of spike-tooth harrow, cultipacker, raking or other approved devices.

3.2.3 Mulching

3.2.3.1 Hay or Straw Mulch

Hay or straw mulch shall be spread uniformly at the rate of 2 tons per acre. Mulch shall be spread by hand, blower-type mulch spreader, or other approved method. Mulching shall be started on the windward side of relatively flat areas or on the upper part of steep slopes, and continued uniformly until the area is covered. The mulch shall not be bunched or clumped. Sunlight shall not be completely excluded from penetrating to the ground surface. All areas installed with seed shall be mulched on the same day as the seeding. Mulch shall be anchored immediately following spreading.

3.2.4 Erosion Control Material

Install in accordance with manufacturer's instructions, where indicated or as directed by the Contracting Officer.

3.2.5 Watering

Start watering areas seeded as required by temperature and wind conditions. Apply water at a rate sufficient to insure thorough wetting of soil to a depth of 6 inches without run off. During the germination process, seed is to be kept actively growing and not allowed to dry out.

3.3 PROTECTION OF TURF AREAS

Immediately after turfing, protect area against traffic and other use.

3.4 RESTORATION

Restore to original condition existing turf areas which have been damaged during turf installation operations at the Contractor's expense. Keep clean at all times at least one paved pedestrian access route and one paved

vehicular access route to each building. Clean other paving when work in adjacent areas is complete.

-- End of Section --

REVISED FINAL CORRECTIVE MEASURES IMPLEMENTATION WORK PLAN SWMU 68

For NAVAL ACTIVITY PUERTO RICO
EPA I.D. No. PR2170027203
CEIBA, PUERTO RICO

Prepared for:

Department of the Navy
NAVFAC SOUTHEAST
North Charleston, South Carolina

Contract No. N69450-08-C-0093

September 3, 2010

Prepared by:

Right Way Environmental
Contractors, Inc.
Naranjito, Puerto Rico

Corrective Action for SWMUs 14, 56, 68, and 69
Naval Activity Puerto Rico, Ceiba, Puerto Rico

REVISED FINAL

CORRECTIVE MEASURES IMPLEMENTATION WORK PLAN
SWMU 68

NAVAL ACTIVITY PUERTO RICO
EPA I.D. NO. PR2170027203
CEIBA, PUERTO RICO

SEPTEMBER 3, 2010

Prepared for:

DEPARTMENT OF THE NAVY
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North Charleston, SC

Under:

Contract No. N69450-08-C-0093

Prepared by:

RIGHT WAY ENVIRONMENTAL CONTRACTORS, INC.
Naranjito, Puerto Rico 00719

I certify under penalty of law that I have examined and am familiar with the information submitted in this document and all attachments and that this document and its attachments were prepared either by me personally or under my direction or supervision in a manner designed to ensure that qualified and knowledgeable personnel properly gather and present the information contained therein. I further certify, based on my personal knowledge or on my inquiry of those individuals immediately responsible for obtaining the information, that the information is true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowingly and willfully submitting a materially false statement.

Signature: Mark E. Davidson

Name: **Mark E. Davidson**

Title: **BRAC Env. Coordinator**

Date: **September 3, 2010**

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Appendix B – Organizational Chart

Appendix C – Sampling and Analysis Plan

Appendix D – Quality Control Forms

Appendix E – Submittal Register

Appendix F – Project Schedule

Appendix G – Site Specific Health and Safety Plan

LIST OF ACRONYMS AND ABBREVIATIONS

AHA	Activity Hazard Analysis
ANSI	American National Standards Institute
APA	Aerial Photography Analysis
Baker	Michael Baker Jr., Inc.
bgs	below ground surface
BOD	Basis of Design
BRAC	Base Realignment and Closure
CAOs	Corrective Action Objectives
CD	Construction Debris
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CERFA	Community Environmental Response Facilitation Act
CFR	Code of Federal Regulations
CIH	Certified Industrial Hygienist
CMI	Corrective Measures Implementation
CMS	Corrective Measures Study
CO	Contracting Officer
COC	Contaminant of Concern
COE	US Army Corps of Engineers
COR	Contracting Officer's Representative
CQC	Contractor Quality Control
CY	Cubic Yards
DFW	Definable Features of Work
DI	Deionized
DPW	Department of Public Works
DQCR	Data Quality Control Report
ECP	Environmental Condition of Property
EM	Engineering Manual
EQB	Puerto Rico Environmental Quality Board
FVR	Field Variance Report
kg	kilogram
LANTDIV	Naval Facilities Engineering Command, Atlantic Division
mg	Milligram
NAPR	Naval Activity Puerto Rico
NAVFAC	Naval Facilities Engineering Command Atlantic Division
NCR	Nonconformance Report
NDE	nondestructive Examination
NEPA	National Environmental Policy Act
NPDES	National Pollutant Discharge Elimination System

LIST OF ACRONYMS AND ABBREVIATIONS
(continued)

NSRR	Naval Station Roosevelt Roads
NTR	Navy Technical Representative
OSHA	Occupational Safety and Health Administration
PGM	Program Manager
PM	Project Manager
PMO	Program Management Office
PPE	Personal Protective Equipment
ppm	parts per million
PVC	Polyvinyl Chloride
QA	Quality Assurance
QA/QC	Quality Assurance/Quality Control
QC	Quality Control
QCSM	Quality Control Systems Manager
RCRA	Resource Conservation and Recovery Act
RWEC	Right Way Environmental Contractors, Inc.
SAP	Sampling and Analysis Plan
SE	Southeast
SHM	Safety and Health Manager
SOW	Statement/Scope of Work
SSHO	Site Safety and Health Officer
SSHP	Site Safety and health Plan
SWMU	Solid Waste Management Unit
USACE	United States Army Corp of Engineers
USEPA	United States Environmental Protection Agency

1.0 INTRODUCTION

This document provides overall guidance for the successful completion of the Corrective Measures Implementation (CMI) at Solid Waste Management Unit (SWMU) 68 Naval Activity Puerto Rico (NAPR), Ceiba, Puerto Rico. Activities described herein are in accordance with the requirements of Contract Number N62450-08-C-0093. This Work Plan applies only to activities to be performed by Right Way Environmental Contractors, Inc. (RWEC) and its subcontractors under the above-referenced contract to include sampling and soil removal activities.

This document is divided into nine sections. Section 1 introduces the document, provides site location, background and history; Scope of Work (SOW), and site remedial objectives. The project organization is provided in Section 2. Section 3 presents the general requirements. Project activities are discussed in Section 4. The Environmental Protection Plan is presented in Section 5 and the Contractor Quality Control (CQC) Plan is presented in Section 6. Section 7 provides project documentation and reporting requirements. The project schedule is presented in Section 8. References are provided in Section 9.

The attached appendices contain auxiliary document information. This includes the following:

- Appendix A: SWMU 68 Design drawings
- Appendix B: Organizational Chart
- Appendix C: Sampling and Analysis Plan
- Appendix D: Quality Control (QC) Forms
- Appendix E: Submittal Register
- Appendix F: Project Schedule
- Appendix G: Site Safety and Health Plan (SSHP)

1.1 Purpose

This Work Plan has been prepared to provide overall guidance for the successful completion of fieldwork described in the project scope of work and associated design documents. It also describes the coordination activities and sequence of events necessary to ensure the proper and timely completion of work.

1.2 Site Location, Background and History

1.2.1 NAPR

NAPR occupies over 8,800 acres on the northern side of the east coast of Puerto Rico along Vieques Passage with Vieques Island lying to the east about 10 miles off the harbor entrance (see Figure 1-1). NAPR also occupies the immediately adjacent islands of Piñeros and Cabeza de Perro, as presented on Figure 1-2. The northern entrance to NAPR is about 35 miles east along the coast road (Route 3) from San Juan. The property consists of 3,938 acres of upland (developable) property and 4,955 acres of environmentally sensitive areas including wetlands, mangrove, and wildlife habitat. The closest large town is Fajardo (population approximately

37,000), which is about 5 miles north of NAPR off Route 3. Ceiba (population approximately 17,000) adjoins the west boundary of NAPR (see Figure 1-1).

The facility was commissioned in 1943 as a Naval Operations Base, and designated as a Naval Station in 1957. Naval Station Roosevelt Roads (NSRR) operated as a Naval Station from 1957 until March 31, 2004. NSRR was one of the largest naval facilities in the world with more than 100 miles of paved roads, approximately 1,300 buildings, a large scale airfield (Ofstie Field), a deep water port and over 30 tenant commands. NSRR played a major role in providing communication support to the Atlantic and Caribbean areas and also served as a major training site for fleet exercises.

Section 8132 of fiscal year 2004 Defense Appropriations Act, signed into law on September 30, 2003, directed that NSRR be disestablished within six months, and that the real estate disposal/transfer be carried out in accordance with procedures contained in the Base Realignment and Closure (BRAC) Act of 1990. This legislation required that the base closure be conducted in accordance with the Comprehensive Environmental Response Compensation and Liability Act (CERCLA), as amended by the Community Environmental Response Facilitation Act (CERFA). NSRR has undergone operational closure as of March 31, 2004 and has been designated as Naval Activity Puerto Rico. The mission of NAPR is to protect the physical assets remaining, comply with environmental regulations, and sustain the value of the property until final disposal of the property. NAPR will continue until the real estate disposal/transfer is completed.

In anticipation of operational closure of NSRR the Naval Facilities Engineering Command, Atlantic Division (LANTDIV) prepared Phase I/Phase II Environmental Condition of Property (ECP) Reports to document the environmental condition of NSRR. The Draft Phase I Environmental Condition of Property Report dated March 31, 2004 (LANTDIV, 2004) identified new sites at NAPR based on the results of a review of records, an analysis of historic aerial photographs, physical site inspections, and interviews with persons familiar with past and current operations and activities. The new ECP sites had not been previously identified or investigated under existing environmental program areas. A Phase II ECP field investigation was performed in 2004 to conduct environmental sampling to determine if a release/disposal actually occurred at any of the sites recommended for further evaluation in the Phase I ECP and, if so, whether any potential risk to human health was present. The Final Phase II Environmental Condition of Property Report recommended additional sampling (to be undertaken as part of the Resource Conservation and Recovery Act [RCRA Program]) at several sites to permit a more detailed assessment (NAVFAC, 2005).

The USEPA issued a RCRA 7003 Administrative Order (Environmental Protection Agency [EPA] Docket No. RCRA-02-2007-7301), which identified a number of SWMUs (including SWMU 68) as having documented releases of solid and/or hazardous waste and hazardous constituents, and required follow-on actions. Following a public comment period the Consent Order became effective on January 29, 2007 (USEPA 2007).

Ownership of the airfield parcel at NAPR (Ofstie Airfield) was transferred from the United States Navy to the Puerto Rico Ports Authority on February 7, 2008. The Ports Authority developed the airfield into an operational regional airport. However, in accordance with the Administrative Order, the Covenant Deferral Request and Quitclaim Deed of Transfer, the US Navy maintains responsibility for the investigation and cleanup of SWMU 68.

The following subsections provide a brief discussion of the background for SWMU 68 sites addressed in this work plan. The location of SWMU 68 is shown on Figure 1-2 and design drawings are included in Appendix A.

1.2.2 SWMU 68

SWMU 68, the Former Southern Fire Training Area (also known as ECP Site 14), is located at the southwest end of the Ofstie Airfield within a flat lying open area surrounded by secondary growth vegetation as shown on Figures 1-2 and 1-3. SWMU 68 covers approximately 18 acres and includes a circular area formerly bisected by an east-west running road.

The Aerial Photography Analysis (APA) presented in the Phase I ECP Report (LANTDIV, 2004) identified this area as photo identified Site 19, due to the observation of a circular, graded area with an aircraft fuselage and two stained areas consistent with a fire training area from 1961-1964. The Phase I ECP records review did not identify a fire training area at this location. However, interviews conducted during the Phase I ECP confirmed former use of the area for fire training; dates of usage and fuel used are unknown but were suspected to be in the 1950s and 1960s. The physical site inspection conducted during the Phase I ECP identified a disturbed circular area consistent with that of a fire training area, but no stressed vegetation or stained soils were observed.

Three soil borings were advanced at SWMU 68 during the Phase II ECP investigation to profile surface and subsurface conditions (see Figure 2-4). Three surface soil and three subsurface soil samples were collected and analyzed for Appendix IX volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), metals, and total petroleum hydrocarbon (TPH) gasoline range organics (GRO) and diesel range organics (DRO). Groundwater samples were not collected at SWMU 68 during the ECP investigation based on the photoionization detector (PID)/flame ionization detector (FID) levels in soil; the levels did not indicate potential impact to groundwater (NAVFAC Atlantic, 2005).

A Phase I RFI was conducted at SWMU 68, and is documented in the Final Phase I RFI Report (Baker, 2008). Overall, very little impact on the environment was found during the Phase I RFI at SWMU 68. However, because concentrations of lead, copper and zinc from the ECP investigation indicated the presence of contamination in the surface soil above their ecological screening values and respective background levels, and nearby surface soil samples from the Phase I RFI had relatively low concentrations with no exceedances for these metals, a very limited remedial action for surface soil (excavation and disposal) was recommended in the Phase I RFI to address potential ecological risks at this site. Corrective Action Objectives (CAOs) for these compounds were developed in the Phase I RFI (Baker, 2008) and will be discussed in Section 1.4.

A Corrective Measures Study (CMS) Final Report (Baker, 2009a) was prepared to document the proposed remedial plan. The CMS describes the site conditions, presents results from previous investigations and identifies the strategy for corrective measures at the site.

Only surface soil removal and sampling activities associated with SWMU 68 is addressed under this contract. The location of SWMU 68 is shown on Figure 1-2 and the site layout is presented on Figure 1-3 and in Appendix A.

1.3 Project Statement of Work

The objective of this project is to remove contaminated media to meet established CAOs for SWMU 68. All work to be conducted as part of this project will be conducted in accordance with the approved CMI design packages for SWMU 68, as modified by the project documents (the project Statement of Work [SOW] and the Proposal Clarifications). The overall objective of the removal actions is the protection of human health and the environment by removal of

contaminated media to established remedial goals.

The following activities will be performed:

- Coordinate schedule with the Navy Technical Representative (NTR);
- Obtain appropriate clearance and identification for all personnel and vehicles;
- Obtain soil samples in the historic drainage feature (ditch) area located southeast of 14E-01;
- Perform a wetland delineation to determine the absence or presence of wetlands in the work area to ensure that construction activities do not affect wetlands located adjacent to the proposed excavation area; wetlands will be marked in the field, and will be avoided during all construction activities including placement of the access roadway and soil stockpile area.

Survey and stake all planned excavation areas in accordance with boundaries given in the design documents;

- Analytical data from CMS sampling will be submitted as waste profile information to appropriate waste proposal facility;
- A brief overview of the primary corrective measures and objectives for SWMU 68 as presented in Design Drawings C-2, Removal Action Plan is provided as follows;

  Excavation of one 5,000 square foot area of surface soil contamination surrounding sample point 14E-01 to a depth of two feet below the ground surface. The Contaminants of Concern (COCs) for this area are lead and zinc.

  Excavation of one 2,500 square foot area of surface soil contamination surrounding sample point 14E-03 to a depth of two feet below the ground surface. The COCs for this area are copper and lead.

- Set up lay down area and waste soil staging area;
- For hazardous soils, provide appropriate waste storage containers at the waste staging area with adequate cover or drainage;
- Mobilize appropriate equipment to lay down area;
- Coordinate and verify utility clearance activities;
- Install site access controls where necessary;
- Clear and grub as required for unimpeded access;
- Install erosion-control measures where necessary;
- Coordinate with the NTR for excavation activities;
- Perform excavation activities in accordance with applicable approved designs

- Stage excavated (waste) soil in appropriate waste storage containers with appropriate and adequate covers for subsequent disposal at off-site waste disposal facility;
- If necessary, collect any additional waste characterization samples as required by waste disposal facilities and complete profile acceptance;
- Transport excavated soil in appropriate waste storage containers to appropriate disposal facilities using all required tracking and documentation;
- Once excavation limits are reached, collect confirmation samples for laboratory analysis in accordance with the Sampling and Analysis Plan (SAP) (Appendix C);
- When proposed limits of soil excavation are achieved or all sidewall confirmation sample results indicate contaminant concentrations are below corrective action objectives, discontinue excavation activities;
- Collect representative sample from borrow pit for analysis to confirm soil is clean;
- Backfill and compact excavations;
- Revegetate site;
- Demobilize from NAPR;
- Obtain final disposition documentation from disposal facility;
- Produce closeout reports.

A brief overview of the primary corrective measures and objectives for SWMU 68 as presented in Design Drawing C-2, Removal Action Plan is provided as follows:

- Excavation of one 5,000 square foot area of surface soil contamination surrounding sample point 14E-01 to a depth of two feet below the ground surface. The Contaminants of Concern (COCs) for this area are lead and zinc.
- Excavation of one 2,500 square foot area of surface soil contamination surrounding sample point 14E-03 to a depth of two feet below the ground surface. The COCs for this area are copper and lead.

1.4 Corrective Action Objectives

The remedial goals for SWMU 68 are based upon the current property use at SWMU 68, the future use of the airfield parcel as an airfield (industrial), and the most likely future potential human and ecological receptors. The following table summarizes the corrective action objectives for SWMU 68.

Media	Chemical	Final Corrective Action Objective (mg/kg)
Surface Soil	Copper	168
	Lead	87
	Zinc	120

2.0 PROJECT ORGANIZATION

This section identifies and defines responsibilities of the principal decision-makers and all persons responsible for implementing the work (see Appendix B, Organizational Chart).

2.1 U.S. Department of the Navy – NAVFAC Southeast

The Contractor's responsibility is directly to the Contracting Officer (CO) via the Contracting Officer's Representative (COR). Any requested change and/or deviation in scope will be brought to the attention and approved by the CO. In no case will changes to the contract scope of work be made at the activity level or by any person other than the CO. If work outside the SOW is required (i.e., over-excavation), the CO or COR will be notified immediately. This notification will be via email and telecom and will be initiated by RWEC. The CO for this project is Debbie R. Sanders. Her contact information is presented below:

BRAC Program Management Office, SE
4130 Faber Place Drive, Suite 202
North Charleston, SC 29405-8503
843-743-2145
debbie.sanders@navy.mil

Inherent to this project is the potential to excavate beyond the design limits in order to maximize the amount of contaminated materials removed under this remedial action. The project has been scoped such that unit pricing will be used to compensate RWEC based on the amount and types of material removed (hazardous soils versus nonhazardous soils). RWEC will closely monitor the quantities and types of soils removed. In the event that the budgeted estimated quantities will be approached, RWEC will notify the CO. The CO will authorize any change that is required for quantities of soils disposed.

The NTR is RWEC's point of contact for day-to-day project communication and project deliverables. The NTR is responsible for Navy technical review and approval of all deliverables prepared by the Contractor. The NTR coordinates technical input as required or requested by the contractor and may provide recommendations and/or information to the CO. RWEC and the NTR understand that the CO is responsible for authorizing, in writing, any changes in scope. Mark Davidson is the NTR for this project. His contact information is presented below:

Mark Davidson
BRAC Program Management Office, SE
4130 Faber Place Drive, Suite 202
North Charleston, SC 29405-8503
843-743-2130
Mark.Davidson@navy.mil

2.2 U.S. Department of the Navy – NAPR DPW

At NAPR, Pedro Ruiz represents the Department of Public Works (DPW) and has the responsibility for Navy oversight of field activities at NAPR including assisting on site contractors with site background information and all other issues not related to contracts.

2.3 USEPA – Region 2

Tim Gordon has overall responsibility to ensure the environmental program at NAPR is in compliance with the USEPA environmental program. USEPA will review the Work Plan, SAP, and the project closure reports.

2.4 Puerto Rico Environmental Quality Board

Wilmarie Rivera and Gloria Toro have overall responsibility to provide regulator oversight for Puerto Rico's Environmental Quality Board (EQB). All interaction with Puerto Rico EQB will be through the Navy.

2.5 RWEC

RWEC has the ultimate responsibility for the successful execution of this project, as measured by achieving all of the project goals within the planned schedule and budget. All RWEC subcontractors will adhere to RWEC's QC program to ensure all Corporate and project QC standards are met.

The selection of personnel to perform specific QC functions is based on their experience related to the work being performed and their educational qualifications. Personnel selection for project delivery activities are based upon an evaluation of the staff member's education, work experience, and training. The program manager (PGM) conducts these evaluations before the project begins and selects the project personnel.

For this project, key personnel have been selected, and brief descriptions of their specific responsibilities are provided in the following subsections.

2.5.1 Program Manager

The PGM, Pedro Tejada, will have the overall responsibility for all technical, contractual, safety, and administrative matters for RWEC under this contract. He will ensure a high degree of client responsiveness is maintained. Additionally, he will be responsible for overseeing staff selection, monitoring contract and task funds and schedules, and ensuring quality assurance (QA) processes are being implemented. Mr. Tejada will delegate day-to-day project management to the Project Manager (PM) and QC management to the Quality Control Officer.

2.5.2 Project Manager

Pedro Tejada will also serve as the RWEC PM for this project. As PM, Mr. Tejada will:

- Track project progress and communicating progress via updated project schedules and budgets;
- Supervise daily project execution;
- Establish work teams for specific tasks;
- Allocate assigned resources for optimum work execution;
- Conduct direct and frequent technical communication with the BRAC Program

Management Office (PMO) Southeast (SE), and the NTR;

- Ensure early identification and resolution of technical problems;
- Identify, communicate, and execute potential or desired modifications to the SOW;
- Assign and track field QC while assuring its effectiveness through review of documentation and communication with the QC Officer;
- Assign and track site safety and health responsibilities by reviewing site safety and health documentation and communication with the Health and Safety Manager(HSM)
- Serve as a primary point of contact for incidence reporting;
- Address and resolve QC nonconformance issues;
- Prepare project progress reports.

Mr. Tejada will be RWEC's primary contact person with the Navy. He will be in regular contact with the NTR regarding project status, potential schedule, cost impacts, and QC issues.

2.5.3 Quality Control System Manager

The QCSM for this contract is Carlos Brown. The QCSM is responsible for the development and interpretation of QC policies and procedures, and carries the requisite authority to oversee and execute QC activities for the projects that will be implemented under this contract. The QCSM is responsible for establishing the definable features of work (DFWs) and the appropriate QC monitoring and testing. He will provide overall direction to the program QC function; perform audits, surveillance, and document reviews; and execute other quality functions as required in the CQC Plan. Implementation of the QC duties will be delegated to the QC Officer in the field.

Duties of the QCSM include, but are not limited to, the following:

- Implementing the project QC requirements;
- Overseeing onsite QC staff;
- Identifying and reporting nonconforming items or activities;
- Initiating or recommending corrective actions;
- Verifying implementation of corrective actions;
- Notifying the QA Director of conditions adverse to quality that cannot be resolved at the project level;
- Overseeing activities to monitor operations for compliance with contract requirements.

2.5.4 Health and Safety Manager

The Health and Safety Manager (HSM) for this contract is Felix Gonzalez, Certified Industrial Hygienist (CIH). He has the overall responsibility for the RWEC Corporate Safety and Health Program. Under this project, the HSM reports directly to RWEC's PGM Pedro Tejada.

The HSM is responsible for the development of safety and health policies and procedures, and carries the requisite authority to oversee and execute safety and health activities for the projects that will be implemented under this contract. The HSM is responsible for all aspects of the SSHP. The HSM will provide overall direction of safety and health functions perform safety inspections and document reviews as required by the SSHP. Any proposed deviations from the SSHP or changes in the expected site conditions are immediately presented to the HSM for consideration and approval. The HSM will interface with the PM on the safety and health performance of the program and will coordinate all safety and health activities. Implementation of the safety and health duties will be delegated to the SSHO in the field.

2.5.5 Site Superintendent

The Site Superintendent for this project is Luiz Rios. The Site Superintendent is responsible for managing all aspects of project implementation in the field including quality, safety, and coordinating the activities of task-specific groups, subcontractors, or teams working on the project. The Site Superintendent is also the primary interface with the NTR in the field. The Site Superintendent will report directly to the PM, and will provide the PM with daily progress reports. The Site Superintendent will be accessible at all times while the field activities are in progress.

2.5.6 Quality Control Officer

The onsite QC Officer for this project is Alejandro Rodriquez. The QC Officer is responsible for the implementation of the CQC Plan in the field. Responsibilities of the QC Officer include:

- Reviewing received submittals from subcontractors so that all submittals meet QC requirements;
- Reporting to the QCSM on the status of submittals and QC-related activities (see Appendices D, Quality Control Forms, and E, Submittal Register);
- Preparing the Daily Quality Control Report (DQCR) covering all associated activities for this project using the DQCR;
- Performing daily inspections of RWEC and subcontractor work activities;
- Reading and understanding all QC requirements for specific tasks being performed by RWEC and subcontractors, and monitoring for compliance with the specifications;
- Ensuring the quality standards in the project plans are met;
- Assisting in maintaining an effective CQC system;
- Performing and monitoring all control activities and testing;
- Providing acceptable documentation of daily CQC activities that will be incorporated

into the DQCR;

- Implementing changes, as appropriate, to the CQC Plan;
- Ensuring compliance with the requirements of the CQC Plan;
- Maintaining complete, accurate, legible, permanent, and defensible records that document all work performed.

In his role as the QC Officer, Mr. Brown will report to the PGM. The QC Officer will report any deficiencies immediately to the PGM for consultation and assignment of corrective actions. The PGM will empower the QC Officer to enforce all QC issues in the field, including the authority to stop work if QC issues are being compromised.
A copy of the CQC Plan will be made available to all personnel working on the corrective measures activity in the field.

2.5.7 Site Personnel

All site personnel will be required to adhere to the procedures set forth in this Work Plan. The QC Officer and the HSM will be responsible for ensuring that site personnel perform all aspects of the work in accordance with the Work Plan, the CQC Plan, and the SSHP.

2.6 Subcontractors

RWEC will direct and control all subcontractors for this project. Contractual agreements between RWEC and its subcontractors contain flow-down clauses that require subcontractors to meet all appropriate Navy, Federal, and Puerto Rico territory requirements. Onsite subcontractors will coordinate their activities through the Site Superintendent and will be required to submit daily logs documenting their activities. All subcontractors will be required to adhere to the procedures set forth in this Work Plan. The QC Officer will be responsible for ensuring that subcontractors perform all aspects of the work in accordance with the CQC Plan and SSHP.

3.0 GENERAL REQUIREMENTS

3.1 Security Requirements and Facility Access

RWEC will initiate facility access requests for RWEC and subcontractor personnel as soon as possible to avoid potential project start delays. The Puerto Rico Ports Authority is the current property owner.

3.2 Site Controls

RWEC will erect temporary construction barriers (i.e., fencing or caution tape) around active work sites and designated wetland areas to deter entry by unauthorized personnel. Barriers will meet the standard of the United States Army Corps of Engineers (COE) Engineering Manual (EM) 385-1-1 for Class III perimeter protection (COE EM 385-1-1 Chapter 25 and Appendix Q). Fences will be constructed of orange construction safety fence fabric hung on steel posts set at 10-foot intervals. Fencing and/or caution tape will be used in circumstances where heavy or moving equipment is in close proximity to public roads or high-traffic areas and to prevent inadvertent entry to sites where equipment is being used. Safety fences will also be erected around any open excavations in areas where there is potential for vehicular or foot traffic. RWEC will not leave open excavations unattended without fencing or providing a barrier around the full perimeter of the excavation.

RWEC will also keep at least one person at the job site at all times during work hours for site surveillance. Heavy equipment will be parked in designated areas each night and the keys will be removed. All tools and equipment will be properly stored and work areas will be maintained in an orderly and organized manner.

3.3 Protection of Existing Structures and Utility Clearances

RWEC will take necessary measures to protect existing structures, facilities, and utilities that may be affected by removal and cleanup activities. Before intrusive work is initiated at the sites, a site inspection will be performed to identify potential site hazards, such as overhead power lines and structures or other features that require special attention. RWEC will be responsible for locating and clearing utilities. Utility markings will be maintained throughout construction activities. RWEC will avoid unnecessary disturbance of all utilities and will protect any utilities that may be impacted by the corrective measures implementation.

3.4 Safety Requirements

RWEC will take necessary preventive measures for the safe handling of contaminated media. RWEC's Emergency Response Plan is contained in the SSHP, which is included as Appendix G of this plan. The SSHP explains the operations necessary to ensure compliance with federal Occupational Safety and Health Administration (OSHA) and American National Standards Institute (ANSI).

3.5 Decontamination Procedures

Equipment will be decontaminated by dry means (e.g., brushes, shovels) and/or with a power washer and water-soap solution. Solids will be collected and disposed with the waste soil, and liquids will be containerized, characterized, and disposed appropriately. Decontamination equipment and solutions will be treated and/or disposed in accordance with the SAP (Appendix C).

3.5.1 Dry Decontamination

- As a first measure in decontamination, using shovels and brooms, remove large dirt clods and debris. If possible, lift and spin tracks to loosen material;

- To collect and control any removed debris during the dry decontamination, it will be performed over the wet decontamination pad or the approved waste storage container to ensure that potentially impacted soils will not contaminate the ground surface;

- Collect solids and combine with waste soil.

3.5.2 Wet Pressure-Washing Decontamination

- Once dry decontamination has been completed, wet decontamination will be performed in an area that is covered with plastic sheeting and is bermed to contain and collect all fluids;

- Using a potable water pressure washer, direct-spray all areas that have been exposed to contaminated soils including tires, tracks, and buckets. Make sure all visible dirt is removed;

- Collect and containerize waste solids and liquids. Solids will be combined with waste soil, and liquids will be containerized in 55-gallon drums and staged as described in the SAP (Appendix C);

- The following procedures will be used to decontaminate field heavy equipment at least 24 hours before excavation activities or departing site:

  - Rinse with potable water. Change the water frequently and containerize used fluids appropriately.

  - Wash with the non-phosphate detergent and water solution. Dilute the non-phosphate detergent as directed by the manufacturer.

  - Rinse with potable water. Change the water frequently and containerize used fluids appropriately.

  - Triple rinse with pesticide-grade (99 percent or better) isopropyl alcohol.

  - A rinse with nitric acid/deionized water solution. The solution will be made from 10 percent reagent-grade nitric acid and deionized water.

  - Triple rinse with potable water. Rinsing will be done by applying the water from a pressurized sprayer or garden hose while holding equipment over an appropriate liquid collection system.

  - Allow heavy equipment to air dry at least 24 hours.

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  - All containerized fluids will be sampled and analyzed for disposal purposes.

Wherever possible, disposable equipment will be used to minimize the amount of decontamination that will be required.

For hand-auger sampling, it is not possible to exclusively use disposable sampling equipment. Rods, flights, and spoons will require field decontamination between sampling locations and between actual samples when more than one sample is to be collected at a given location. Decontamination of reusable sampling equipment that comes in contact with samples will be performed to prevent the introduction of extraneous material into samples, and to prevent cross-contamination between samples. To prevent possible contamination from sampling equipment, all sampling devices will be decontaminated and sealed before initiation of sample collection. To the greatest extent possible, sampling equipment will be field decontaminated. The following procedures will be used for field decontamination of reusable sampling equipment and personal protective equipment, to include non-disposable hand augers, stainless steel sampling spoons, etc.:

- Rinse with potable water. Change the water frequently and containerize used fluids appropriately.

- Wash with the non-phosphate detergent and water solution. Dilute the non-phosphate detergent as directed by the manufacturer.

- Rinse with potable water. Change the water frequently and containerize used fluids appropriately.

- Triple rinse with pesticide-grade (99 percent or better) isopropyl alcohol.

- A rinse with nitric acid/deionized water solution. The solution will be made from 10 percent reagent-grade nitric acid and deionized water.

- Triple rinse with deionized water (DI). Rinsing will be done by applying the DI from a stainless steel Hudson-type sprayer or squeeze bottle made of Nalgene™ or Teflon™ (or equivalent) while holding equipment over a 5-gallon bucket.

- Allow equipment to air dry at least 24 hours. Then, wrap equipment with aluminum foil and cover with plastic. Rinsate will be placed in drums or tanks and staged for disposal.

- All containerized fluids will be sampled and analyzed for disposal purposes.

3.6 Permits and Licenses

The Federal agency, in this case the Navy, is responsible for obtaining National Environmental Policy Act (NEPA) permits with the regulatory agencies. It is expected that a DS-1 (Solid Waste Transporter) and an Air Emissions permit will be required. These permits will be requested by RWEC. The basis of the permit request will be the directive from EQB.

4.0 PROJECT ACTIVITIES

The following subsections describe field activities that will be performed in conjunction with this project. The main components of the construction activities are listed in Section 1.3.

The following subsections provide details of the field activities associated with the removal activities at SWMU 68.

4.1 Mobilization and Site Preparation

RWEC will mobilize a Site Superintendent, the QC Officer, and the HSM. Heavy equipment will be procured from local suppliers throughout the duration of fieldwork to address the ongoing needs at the site. Site preparation will include verifying utility locations with onsite Navy personnel, installing erosion controls, clearing and grubbing (where required), constructing laydown and staging areas, establishing access routes for equipment and transport vehicles, and delineating work areas. Temporary laydown and staging areas will be approved by the NTR.

Erosion controls will be installed around excavation areas in accordance with remedial designs and applicable regulations (e.g., National Pollutant Discharge Elimination System [NPDES]) (see Section 5.3 of this Work Plan). Staging areas for excavated material stockpiles will be underlain with 20-mil polyethylene sheeting, and will be bermed to prevent runoff from potentially contaminated stockpile materials. At the completion of site preparation, work areas will be delineated with plastic safety fencing and/or caution tape to limit access to excavation areas and the material staging pads. Plastic safety fencing will be installed using steel rods driven 2 feet or more into the ground, and the fencing will be attached to each rod at the top, middle, and bottom elevations of the fence.

4.2 Site Surveying

RWEC will use a subcontractor for surveying services, as necessary. Survey coordinates for the excavation areas are provided in Appendix A Sheet C-2 and the subcontracted surveyor will lay out the removal limits, which will be tied into local reference points as required by the remedial design documents. The surveyors will be requested to return to the site to re-survey any sampling locations that may have been moved due to refusal or other obstructions and if the soil removal areas expand beyond their initial proposed limits.

4.3 Ditch Confirmation Sampling and Wetlands Delineation

RWEC or their subcontractor as the designated Navy representative shall obtain all confirmatory samples. RWEC will be responsible for wetland delineation which shall be performed by certified wetlands expert.

Before intrusive work is initiated, the historic drainage feature (ditch) located adjacent to the southeast of sampling location 14E-01 will be sampled to ensure the limits of the excavation have been delineated. A minimum of two samples will be taken from the ditch and analyzed for copper, lead and zinc. If the results of the ditch sampling indicate the presence of copper, lead, and/or zinc above corrective action objects, the removal action will be extended to include this area.

Wetlands will be delineated to determine the absence or presence of wetlands in the area. If present, then their boundary will be mapped and an evaluation will be conducted to determine if their presence affects the excavation work. Wetlands will be marked in the field, and they will be

avoided during all construction activities including placement of the access roadway and soil stockpile areas.

4.4 Excavation Procedures

At SWMU 68, two areas, 50 feet by 50 feet (COCs are copper and lead) and 50 feet by 100 feet (COCs are lead and zinc), will be excavated to a depth of approximately 2 foot below ground surface (bgs), as shown in Appendix A. The excavation will be completed with appropriately sized heavy equipment. At a minimum, an excavator will be used during the removal activities. RWEC will excavate soil to the appropriate depth at SWMU 68 within the removal areas staked by the surveyor. See design drawings in Appendix A for removal area locations. It is estimated that at SWMU 68, 555 cubic yards (CY) corresponding to 833 tons will be excavated from the SWMU.

The CAOs from the EPA approved Final CMS identify potential risk to ecological (avian) receptors to surface soil. Since soil below depths greater than 2.0 feet bgs do not represent significant exposure points for ecological receptors no additional excavation beyond the 2.0 ft bgs is required. No human health risks were indentified for the surface or subsurface soils or groundwater for the site. No ecological risks were identified in the subsurface soils for the site. Therefore, confirmation samples for excavation pit bottoms will not be collected because the pathway (top two feet of surface soil) has been removed and CAO has been satisfied.

During excavation, good engineering practices and appropriate measures will be implemented to control both contaminant releases and general exposure to workers. Workers engaged in waste removal or handling activities will be required to wear an appropriate level of personal protective equipment (PPE) as described in the SSHP and as determined on site by the HSM.

RWEC will excavate the predetermined locations to the surveyed boundaries and planned depth. Since the limits of the excavations are defined by “clean” samples, these samples will be used to supplement the confirmatory sampling, as described in the SAP given in Appendix C. RWEC will communicate the results of the analyses to the NTR to determine the requirements for over-excavation. If over-excavation is required, the NTR will notify the COR and coordinate those activities with cooperation/coordination between both RWEC and the COR. No additional excavation will be conducted without written authorization by the COR. If impacts to a “sensitive area” are considered possible, excavation will be stopped and the COR will be notified.

If over-excavation is required, RWEC will excavate horizontally (in two-foot increments) only to a depth of two feet below the ground surface. Should sidewall confirmation sample results indicate contaminated soil remains in place, the NTR will be notified. It is not expected that vertical excavation will be required deeper than two feet as limits of previous activities did not extend below two feet... When the confirmation sampling results indicate that the extent of contaminated soil has been removed, RWEC will communicate the final sampling results to the NTR.

Groundwater at the site is between 6.69 feet bgs and 14.65 feet bgs. Excavation will not extend below 2 feet bgs; therefore groundwater should not be encountered. Should groundwater be encountered in the excavation, work will be stopped and specifications will be developed for dewatering, containerization, sampling, analysis, and disposal of the groundwater.

To avoid surface water contact with contaminated materials, the Contractor may employ devises such as water proof barriers or covers (plastic sheeting) or construct earthen berms to divert surface water away from construction areas. Excavated soil shall be deposited directly into

appropriate waste storage containers with appropriate and adequate covers which will not be susceptible to collection of surface water.

4.5 Material Handling, Staging and Loadout

Details of the waste management procedures are in Section 3 of the SAP (Appendix C).

Specifically, for waste soil, the excavated material will be placed directly into appropriate waste storage containers in preparation for transport to and disposal at a Navy- and EPA-approved facility. Storage containers will be covered with 8-mil polyethylene sheeting at the end of each day to prevent excess moisture from precipitation and to prevent runoff caused by rain events. Storage containers will be inspected weekly or after rain events for storage container integrity and inspection comments will be noted on the DQCR.

Upon completion of site preparation activities, historic drainage feature pre-excavation delineation samples will be collected and analyzed to determine extent of contamination. The soil to be removed within the proposed area of soil removal has been characterized for disposal based on analytical results from Phase II ECP investigation and Phase I RFI (dated September and October 2007) so that soil can be directly loaded into appropriate waste storage containers for transport to approved off-site disposal facility. Excavated soil will be analyzed as summarized in Table 3-1 of the SAP.

The excavation will be completed with appropriately sized heavy equipment. At a minimum, an excavator will be used during the removal activities. RWEC will excavate soil to the appropriate depth at each site within the removal areas staked by the surveyor. During excavation, good engineering practices and appropriate measures will be implemented to control both contaminant releases and general exposure to workers. Workers engaged in waste removal or handling activities will be required to wear an appropriate level of PPE as described in the SSHP and as determined on-site by the HSM.

Specific details for disposal are outlined in Section 3.8 of the SAP.

4.6 Sampling and Analysis

As part of the corrective measures activities, RWEC will collect representative samples from various media. Sampling activities for this project include confirmation sampling for soil removal, backfill material characterization, and waste characterization sampling for other solid and liquid wastes. Detailed discussions of the sampling and analysis program are provided in the SAP (Appendix C). The NTR will approve the completed excavations based upon the confirmation sample analytical results for the different sites.

Quality control samples will be taken at 10% intervals for duplicates and 5% for matrix spike and matrix spike duplicates. No field blank is required if analysis is for metals only. Equipment blanks will be collected and analyzed for field instruments used to collect samples.

4.7 Backfill and Site Restoration

Backfill and site restoration will be performed in accordance with the Basis of Design (BOD) and project specifications (Baker, 2009b).

RWEC will maintain a clean site by disposing any generated construction debris (CD). CD will be stored within the designated work areas and will be disposed as directed by the NTR.

Oncroject activities are completed, RWEC will restore the site to its original condition to the extent possible. However, RWEC will not restore or replace trees that are damaged or removed for site access or as a result of remediation activities. Surplus materials, rubbish, temporary structures, barricades, and project signs will be removed from the sites.

Upon completion of excavation and satisfactory confirmatory sampling activities at the sites, site restoration will begin. Restoration consists of backfilling the excavations with clean borrow source material from an NTR-approved offsite source. Backfill material shall be obtained from off-site sources, therefore, it is required to be tested in accordance with Technical Specification 31 23 00.00 20, Part 1.6 Requirements for Off Site Soil. Material shall not be brought on site until test results have been approved by the NTR. Refer to the SAP (Appendix C) for backfill sampling requirements. The required chemical and physical characteristics and testing methods for backfill and topsoil are provided in the Technical Specifications Section 02 61 13 Part 2.1; 31 23 00.00 20 Parts 1.6, 2.1.1, 2.1.4, 2.1.5, and 2.1.6; and 32 92 19 Part 2.2.2.

The soil will also be tested to determine the geotechnical properties. A 6-inch layer of certified-clean topsoil will be used to restore the surfaces of all excavation areas. The primary specifications are as follows:

- The topsoil will contain from 5 percent to 8 percent organic matter;
- The maximum particle size will be ¾ inch with maximum 3 percent retained on ¼-inch screen;
- The composition of the fill will be 25 percent to 50 percent silt, 10 percent to 30 percent clay, 20 percent to 35 percent sand;
- The pH of the soil will be from 5 to 7.6 and will have a maximum of 600 parts per million (ppm) soluble salts.

Final grading will provide positive drainage of surface water across the restored area i.e. grading will be performed such that there will be no areas where surface water may collect. Site restoration will involve removing all construction-related facilities, including leftover construction materials and materials used to construct equipment staging areas. RWEC will remove all equipment at the time of demobilization from each site. Temporary erosion control measures will be removed after permanent erosion control has been established. Any other construction-impacted areas or features, including utilities, structures, pavement, or curbs, will be restored to preexisting conditions. Trees that are damaged and/or removed as part of clearing for access or remediation activities will not be replaced.

Once backfilling and final grading is completed, RWEC will seed and fertilize the disturbed areas with 100 percent Common Bermuda grass and fertilizer, as identified in the specifications.

5.0 ENVIRONMENTAL PROTECTION PLAN

RWEC, as the prime contractor, is responsible for ensuring adherence to this Environmental Protection Plan.

5.1 Protection of Features

RWEC will confine construction activities to areas defined in the plans or to areas specifically assigned for RWEC's use. Equipment storage and related areas and access routes required temporarily by RWEC will be assigned by the NTR. No other areas on government premises will be used by RWEC without written consent of the NTR.

RWEC will not deface, injure, or destroy trees and shrubs, nor remove or cut them without authorization. Ropes and cables will not be fastened or attached to trees for anchorage. Any tree scarred or damaged by RWEC's operations outside of authorized removal areas will be restored as much as possible to its original condition. Some trees and foliage in the immediate work area will be removed to access excavation areas, while those outside of the immediate work area will be left undisturbed. Trees and foliage will be inspected during the final site walkthrough. Appropriate actions will be taken at the direction of the NTR. Trees outside of authorized removal areas that are damaged by RWEC that cannot be saved will be immediately removed, and if directed by the NTR, replaced with a tree of the same species. Trees that are damaged and/or removed as part of clearing for access or remediation activities will not be replaced.

All streams, waterways, and storm drainage systems will be protected from damage and from sedimentation in accordance with the Erosion Control Plan discussed in Section 5.3.

5.2 Traffic Plans

RWEC will coordinate with the NTR and Ports Authority to determine an appropriate haul route for equipment/material deliveries and transport of wastes off site. All RWEC personnel and subcontractors will be informed of the approved route and will adhere strictly to the approved route. The Site Superintendent will audit conformance with the approved route on a daily basis.

5.3 Erosion Control Plan

Erosion control will be maintained on each site in accordance with the requirements and plans presented in the design documents (Baker, 2009b).

5.4 Spill Control Plan

RWEC will be responsible for any spills or leaks caused by its operations during the performance of this contract. RWEC will provide contingency measures for potential onsite spills of any potentially hazardous or other regulated materials. RWEC will provide the following:

- Identification of potential spill pathways and receptors;
- Methods, means, and facilities to prevent contamination of soil, water, air, structures, equipment, or material from a release due to RWEC's operations;
- Equipment and personnel to perform emergency measures to mitigate spills and control their migration;

- A decontamination program to minimize potential for contamination of adjacent areas.

The methods employed on this project to prevent and control spills will include installing liners inside appropriate waste storage containers; carefully loading soil into containers to avoid spillage; and always using good work practices to avoid unnecessary spillage.

5.4.1 Spill Response

The following requirements will be met for a spill of a hazardous material:

- Take immediate measures to control and contain the spill to prevent releases into sewers to surface water;
- Notify the NTR immediately;
- Notify NAPR Fire Department immediately at 9-1-1;
- If the amount is above a reportable quantity or if any amount enters a waterway or storm sewer, RWEC will notify both The National Response Center Spill Reporting Hotline at 1-800-424-8802 and the Puerto Rico Environmental Quality Board at 787-767-8056 within 2 hours of the spill;
- Isolate and contain hazardous spill areas with absorbent pads, booms and pillows;
- Use spill kits to absorb liquids;
- For larger spills, dispatch vacuum tanker and/or emergency response team;
- Deny entry to unauthorized personnel;
- Do not allow anyone to touch the spilled material;
- Stay upwind and keep out of low areas;
- Keep combustibles away from the spilled material;
- Collect samples for analysis to determine that cleanup is adequate;
- Take other appropriate actions, as needed.

5.4.2 Notification of Spills and Discharges

RWEC will provide verbal and written notification of any spill of hazardous substances as required by the federal 40 Code of Federal Regulations (CFR) 355, State, local regulations and Navy Instructions. Spill response shall be in accordance with 40 CFR 300 and applicable state and local regulations. The reportable quantities of a release can be found in 40 CFR 302.5 (Table 302.4 – List of Hazardous Substances and Reportable Quantities).

Refer to the SSHP for the Emergency Contact List. In the event of a spill, the NTR and the NAPR Fire Department will be notified immediately at 9-1-1. If the amount is above a reportable

quantity or if any amount enters a waterway or storm sewer, RWEC will notify both The National Response Center Spill Reporting Hotline at 1-800-424-8802 and the Puerto Rico Environmental Quality Board at 787-767-8056 within 2 hours of the spill. RWEC will submit a spill and/or discharge report to the NTR within 2 days of a release. The report will include the following items:

- Description of material spilled including identity, quantity, and a copy of the waste disposal manifest;
- Exact time and location of the spill, and a description of the area involved;
- Containment procedures used;
- Description of cleanup procedures used at the site including disposal of spill residue;
- Summary of RWEC communications with other agencies.

The report will be finalized between RWEC and the Navy within 7 days of the spill, and the Navy will provide the report to the appropriate regulatory authorities.

5.4.3 Spill Response Resources

RWEC will have a representative available on-call 24 hours a day during this project to handle emergencies at the site. Refer to the SSHP for the Emergency Contact List. An established local work force having OSHA 1910.120 training will be used for emergency response. RWEC will have spill kits, absorbent pads, and a decontamination pad on site for the duration of the project.

5.5 Dust Control Plan

Dust may be generated by construction activities during dry weather. If visible dust appears to be generated within the breathing zone of workers or capable of migrating beyond the construction limits at any of the sites, dust control measures will be implemented. The measures may include covering stockpiled soils or spraying water on the soils and worksite. If dust is still not adequately controlled, workers exposed to the dust may be required to upgrade their PPE from Level D to Level C (full-face respirator with the appropriate cartridge) in accordance with the SSHP. The particulate (dust) concentration and action levels will be determined and documented as described in the SSHP, and PPE upgrade will be performed if the particulate action level is exceeded.

5.6 Contaminant Prevention Plan

All activities will be performed in a manner to minimize risk for accidental release to the environment, minimize unsafe worker conditions, and minimize complications and delays to project completion. RWEC will minimize the number of times contaminated soils are handled. Onsite handling of soils will occur during excavation, loading, and sampling activities. Soil removed from the excavated areas shall be placed directly into appropriate waste storage containers, minimizing the migration of contaminants off site or into clean soil.

Exclusion zones will be established within the work areas by the HSM. All heavy equipment, machinery, vehicles, instrumentation, and personnel will be decontaminated before exiting these zones in an effort to minimize migration of contaminants.

6.0 CONTRACTOR QUALITY CONTROL

The following section outlines the use of operational procedures to ensure CQC from the preparatory stages of vendor material inspections and project plan reviews to delivery of a final product to the Navy, for the corrective measures to be performed at SWMU 68. This section also covers actual procedure selection, control, monitoring, change, and application to remedial measures and construction activities outlined in the project SOW.

6.1 QC Coordination

The PM will effectively communicate the content and intentions of the contract documents to all members of the project team to ensure consistency of project understanding and planned implementation. Coordination will be based upon the concept of the three-phase QC inspection process (preparatory, initial, and follow-up). Scheduled coordination activities will be detailed on the project's field schedule to integrate the QC process into all aspects of the project. RWEC will provide notification to the NTR for coordination of meetings, inspections, testing, and start-up activities at the job site. RWEC will provide required engineering and other support services throughout the construction process, accurate test results, and field reports.

6.2 Meetings

6.2.1 Preconstruction Quality Management Coordination Meeting

Before the start of construction, a preconstruction quality management coordination meeting will be held. During this meeting between RWEC's staff and the appropriate Navy personnel, a mutual understanding of the QC System details (on-site and off-site) will be established, including procedures and documentation for CQC operations, control activities, and testing.

Relevant QC topics discussed in this meeting will include, but are not limited to, the following:

- QC documentation and each organization's role relative to design criteria, plans, and specifications and the QC process;
- QC staff, responsibilities, authorities, and communication procedures Methods for modifying the CQC Plan;
- DFWs;
- Three-phase control system;
- Procedures for observation, testing, and sampling;
- Procedures for nonconformance identification, documentation, and resolution DQCRs;
- Document control;
- Construction schedule.

This meeting will be conducted by the NTR and attended by the PM and QC Officer and other team members including, but not limited to, the Site Superintendent, and the HSM, as required. Minutes of these meetings will be recorded by the project QC Officer and distributed to all

participants. From that point on, the CQC Plan will be used to inspect and document the delivery of a quality product and service. Ongoing QC meetings, coordination of construction activities, and maintaining accurate field records will be the means used to maintain effective follow-up QC. All appropriate members of the project team, including subcontractors, will be required to participate.

6.2.2 Progress Meetings

Progress meetings will be scheduled weekly or as established by the NTR and, whenever necessary, to address significant questions, establish new guidelines, introduce a new aspect to the project, or to address issues that affect the progress of the work. The Site Superintendent and other appropriate RWEC staff such as the QC Officer and HSM will attend these meetings and record and distribute the meeting minutes. Topics that typically will be addressed at the progress meetings include:

- Review and approval of minutes of previous meeting ;
- Review of safety and health requirements and procedures;
- Review of QC requirements and procedures;
- Review of work progress;
- Field observations, problems, and conflicts;
- Problems that may impede the schedule, and proposed corrective actions;
- Revisions to project schedule;
- Coordination of scheduled activities;
- Review of submittal schedules;
- Pending changes and substitutions;
- Review proposed changes for effect on construction and on completion date, and effect on other contracts of the project.

6.2.3 Daily Safety and Coordination Meetings

The Site Superintendent and the HSM will assess each work area for potential hazards before beginning work in that area and will hold daily safety meetings with all site personnel at the beginning of every work shift. These daily safety meetings will be brief and meaningful. A daily tailgate safety meeting record will be used to document the meeting. A serious discussion will occur on the following issues as they pertain to each day's work:

- Review of the activity hazard analyses (AHAs) for specific tasks to be conducted on that day;
- Work planned for the current day and any coordination required to maintain a no-delay schedule;

- Safety hazards associated with specific feature of work;
- Tools and equipment to be used, and special safety and maintenance procedures/requirements to be used with the equipment;
- Pre-work inspections to be performed;
- Emergency plan including brief review of emergency hospital route;
- End-of-day work area condition including cleanup, placement of equipment and materials, and preparation for next day.

6.3 Selection, Approval and Monitoring

The NTR, PM, Site Superintendent, and QC Officer will approve all detailed QC procedures incorporated into the CQC Plan. The same parties will approve subsequent changes following initiation of work. QC monitoring, observation, and surveillance systems will be coordinated with key construction steps under each DFW, testing, and three-phase QC inspection point.

The QC Officer will keep a daily logbook to document observations of construction activities and will report on the status of ongoing testing and analytical results and any other data relevant to the QC effort. The daily logbook will be used to support the DCQR and will be archived as part of project records. The QC Officer will closely monitor the actual field testing, verifying proper procedure technique, sample handling, and chain of custody, as required. The QC Officer will report the results of testing to provide timely authorization to proceed with work sequence or initiate nonconformance action.

6.4 Change and Control Procedures

RWEC will identify, document, and track the status of changes in project activities. A Field Variance Report (FVR) will document changes in procedures or conditions that are inconsistent with the stated SOW and could have a cost impact on the project. Proposed changes that have not physically occurred will also be documented on a FVR. In instances where the physical work has been completed, the FVR will be used to provide the as-built information and allow the opportunity to review the impact of those potential changes on other components of the work. A copy of an FVR is included in Appendix D.

The Site Superintendent and the QC Officer, as required, will prepare the FVR and submit it to the PM for review. The PM will discuss potential changes with the NTR and RWEC's technical staff. Before routing the FVR, the Site Superintendent will assign an FVR number using the document control system, retain a copy for the FVR log and contract files, and then forward a copy of the FVR to the PM. The QC Officer will monitor the documentation and provide support. The responsible engineer, Site Superintendent, and PM will review the change request. Upon resolution, each will sign the FVR and forward the FVR to the NTR for review and processing. In summary, the NTR will determine if the FVR represents a significant change to the work Plan. Procedure for resolution of FVR requires agreement between RWEC personnel (Project Manager, Site superintendent, or QC Officer) and NTR.

EPA will be notified of any significant changes within 48 hours of identification of the need to make a significant change. A significant change is defined as a circumstance not covered in the SOW.

6.5 Construction Activities and Definable Features of Work

This section identifies the construction activities as DFWs that will require QC monitoring, testing, and observation. A DFW is an activity that is separate and distinct from other activities and that requires separate QC activities. In general, each discipline or work item is considered a DFW. Activities within a discipline or work item can be considered a DFW if separate and distinct control requirements exist. QC is accomplished for each of these DFWs using the U.S. Army Corps of Engineers (USACE) three-phase process.

Surveillance during the execution of these activities will be noted on the appropriate forms contained in Appendix D. For each task assignment, specific charts, checklists, etc., will be prepared to assist the QC Officer in ensuring that the work elements are properly performed. The DFWs for all of the site work are summarized below.

6.5.1 Project Planning and Submittals

Anticipated submittals for approval include a draft and final Work Plan, including a SAP, CQC Plan, and SSHP; draft and final versions of the Construction Completion Report; data, procedures, and confirmation, borrow, and historic drainage feature delineation sampling results. Submittals that RWEC expects from its subcontractors include laboratory analytical results and QA/QC documentation; qualifications from the surveyor; and completed shipping manifests and bills of lading. The submittal register is included in Appendix E.

6.5.2 Mobilization

Mobilization is the actual movement of personnel and equipment onto the site to establish a presence for project implementation and will include the following activities:

- Mobilize equipment and personnel;
- Establish equipment staging and waste storage container locations.

Mobilization will be executed upon approval by the NTR.

6.5.3 Site Preparation

RWEC will perform the following site preparation activities:

- Establish support area;
- Establish initial site controls and zones;
- Establish/Construct staging areas for waste storage containers;
- Identify, protect and relocate utilities, if necessary;
- Construct necessary erosion controls;
- Clear vegetation and establish access routes;
- Establish vehicle entrance/exit pads;

- Construct decontamination pad;
- Site surveying and layout of removal areas.

RWEC will supervise the surveying and layout of excavation grids by a subcontractor.

6.5.4 Solid (Soil) Excavation and Staging

RWEC will remove contaminated materials from the defined areas at the SWMU and place them directly in the designated appropriate waste storage containers for subsequent transportation and disposal. RWEC will measure excavated areas and estimate quantities by both volume and weight. At the onset of excavation work, RWEC will use a multiplier of 1.3 tons per cubic yard of soil, and RWEC will adjust that estimate based on the actual weights of the soil as recorded by the weight tickets at the landfill. Thus, the cubic volume of soil will be tracked and the weight of soil will be estimated using a site specific conversion factor.

6.5.5 Confirmation and Characterization/Profile Sampling

Following excavation, soil samples will be collected from the soil removal areas in accordance with the SAP to verify that the contaminated materials have been removed. All material removed during excavation will be tested in accordance with the SAP and the disposal facility's requirements. Sampling and analytical protocols are defined in the SAP.

6.5.6 Contaminated Soil Loadout, Transportation, and Disposal

RWEC will supervise the transportation and disposal of all waste streams associated with the project work. Waste profiles and shipping manifests will be signed by a government authorized representative.

6.5.7 Restoration

Following the completion of excavation and disposal activities, the edges of the excavations will be regarded, the excavations will be backfilled with clean borrow source material, graded, seeded, and fertilized.

6.5.8 Equipment Decontamination

Heavy equipment will be decontaminated by dry means (e.g., brushes, shovels) and/or with a power washer and water-soap solution. The rinsate and solids will be collected and disposed of appropriately. Decontamination equipment and solutions will be treated and/or disposed of in accordance with applicable regulations and requirements.

Field equipment, such as probes, tools, etc., will be decontaminated with dry methods or with a solution of biodegradable detergent and water and rinsed with tap water from the base water supply. Distilled water will be used to rinse reusable sampling equipment such as trowels, scoops, and bailers. Rinsate will be placed in drums or tanks and staged for disposal.

6.5.9 Demobilization

Once site restoration activities are complete, RWEC will:

- Clean all affected areas of the site; Remove support facilities, temporary storm water and erosion-control measures, temporary construction roads, and decontamination facilities;
- Prepare and submit final documentation of completed work and project areas;
- Notify all applicable parties that the remediation activities are complete.

The Navy and RWEC will then perform a final inspection of the areas to ensure compliance with the Work Plan and the contract documents.

6.6 Inspections

To ensure that all construction activities comply with the requirements of the contract, RWEC's QC Officer or another designated member of the QC Team will perform QC inspections. The types of QC inspections will include preparatory, initial, follow-up, and completion inspections for all DFWs. For each preparatory and initial inspection, the QC Officer will develop a narrative description that presents the detailed QC procedures to be used. This documentation will be finalized and approved at the QC meeting held for each distinct inspection and will become part of the minutes to the meeting that are attached to the DQCR. The QC inspection will be scheduled and conducted by the QC Officer or another designated member of the QC Team. The QC Officer or another designated member of the QC Team will document all QC meetings with meeting minutes. The format for documenting preparatory and initial inspections is included in Appendix D. Compliance with all QC requirements is accomplished by using this three-phase process for all DFWs.

6.6.1 Preparatory Phase

The QC Officer or another designated member of the QC Team will review construction drawings, submittal status, material requirements and onsite availability, worker qualifications, and equipment requirements before beginning work on each DFW. This review will be performed with all subcontractors involved in the DFW. During this phase, qualified staff will be assigned, testing controls prepared, and safety concerns addressed. This phase will include:

- Review of the particular activity in the Work Plan;
- Verification that all required submittals have been completed and approved;
- Review to ensure that all materials and equipment have been delivered, tested, and approved;
- Review of provisions to provide required inspection and testing;
- Examination of the work area to ensure that all required preliminary work has been completed and is in compliance with the contract;
- Physical examination of required materials and equipment to ensure that they are on hand, conform to approved plans, drawings, or other submitted data, and are properly

stored;

- Review the appropriate Health and Safety Plan to ensure safety requirements are met;

- Discussion on procedures for controlling quality of the work including repetitive deficiencies;

- A check to ensure that the plan for the work to be performed has been accepted by the NTR;

- Discussion of the initial control phase;

- Documentation of the QC process including narrative description of detailed QC inspection procedures, meeting minutes, inspection results, corrective measures, etc., using forms presented in Appendix D.

RWEC will notify the NTR at least 48 hours in advance of beginning the preparatory phase. This phase will also include a meeting conducted by the QC Officer or another designated member of the QC Team and attended by the Site Superintendent and other appropriate staff responsible for the DFW. The results of the preparatory phase actions will be documented by separate minutes prepared by the QC Officer or another designated member of the QC Team and attached to the DQCR. The QC Officer or another designated member of the QC Team will also instruct applicable subcontractor staff as to the acceptable level of workmanship required to meet contract specifications and familiarize all workers with the safety precautions developed in the Health and Safety Plan.

6.6.2 Initial Phase

This phase of inspection must be accomplished at the beginning of physical work on a DFW. The Initial Phase will verify that control for the work developed in the "Preparatory Meeting" is implemented and work is performed to the level of workmanship mutually agreed upon. RWEC will ensure that subcontractor and RWEC workers understand, through immediate inspection, the contract standards, and the standards of workmanship desired. If there is a difference of opinion in the interpretation of contract requirements, the issue will be settled at this time. The initial inspection phase is a practical method of performing preventive inspection and resolving conflicts. The following items will be accomplished during this phase:

- A check of work to ensure that it is in full compliance with the contract requirements. Minutes of the preparatory meeting will be reviewed;

- Verify adequacy of controls to ensure full contract compliance. Verify required control inspection and testing;

- Establish level of workmanship and verify that it meets the desired acceptable workmanship standards;

- Resolve all differences;

- Check safety to include compliance with and upgrading (if necessary) of the safety plan. Review the safety plan with each worker;

- Documentation of QC process, including narrative description of detailed QC inspection procedures, minutes of meetings, inspection results, corrective measures, etc., using forms presented in Appendix D.

RWEC's QC Officer or another designated member of the QC Team will notify the NTR at least 48 hours in advance of beginning the initial phase. Separate minutes of this phase will be prepared by the QC Officer or another designated member of the QC Team and attached to the DQCR. Exact location of the initial phase will be indicated for future reference and comparison with the follow-up phase.

The initial phase will be repeated for each new crew working on site any time after an extended work stoppage (greater than a week) or any time acceptable specified quality standards are not being met.

6.6.3 Follow-Up Phase

Follow-up inspection and testing will be geared to a level of effort sufficient to verify the continuation of contract compliance and standards of workmanship established during the previous two phases. Daily checks will be made a matter of record in the CQC documentation for each DFW. Final follow-up checks will be conducted, and all deficiencies will be corrected before the start of additional DFWs that may be affected by any deficient work.

6.6.4 Additional Preparatory and Initial Phases

Additional preparatory and initial phase inspections will be conducted of the same DFWs if the quality of ongoing work is unacceptable (i.e. work not executed in accordance with this Work Plan or the Design Drawings (Appendix A), if there are changes in the CQC staff or work crew, if work on a DFW is resumed after a substantial period of inactivity or if other problems develop.

6.6.5 Completion Phase

At the completion of the DFW, the QC Officer or another designated member of the QC Team will conduct a completion inspection to verify that all work items are complete and in conformance with the project plans and specifications.

Prefinal Inspection. Upon completion of work, the QC Officer will inspect the work and develop a "punch list" of items that do not conform to the approved drawings and Work Plan. Such a list of deficiencies will be included in the CQC documentation and will include the estimated date by which the deficiencies will be corrected. These inspections and any deficiency corrections required following prefinal and final inspections will be accomplished within the time slated for completion of the project.

Final Acceptance Inspection. RWEC's QCSM or other designated member of the QC Team, representatives from applicable subcontractors, and the NTR will be in attendance at this inspection. The NTR will formally schedule the final acceptance inspection. Notice will be given to the NTR at least 14 days before the planned final acceptance inspection date.

6.7 Nonconformance and Corrective Action

All identified nonconforming construction methods, procedures, and materials will be corrected through systematic actions. Any time a condition exists that does not comply with the project plans, applicable codes, workmanship standards, or Navy requirements, the nonconformity will

be resolved. The QC Officer will take the following actions:

- If at any time materials or workmanship are observed that do not comply with project plans, codes, or acceptable construction practices, the QC Officer will notify the RWEC Site Superintendent and subcontractor (if appropriate) to initiate prompt corrective action

- The discrepancies, if they cannot be verbally communicated and corrected immediately, will be documented on a Nonconformance Report (NCR) form (see Appendix D). A detailed description will be given of the item or condition that has failed to meet the project plan or other requirements with an explanation of conditions at the time of failure and its probable cause

- The QC Officer, subcontractor, and Site Superintendent will evaluate discrepancies, coordinate the problem resolution, and determine methods of correction that will prevent recurrence of the problem

- When corrective action is complete, the item will again undergo a final inspection

- The QC Officer will note on the Final Acceptance Report any retest required and performed, nondestructive examination (NDE) required and performed, or changes in identification of any replacement parts used in correcting the problem

- A distribution list for discrepancy reports will be determined at the initial project planning meeting. At a minimum, distribution will include the NTR, PM, Site Superintendent, and QCSM, and the USEPA Notification will occur within 48 hours of incident occurrence.

6.8 Documentation

QC records are the primary means of documenting and reporting construction quality and conformance with contract documents. This section outlines the general procedures that will be followed for the identification, use, handling, filing, storage, and disposition of QC records.

6.8.1 Responsibility

The QC Officer will verify that required records are prepared as work is performed to provide documented evidence of the quality of items, services, and activities. Records will be consistent with applicable codes, work plans, and contracts, and will be adequate for use in management of the project. Inspection and test records will identify the inspector or data recorder, the type of observation, the results, and the acceptability or action taken in connection with any deficiency.

6.8.2 Requirements

Individual inspections, tests, and observations will be scheduled at predetermined points in the project. The proper documentation to record these activities will be compiled by the QC Officer or another designated QC Team member and discussed with the testing personnel before execution. The QC Officer or another designated QC Team member will monitor the inspection process and document progress and observations in the QC logbook. This information will be summarized in the DQCRs provided to the COR, Site Superintendent, and QCSM.

Reports and Records. The QC Officer will maintain current records providing factual evidence that required QC activities and/or tests have been performed. These records will also address the work of subcontractors and suppliers and will be on an acceptable form that includes, at a minimum, the following information:

- Contractor/Subcontractor and their area of responsibility;
- Description of equipment used and number of hours used, idle, or repaired;
- Work performed, including a description and a sketch, if necessary;
- Test and/or control activities performed with results and references to Work Plan requirements. The control phase will be identified (preparatory, initial, or follow up). Any deficiencies will be noted along with corrective actions;
- Quantity of materials received at the site with statement as to acceptability and storage;
- Submittals reviewed and action taken;
- Offsite surveillance activities and actions taken;
- Job safety evaluations stating what was checked, instruction, corrective actions, and results;
- Contractor's statement verifying compliance with contract documents.

These records will cover both conforming and deficient features and will include a statement that the equipment and materials incorporated in the work as well as the workmanship comply with the contract requirements. The reports will be signed and dated by the QC Officer. The report from the QC Officer will include copies of test reports and copies of reports prepared by all QC personnel.

Forms. Construction QC forms will be used for visual observations, inspections, and testing. The QC Officer or another designated QC Team member will witness all required field testing and sign the appropriate forms for the work to be accepted. Inspection and testing forms will identify the equipment, materials, and installations involved, and checklists will be marked where applicable. Locations, orientations, elevations, test parameters, test results, and other comments will be included on the forms as appropriate. Forms will be dated and signed by the person performing the observation, inspection, or test. Forms will also be signed and dated by the QC Officer and submitted to the Site Superintendent for approval.

The QC Officer will document all QC activity on the appropriate forms. Appendix D contains the formats for the DQCR, FVR, List of Outstanding Deficiencies, NCR, Submittal Register and Transmittal Forms, CQC Test Report List, Record of Preparatory and Initial Inspections, Preparatory Inspection Outline, Initial and Follow-up Phase Checklist, and Field Inspection Report. Additional forms may be used as necessary and as approved by the QCSM.

Control. A standard records management and document control system will be used. The PM will be responsible for implementing the system for the entire project and the Site Superintendent will be responsible for implementing these practices in the field. Elements of the records management system include:

- Master index system;
- Logging and issuing of document numbers;
- Method to determine status of documents in progress;
- Standardized procedures/forms;
- Proper storage of documents;
- Retrieval;
- Archiving.

Elements of the document control system include:

- Logging and issuing of control numbers;
- Assignment of a central control person;
- Controlled access.

Project records will be maintained in a safe and retrievable manner until project closeout. Physical and electromagnetic protection will be provided until records are delivered to the client or archived. Archived records will be protected from loss or damage for 5 years or as specified by the government.

7.0 DOCUMENTATION AND REPORTING

7.1 Construction Completion Report

Following the completion of all construction work, RWEC will prepare a construction completion report. This closure report will address site-specific information including the following:

- A cover letter signed by the PGM certifying that all services were performed according to the project requirements;
- A synopsis/written narrative report describing site activities including quantities of materials removed, sample collection data, and certification that the work was completed in accordance with the Work Plan, which includes the CQC Plan, SAP, and SSHP;
- Explanation and description of any modifications to the Work Plan or any other plans and why the modifications were necessary;
- Information demonstrating that the approval plans were implemented and the cleanup criteria have been met;
- Summary of significant activities that occurred during construction, including problems that were encountered and how they were addressed;
- Copies of all analyses performed including QC data;
- Information on who sampled, analyzed, transported, and accepted all wastes encountered and copies of manifests, as applicable;
- As-built scale drawings that depict the site;
- A CQC summary;
- Summary of total project costs;
- Preconstruction, progress and post-construction photographs.

7.2 Weekly Progress Meetings

While field activities are in progress, RWEC will participate in weekly progress meetings with the NTR. The standard agenda will include the following:

- A description and status of the project and cost report;
- Summaries of all findings and description of significant activities and work completed or accomplished;
- Summaries of all changes made during the reporting period (e.g., personnel, documentation, construction);

- Summaries of all problems encountered or anticipated problems prevented during the reporting period;
- Actions taken to rectify/prevent problems;
- Problems resolved;
- Changes to key project personnel;
- Projected work for the next reporting period;
- Deliverables submitted;
- Schedule updates.

7.3 Daily Quality Control Reports

A DQCR will be completed daily during field activities to document all project activities. The report will cover both conforming and nonconforming work and materials and, where applicable, will include a statement of certification that all materials, supplies, and work accepted that day comply with the contract requirements. The QC Officer or authorized designee will sign the DQCR to validate the certification. The DQCR will include, but not be limited to the following:

- Type and number of control activities;
- Results of inspections and tests;
- Types of defects/causes for rejection, if any;
- Corrective actions proposed/taken, if any;
- Number of personnel working on project by trade;
- Types and quantities of equipment on site;
- Types and quantities of materials delivered to site;
- Weather conditions/long-term forecast;
- Delays and their causes, if any;
- Verbal instructions;
- Samples collected;
- Waste transportation and disposal summary;
- Visitors to the site such as regulators, politicians, reporters, etc.;
- Health and safety activities;
- Daily and cumulative safety hours.

8.0 PROJECT SCHEDULE

Appendix F presents a chart showing the corrective measures schedule. Before mobilization, the proposed construction schedule will be reviewed with the appropriate Navy personnel to identify the best time frame to complete the work and to identify access limitations, if any. Work will be scheduled to minimize delays and expedited to determine if additional funding is needed to complete the project.

The schedule includes review of plans by USEPA, Puerto Rico EQB, and Navy personnel; sampling and analysis; procurement of necessary equipment and materials; completion of all corrective measures activities; and the preparation of final reports.

9.0 REFERENCES

Michael Baker Jr., Inc. (Baker) 1995. Final RCRA Facility Investigation Management Plans, Naval Station Roosevelt Roads, Ceiba, Puerto Rico. September 14, 1995. Coraopolis, Pennsylvania.

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US Army Corps of Engineers (2003). Engineering Manual (EM) 385-1-1. Safety – Safety and Health Requirements. Class III Perimeter Protection, Chapter 25 and Appendix Q. COE EM 385-1-1. November 3, 2003.

USEPA, 2007. RCRA § 7003 Administrative Order on Consent. In the Matter of: United States The Department of the Navy, Naval Activity Puerto Rico formerly Naval Station Roosevelt Roads, Puerto Rico. Environmental Protection Agency, EPA Docket No. RCRA-02-2007-7301. January 29, 2007.

FIGURES

FIGURE 1–1
REGIONAL LOCATION MAP
REMEDIAL ACTION WORKPLAN FOR
SWMU 68–FORMER SOUTHERN FIRE TRAINING AREA

NAVAL ACTIVITY PUERTO RICO
CEIBA, PUERTO RICO

SOURCE: METRODATA, INC., 1999.

LEGEND

– SWMUs

– AOCs

– AREA TO WHICH THIS INVESTIGATION PERTAINS

SOURCE: GEO-MARINE, INC., SEPTEMBER 6, 2000.

3000 0 1500 3000

1 inch = 3000 ft.

FIGURE 1-2
SWMU/AOC LOCATION MAP
REMEDIAL ACTION WORK PLAN FOR
SWMU 68-FORMER SOUTHERN FIRE TRAINING AREA

NAVAL ACTIVITY PUERTO RICO

SOURCE: GEO-MARINE, INC., SEPTEMBER 6, 2000.

LEGEND

- 1961 POLYGON FEATURE
- 1964 POLYGON FEATURE
- 1961 DRAINAGE
- ECP SITE BOUNDARY
- WETLANDS DELINEATION
- PEM1 – WETLANDS DELINEATION IDENTIFICATION CODES

500 0 250 500

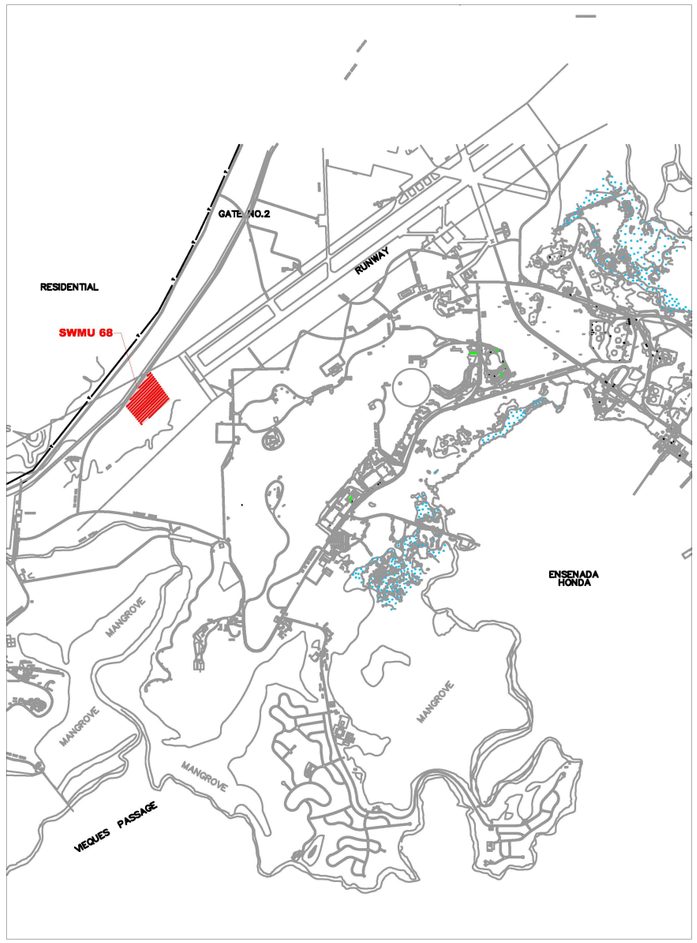
1 inch = 500 ft.

FIGURE 1-3
SITE LAYOUT
REMEDIAL ACTION WORK PLAN FOR
SWMU 68-FORMER SOUTHERN FIRE TRAINING AREA

NAVAL ACTIVITY PUERTO RICO

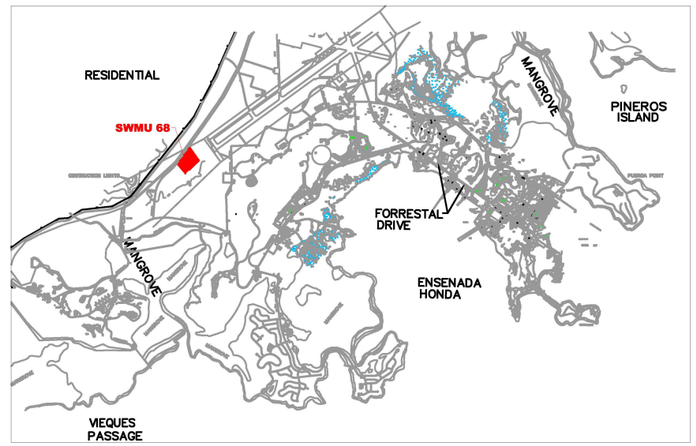
APPENDIX A
SWMU 68 DESIGN DRAWINGS

CORRECTIVE MEASURES IMPLEMENTATION
REMEDIAL DESIGN FOR SOIL REMEDIATION
SWMU 68–FORMER SOUTHERN FIRE TRAINING AREA
NAVAL ACTIVITY PUERTO RICO (NAPR)
CEIBA, PUERTO RICO



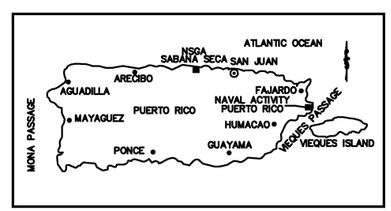
LOCATION MAP

1"=2000' 0' 2000' 4000' 6000' 8000' 10000'



VICINITY MAP

1"=4000'



INDEX OF SHEETS

SHEET NO.	TITLE
T–1	COVER SHEET AND GENERAL NOTES
C–1	EXISTING CONDITIONS PLAN
C–2	REMOVAL ACTION PLAN
C–3	GRADING PLAN
C–4	CIVIL DETAILS

ABBREVIATIONS

BGS	BELOW GROUND SURFACE
BLDG.	BUILDING
℄	CENTERLINE
CMI	CORRECTIVE MEASURES IMPLEMENTATION
E	EAST
EL.	ELEVATION
FT	FOOT OR FEET
INV.	INVERT ELEVATION
mg/kg	MILLIGRAMS PER KILOGRAM
MSL	MEAN SEA LEVEL
N	NORTH
NAD	NORTH AMERICAN DATUM
NAVD	NORTH AMERICAN VERTICAL DATUM
NAPR	NAVAL ACTIVITY PUERTO RICO
NTR	NAVY TECHNICAL REPRESENTATIVE
NTS	NOT TO SCALE
PPM	PARTS PER MILLION
S	SOUTH
SWMU	SOLID WASTE MANAGEMENT UNIT
TYP	TYPICAL

GENERAL NOTES

1. BASED UPON FIELD OBSERVATIONS, NO KNOWN UTILITIES ARE EXPECTED WITHIN THE EXCAVATION LIMITS IDENTIFIED ON THESE DRAWINGS UNLESS INDICATED. THE CONTRACTOR SHALL CONFIRM A UTILITY–FREE AREA PRIOR TO THE COMMENCEMENT OF ANY FIELD ACTIVITY. DAMAGE TO UTILITIES WILL BE REPAIRED AT NO EXPENSE TO THE GOVERNMENT, UNLESS OTHERWISE INDICATED.
2. THE CONTRACT DRAWINGS AND TECHNICAL SPECIFICATIONS ADDRESS THE MINIMUM EROSION AND SEDIMENT CONTROL REQUIREMENTS. THESE REQUIREMENTS SHALL BE ADAPTED AND MODIFIED TO BEST SUIT THE SEQUENCE OF CONSTRUCTION. THE CONTRACTOR SHALL DEVELOP AND IMPLEMENT AN EROSION AND SEDIMENT CONTROL PLAN IN ACCORDANCE WITH THE COMMONWEALTH OF PUERTO RICO'S EROSION CONTROL LAWS, REGULATIONS, AND HANDBOOKS, LATEST REVISION.
3. FIELD–STAKE THE LOCATION OF ALL AREAS TO BE DISTURBED PRIOR TO ACTUAL WORK. THESE LOCATIONS SHALL BE REVIEWED BY THE ROICC PRIOR TO CLEARING, GRUBBING, AND EXCAVATION ACTIVITIES.
4. LIMIT ALL WORK TO THE IMMEDIATE PROJECT AREA. RESTORE ALL DISTURBED AREAS THAT ARE OUTSIDE OF THE PROJECT LIMITS OF WORK TO THEIR ORIGINAL CONDITION.
5. SITE RESTORATION EFFORTS ARE NOT TO BE PERFORMED UNTIL CONFIRMATION OF CONTAMINANT REMOVAL HAS BEEN ACCOMPLISHED AND APPROVED BY THE ROICC.
6. COMPLY WITH ALL FEDERAL, STATE, AND LOCAL ORDINANCES UNLESS OTHERWISE NOTED IN THE CONTRACT DRAWINGS AND TECHNICAL SPECIFICATIONS.
7. INSPECT ALL TRUCK HAULING ROUTES PRIOR TO COMMENCEMENT OF HAULING ACTIVITIES TO ENSURE THAT THE PROPOSED ROUTES AND ASSOCIATED FACILITIES (E.G. ROAD SURFACES, BRIDGES, CULVERTS, UTILITIES) WILL SUSTAIN THE ADDITIONAL TRAFFIC AND LOADS.

QUALITY CONTROL REVIEW

SIGNATURE: Mark E. Kimes DATE: MAY 2010

SOURCE: ICF KAISER.

REVISIONS

DESCRIPTION	DATE	APPROVED

MICHAEL BAKER JR., INC. MOON TOWNSHIP, PENNSYLVANIA

A/E CONTRACT NO. N69450–08–C–0093

DEPARTMENT OF THE NAVY — NAVAL FACILITIES ENGINEERING COMMAND SOUTHEAST, CHARLESTON, S.C

SWMU 68 — CMI REMEDIAL DESIGN FOR SOIL REMEDIATION FOR SWMU 68 — NAPR, CEIBA, PUERTO RICO

COVER SHEET AND GENERAL NOTES

CODE ID. NO. 80091 SIZE D

SCALE: AS SHOWN

EFD NO.

STA. PROJ. NO.

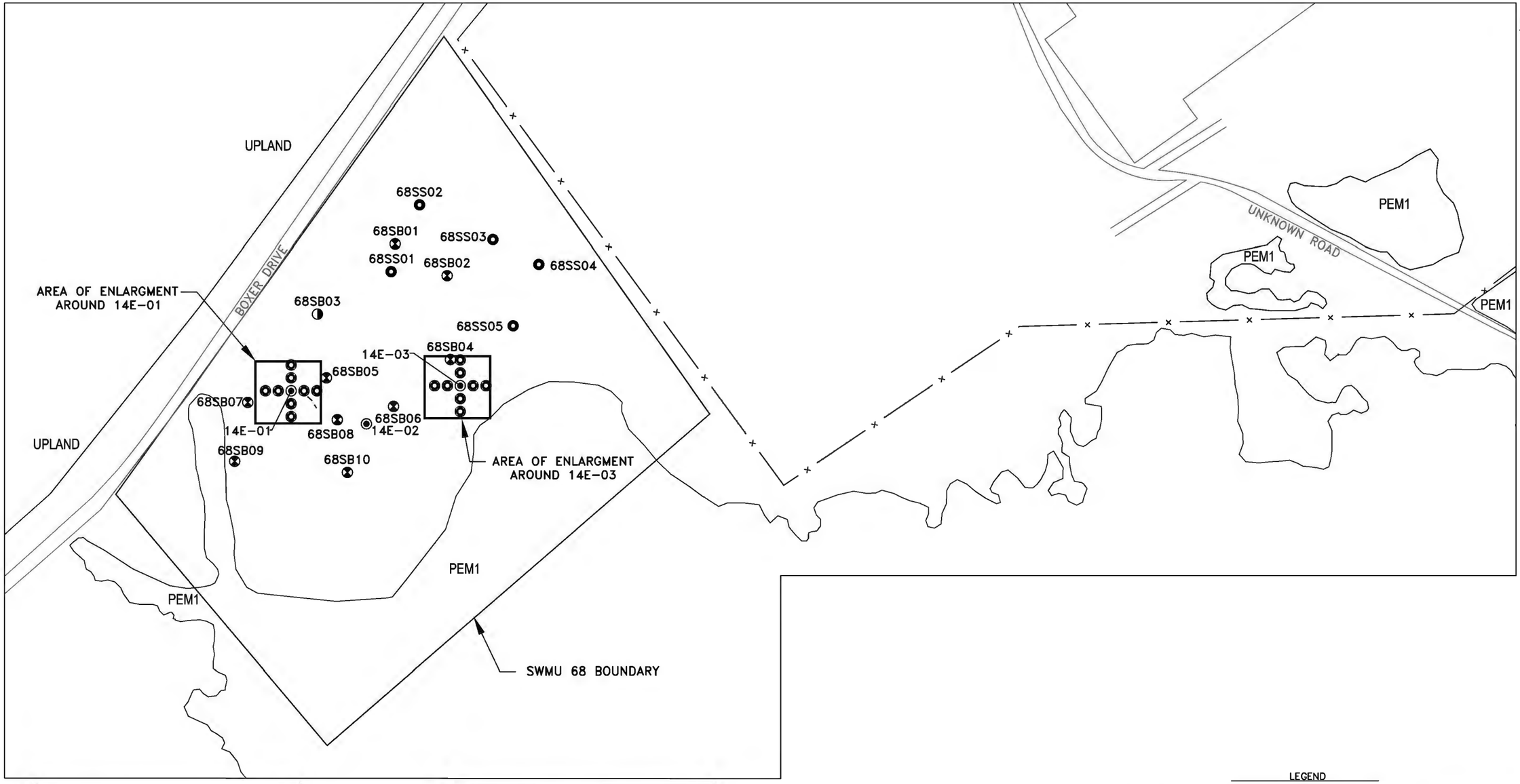
SPEC. NO.

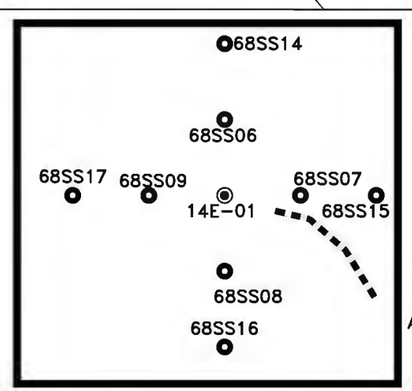
CONSTR. CONTR. NO.

NAVFAC DRAWING NO.

SHEET 1 OF 5

T–1



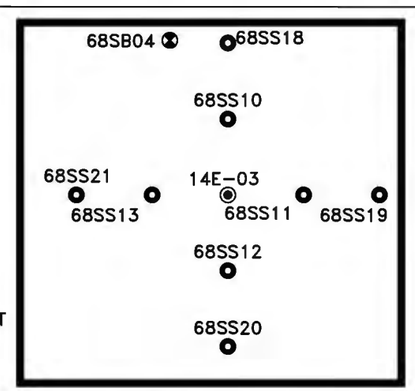


AREA OF ENLARGMENT AROUND 14E-01

AREA OF ENLARGMENT SCALE

0 25 50

1 inch = 50 ft.



AREA OF ENLARGMENT AROUND 14E-03

LEGEND

	EXISTING	REMOVE	NEW
SURFACE AND SUBSURFACE SOIL SAMPLE LOCATION (PHASE II ECP INVESTIGATION 2004)	◉		
SURFACE AND SUBSURFACE SOIL AND GROUNDWATER SAMPLE LOCATION (PHASE I RFI NOV. 06)	⊗		
SURFACE AND SUBSURFACE SOIL SAMPLE LOCATION (PHASE I RFI NOV. 06)	◑		
SURFACE SOIL (PHASE I RFI SEPT. AND OCT. 07) SAMPLE LOCATIONS	⊙		
DELINEATION SAMPLES – SURFACE SOIL	⊙		
PROPOSED AREA OF SOIL REMOVAL			▨
WETLAND DELINEATION	▭		
WETLAND DELINEATION IDENTIFICATION CODES	PEM1		
1961 DRAINAGE DITCH	—		
SAFETY FENCE			—SF—
SILT FENCE			—SC—
PROPOSED LIMITS OF EXCAVATION			—
CONTRACTOR AREAS			▭

100 0 50 100 200 0 100 200

1 inch = 100 ft. FULL SIZE

1 inch = 200 ft. HALF SIZE

115354_68_CMI_01.DWG

SYMBOL	DESCRIPTION	DATE	APPROVED BY

REVISIONS

J.E. MEK DESIGNED
RRR DRAWN
LS REVIEWED
PROJECT MANAGER
PIC PROJECTION
QUALITY CONTROL
PROJECT MANAGER
PROJECT DIRECTOR

Baker

MICHAEL BAKER JR., INC.
MOON TOWNSHIP, PENNSYLVANIA

A/E CONTRACT NO. N69450-08-C-0093

ACTIVITY – SATISFACTORY NO. DATE

RPA FOR INC. COMMANDER ACTIVITY DATE

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND SOUTHEAST
NAVAL STATION CHARLESTON, S.C
SWMU 68 NAPR, CEIBA, PUERTO RICO

CMI REMEDIAL DESIGN FOR SOIL REMEDIATION FOR SWMU 68

EXISTING CONDITIONS PLAN

CODE ID. NO. 80091 SIZE D

SCALE: 1" = 100'

EFD NO.

STA. PROJ. NO.

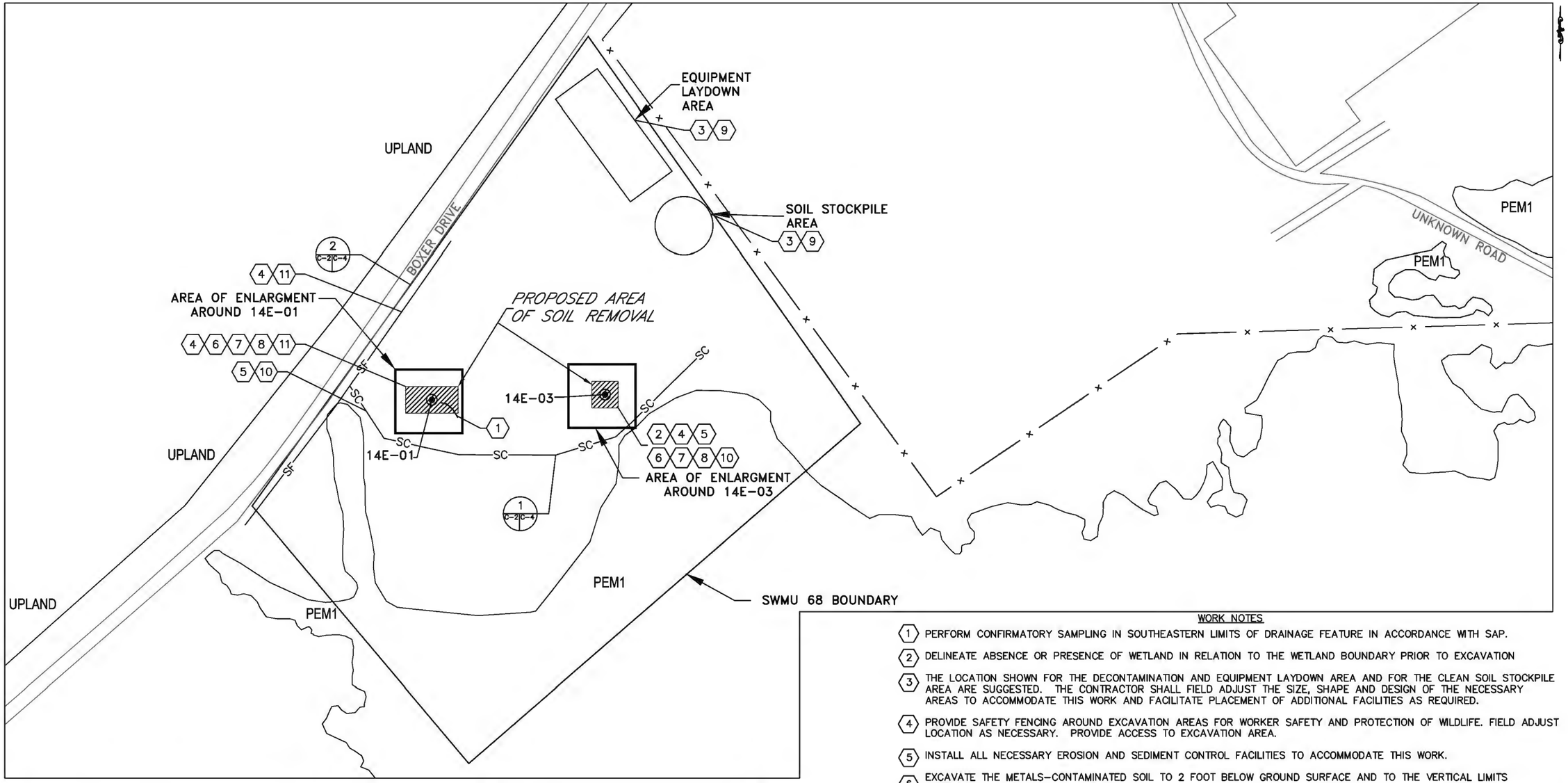
SPEC. NO.

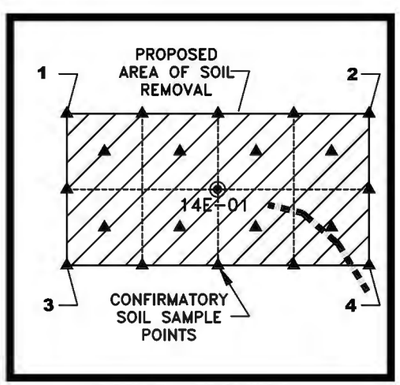
CONSTR. CONTR. NO.

NAVFAC DRAWING NO.

SHEET 2 OF 5

C-1





AREA OF ENLARGMENT AROUND 14E-01

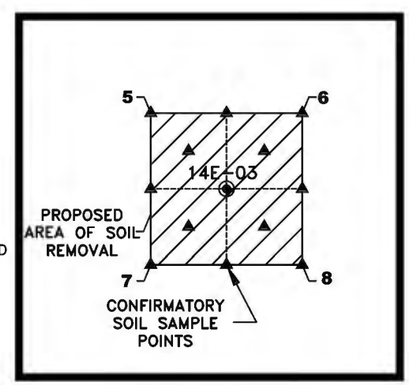
ID	EAST	NORTH
1	924061.280	802437.450
2	924161.020	802437.450
3	924061.280	802387.450
4	924161.020	924161.020
5	924414.970	802447.310
6	924464.970	802447.310
7	924414.970	802397.310
8	924464.970	802397.310

COORDINATES WERE COLLECTED IN PUERTO RICO AND VIRGIN ISLANDS NAD83 US FOOT

AREA OF ENLARGMENT SCALE

0 25 50

1 inch = 50 ft.



AREA OF ENLARGMENT AROUND 14E-03

WORK NOTES

1. PERFORM CONFIRMATORY SAMPLING IN SOUTHEASTERN LIMITS OF DRAINAGE FEATURE IN ACCORDANCE WITH SAP.
2. DELINEATE ABSENCE OR PRESENCE OF WETLAND IN RELATION TO THE WETLAND BOUNDARY PRIOR TO EXCAVATION
3. THE LOCATION SHOWN FOR THE DECONTAMINATION AND EQUIPMENT LAYDOWN AREA AND FOR THE CLEAN SOIL STOCKPILE AREA ARE SUGGESTED. THE CONTRACTOR SHALL FIELD ADJUST THE SIZE, SHAPE AND DESIGN OF THE NECESSARY AREAS TO ACCOMMODATE THIS WORK AND FACILITATE PLACEMENT OF ADDITIONAL FACILITIES AS REQUIRED.
4. PROVIDE SAFETY FENCING AROUND EXCAVATION AREAS FOR WORKER SAFETY AND PROTECTION OF WILDLIFE. FIELD ADJUST LOCATION AS NECESSARY. PROVIDE ACCESS TO EXCAVATION AREA.
5. INSTALL ALL NECESSARY EROSION AND SEDIMENT CONTROL FACILITIES TO ACCOMMODATE THIS WORK.
6. EXCAVATE THE METALS-CONTAMINATED SOIL TO 2 FOOT BELOW GROUND SURFACE AND TO THE VERTICAL LIMITS INDICATED
7. FOLLOWING EXCAVATION TO THE INDICATED LIMITS, THE NAVY'S ON-SITE REPRESENTATIVE WILL CONDUCT CONFIRMATORY SAMPLING AS SPECIFIED TO VERIFY THE REMOVAL OF METALS-CONTAMINATED SOILS FROM THE SITE. EXCAVATION WILL CONTINUE UNTIL THE REMOVAL GOALS ARE MET AS FOLLOWS:

Chemical of Concern	Surface Soil CAO Level
	mg/kg
Copper	168
Lead	87
Zinc	120

8. UPON APPROVAL FROM THE NAVY, BACKFILL THE EXCAVATION AREAS AS SPECIFIED WITH MATERIAL. PLACE 6 INCHES OF COMPACTED TOP SOIL UPON BACKFILL AND VEGETATE AS SPECIFIED.
9. REMOVE THE DECONTAMINATION AND EQUIPMENT LAYDOWN AREA AND THE CLEAN SOIL STOCKPILE AREA. REVEGETATE DISTRUBED AREAS AS SPECIFIED.
10. UPON THE RE-ESTABLISHMENT OF VEGETATION AND APPROVAL FROM THE NAVY, REMOVE ALL EROSION AND SEDIMENTATION CONTROL FACILITIES. REVEGETATE AS SPECIFIED.
11. REMOVE CAUTION TAPE AND SAFETY FENCING UPON COMPLETION OF WORK.
12. APPROXIMATE LOCATION OF CONFIRMATORY SAMPLES. FINAL SAMPLE LOCATIONS AND ID WILL BE DOCUMENTED BY SURVEY.

100 0 50 100 200 — 1 inch = 100 ft. FULL SIZE
0 100 200 300 — 1 inch = 200 ft. HALF SIZE

115354_68_CMI_02.DWG

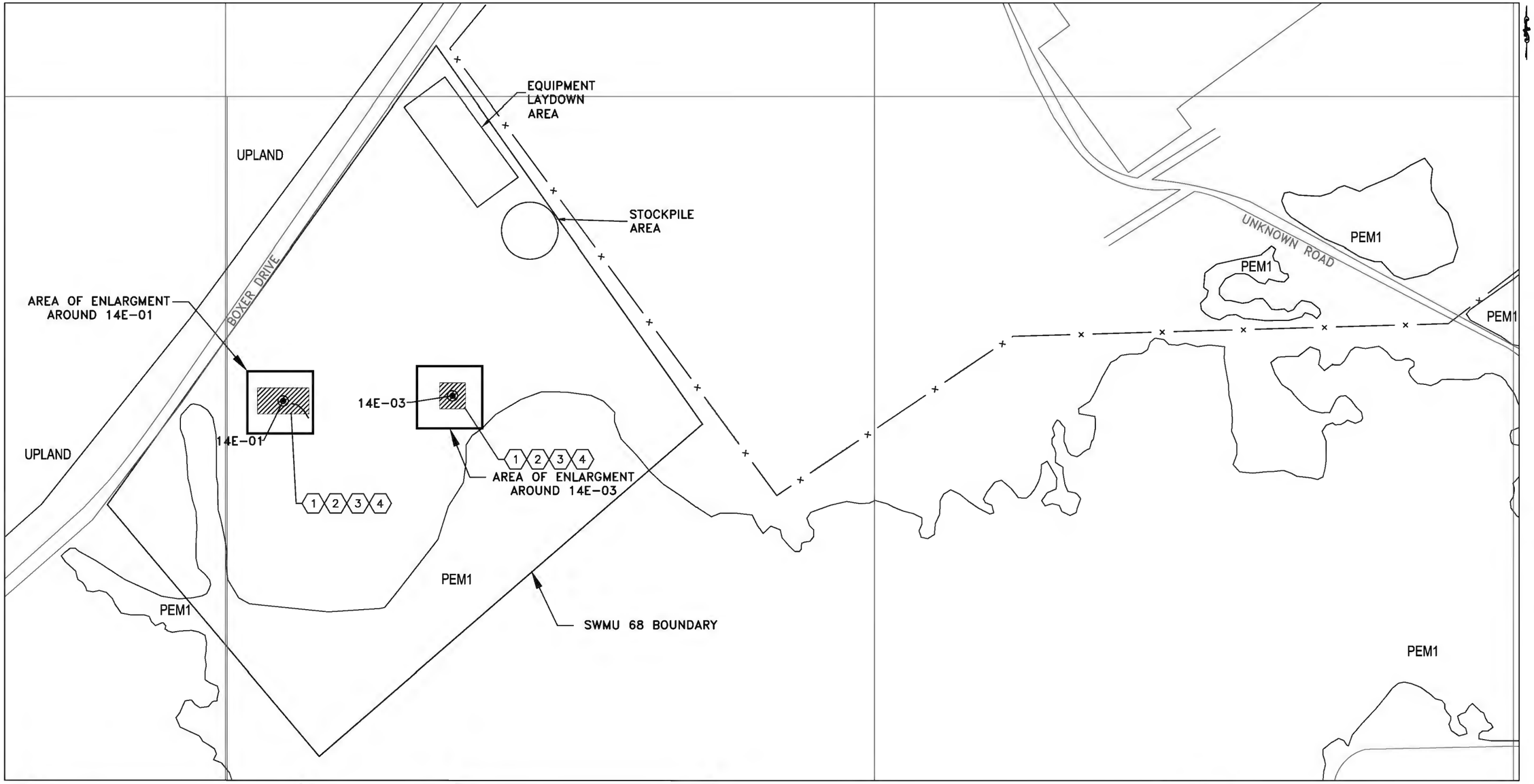
SYMBOL	DESCRIPTION	DATE	APPROVED BY
	REVISIONS		

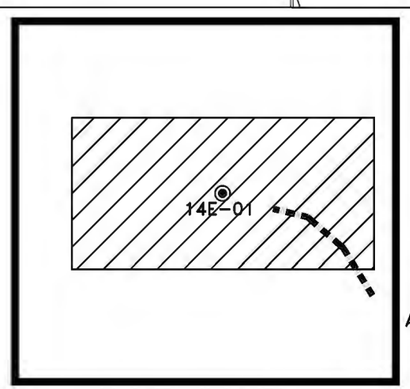
A.E. MEK DESIGN
RRR DRAWN
LS REVIEW
CHIEF AREA/DISC
PROJECT MANAGER
FIELD PROJECTION
QUALITY CONTROL
BRANCH MANAGER
TECHNICAL DIRECTOR

Baker
MICHAEL BAKER JR., INC.
MOON TOWNSHIP, PENNSYLVANIA
A/E CONTRACT NO. N69450-08-C-0093
ACTIVITY – SATISFACTORY NO. DATE
REF. FOR INC. COMMUNICATIONS

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND SOUTHEAST
NAVAL STATION CHARLESTON, S.C
SWMU 68 NAPR, CEIBA, PUERTO RICO
CMI REMEDIAL DESIGN FOR SOIL REMEDIATION FOR SWMU 68
REMOVAL ACTION PLAN

CODE ID. NO. 80091 SIZE D
SCALE: 1" = 100'
EFD NO.
STA. PROJ. NO.
SPEC. NO.
CONSTR. CONTR. NO.
NAVFAC DRAWING NO.
SHEET 3 OF 5
C-2



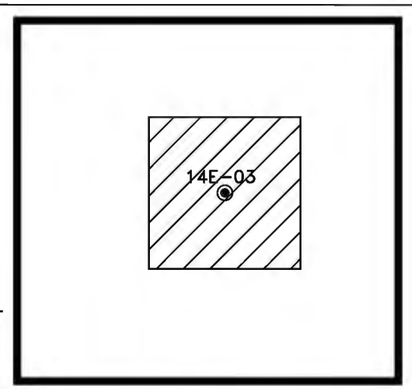


AREA OF ENLARGMENT AROUND 14E-01

AREA OF ENLARGMENT SCALE

0 25 50

1 inch = 50 ft.



AREA OF ENLARGMENT AROUND 14E-03

WORK NOTES

1. LIMIT OF EXCAVATION OF METALS-CONTAMINATED SOIL IS SUBJECT TO CHANGE PENDING RESULTS OF CONFIRMATORY SAMPLING.
2. LIMIT OF DISTURBANCE IS SUBJECT TO CHANGE PENDING RESULTS OF CONFIRMATORY SAMPLING.
3. GRADE AREA TO MEET EXISTING GRADES. FINAL GRADE SHOULD INCORPORATE PLACEMENT OF 6 INCHES OF TOPSOIL. REVEGETATE AS SPECIFIED.
4. DO NOT DISTURB AREAS OUTSIDE THOSE SPECIFIED WITHOUT APPROVAL OF THE NAVY.

100 0 50 100 200 — 1 inch = 100 ft. FULL SIZE

0 100 200 — 1 inch = 200 ft. HALF SIZE

115354_68_C48_03.DWG

SYMBOL	DESCRIPTION	DATE	APPROVED BY
	REVISIONS		

DESIGN MEK
DRAWN RRR
REVIEW LS
PROJECT MANAGER
PRE PRODUCTION
QUALITY CONTROL
BRANCH MANAGER
DIVISION DIRECTOR

Baker

MICHAEL BAKER JR., INC.
MOON TOWNSHIP, PENNSYLVANIA

A/E CONTRACT NO. N69450-08-C-0093

ACTIVITY - SATISFACTORY TO: DATE

RFA FOR INC COMMISSION ACTIVITY: DATE

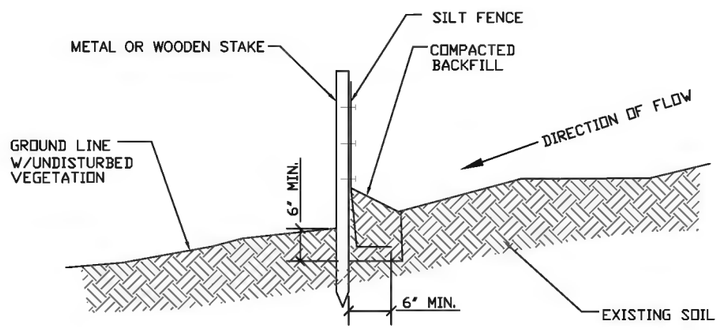
DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
SOUTHEAST
NAVAL STATION CHARLESTON, S.C
SWMU 68 NAPR, CEIBA, PUERTO RICO

CMI REMEDIAL DESIGN FOR SOIL REMEDIATION FOR SWMU 68

GRADING PLAN

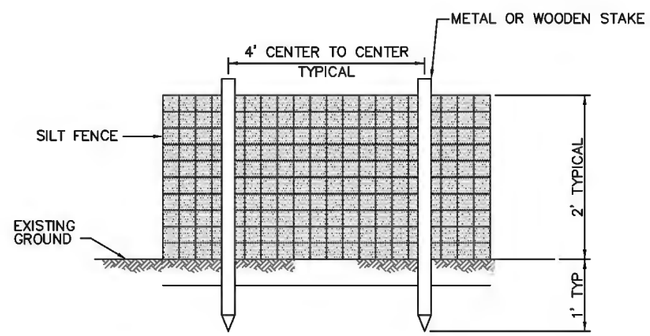
CODE ID. NO. 80091 SIZE D
SCALE: 1" = 100'
EFD NO.
STA. PROJ. NO.
SPEC. NO.
CONSTR. CONTR. NO.
NAVFAC DRAWING NO.
SHEET 4 OF 5

C-3



SILT FENCE ANCHOR DETAIL

1 C-2|C-4 NOT TO SCALE



SILT FENCE

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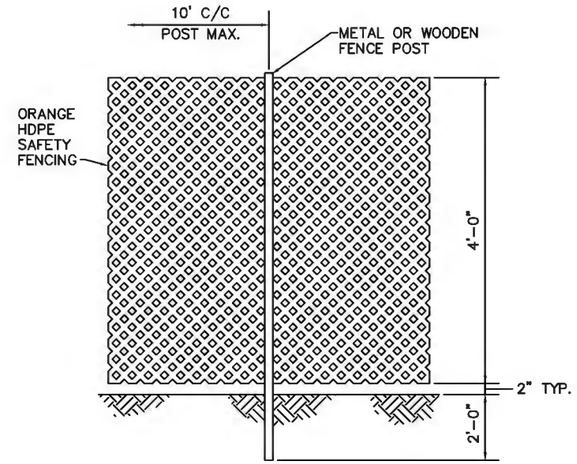


2 C-2|C-4 SAFETY FENCE

NOT TO SCALE

SYMBOL	DESCRIPTION	DATE	APPROVED BY

REVISIONS

DESIGN: MEK
DRAWN: RRR
REVIEW: LS
PROJECT MANAGER
PROJECT ENGINEER
QUALITY CONTROL
BRANCH MANAGER
BRANCH DIRECTOR

Baker

MICHAEL BAKER JR., INC.
MOON TOWNSHIP, PENNSYLVANIA

A/E CONTRACT NO. N69450-08-C-0093

ACTIVITY - SATISFACTORY NO. _____ DATE _____

FOR USE ON CONSTRUCTION SURVEYS

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
SOUTHEAST
NAVAL STATION CHARLESTON, S.C
SWMU 68 NAPR, CEIBA, PUERTO RICO
CMI REMEDIAL DESIGN FOR SOIL REMEDIATION FOR SWMU 68

CIVIL DETAILS

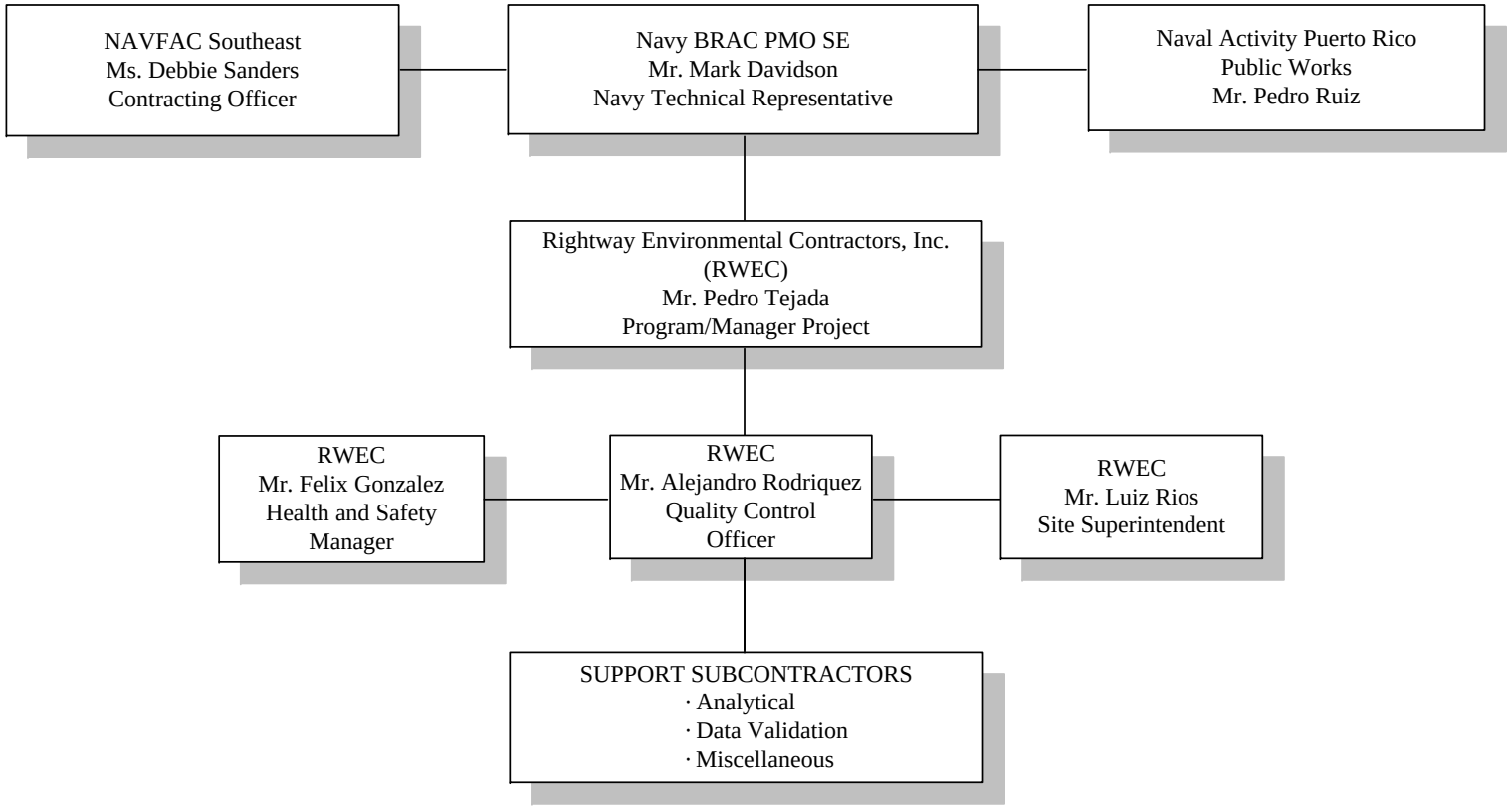
CODE ID. NO. 80091 SIZE D
SCALE: 1" = 100'
EFD NO.
STA. PROJ. NO.
SPEC. NO.
CONSTR. CONTR. NO.
NAVFAC DRAWING NO.
SHEET 5 OF 5

C-4

115354_68_CMI_04.DWG

APPENDIX B
ORGANIZATIONAL CHART

APPENDIX B
PROJECT ORGANIZATION
PHASE I INTERIM CORRECTIVE MEASURES WORK PLAN – SWMU 68
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO



APPENDIX C
SAMPLING AND ANALYSIS PLAN

REVISED FINAL

SAMPLING AND ANALYSIS PLAN
SWMU 68

NAVAL ACTIVITY PUERTO RICO
EPA I.D. NO. PR2170027203
CEIBA, PUERTO RICO

SEPTEMBER 3, 2010

Prepared for:

DEPARTMENT OF THE NAVY
NAVFAC SOUTHEAST
North Charleston, SC

Under:

Contract No. N69450-08-C-0093

Prepared by:

RIGHT WAY ENVIRONMENTAL CONTRACTORS, INC.
Naranjito, Puerto Rico 00719

I certify under penalty of law that I have examined and am familiar with the information submitted in this document and all attachments and that this document and its attachments were prepared either by me personally or under my direction or supervision in a manner designed to ensure that qualified and knowledgeable personnel properly gather and present the information contained therein. I further certify, based on my personal knowledge or on my inquiry of those individuals immediately responsible for obtaining the information, that the information is true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowingly and willfully submitting a materially false statement.

Signature: _____

Name: **Mark E. Davidson**

Title: **BRAC Env. Coordinator**

Date: **September 3, 2010**

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A Standard Operating Procedures

LIST OF ACRONYMS AND ABBREVIATIONS

APA	Aerial Photography Analysis
Baker	Michael Baker Jr., Inc.
bgs	below ground surface
BRAC	Base Realignment and Closure
CAOs	Corrective Action Objectives
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CERFA	Community Environmental Response Facilitation Act
CFR	Code of Federal Regulations
CMI	Corrective Measures Implementation
CMS	Corrective Measures Study
CoC	Chain of Custody
COR	Contracting Officer's Representative
CRQL	Contract Required Quantitation Limits
DQO	Data Quality Objective
ECP	Environmental Condition of Property
EPA	Environmental Protection Agency
ft	feet
IDW	Investigation-Derived Waste
LANTDIV	Naval Facilities Engineering Command, Atlantic Division
mg/kg	Milligrams per Kilogram
mil	millimeter
NAPR	Naval Activity Puerto Rico
NAVFAC	Naval Facilities Engineering Command
NSRR	Naval Station Roosevelt Roads
NTR	Navy Technical Representative
PCBs	Polychlorinated Biphenyls
PI	Photo Identified
PMO	Program Management Office
PPE	Personal Protective Equipment
QA	Quality Assurance
QC	Quality Control
QA/QC	Quality Assurance/Quality Control

LIST OF ACRONYMS AND ABBREVIATIONS
(Continued)

RCRA	Resource Conservation and Recovery Act
RFI	RCRA Facility Investigation
RWEC	Right Way Environmental Contractors, Inc.
SAP	Sampling and Analysis Plan
SE	Southeast
SOP	Standard Operating Procedures
SOW	Scope of Work
SVOC	Semi-Volatile Organic Compound
SWMU	Solid Waste Management Unit
TCLP	Toxicity Characteristic Leaching Procedure
TAT	Turnaround Time
USEPA	United States Environmental Protection Agency
VOC	Volatile Organic Compound

1.0 INTRODUCTION

This Sampling and Analysis Plan (SAP) describes the proposed rationale and procedures for supplemental data collection activities for the implementation of the Corrective Measures at Solid Waste Management Unit (SWMU) 68 Naval Activity Puerto Rico (NAPR), Ceiba, Puerto Rico.

Implementation of the corrective measures is being performed by Right Way Environmental Contractors, Inc. (RWEC) for the Navy Base Realignment and Closure (BRAC) Program Management Office (PMO) Southeast (SE) office under contract N69450-08-R-0093.

This project-specific SAP has been prepared to ensure that the data quality objectives (DQOs) specified for this project are met, that the field sampling protocols are documented and reviewed in a consistent manner, and that the data collected are scientifically valid and legally defensible. The SAP provides the overall technical approach, sampling and data collection procedures, and quality assurance (QA) requirements of the work anticipated under this removal action project. The DQOs, SOPs, and QAPP requirements were approved by EPA in letter dated April 17, 2008.

The field team collecting the samples will carry the SAP and reference it as necessary. Unless otherwise specified in this document, the procedures and protocols established in the Corrective Measures Implementation Work Plan for SWMU 68 (Baker, 2009a) will be followed for this project.

1.1 NAPR

NAPR occupies over 8,800 acres on the northern side of the east coast of Puerto Rico along Vieques Passage with Vieques Island lying to the east about 10 miles off the harbor entrance (see Figure 1-1 of the Work Plan). NAPR also occupies the immediately adjacent islands of Piñeros and Cabeza de Perro, as presented on Figure 1-2 of the Work Plan. The northern entrance to NAPR is about 35 miles east along the coast road (Route 3) from San Juan. The property consists of 3,938 acres of upland (developable) property and 4,955 acres of environmentally sensitive areas including wetlands, mangrove, and wildlife habitat. The closest large town is Fajardo (population approximately 37,000), which is about 5 miles north of NAPR off Route 3. Ceiba (population approximately 17,000) adjoins the west boundary of NAPR.

The facility was commissioned in 1943 as a Naval Operations Base, and re-designated a Naval Station in 1957. Naval Station Roosevelt Roads (NSRR) operated as a Naval Station from 1957 until March 31, 2004. NSRR was one of the largest naval facilities in the world with more than 100 miles of paved roads, approximately 1,300 buildings, a large scale airfield (Ofstie Field), a deep water port and over 30 tenant commands. NSRR played a major role in providing communication support to the Atlantic and Caribbean areas and also served as a major training site for fleet exercises.

Section 8132 of fiscal year 2004 Defense Appropriations Act, signed into law on September 30, 2003, directed that NSRR be disestablished within six months, and that the real estate disposal/transfer be carried out in accordance with procedures contained in the BRAC Act of 1990. This legislation required that the base closure be conducted in accordance with the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), as amended by the Community Environmental Response Facilitation Act (CERFA). NSRR has undergone operational closure as of March 31, 2004 and has been designated as Naval Activity Puerto Rico. The mission of NAPR is to protect the physical assets remaining, comply with

environmental regulations, and sustain the value of the property until final disposal of the property. NAPR will continue until the real estate disposal/transfer is completed.

In anticipation of operational closure of NSRR the Naval Facilities Engineering Command, Atlantic Division (LANTDIV) prepared Phase I/Phase II Environmental Condition of Property (ECP) Reports to document the environmental condition of NSRR. The Draft Phase I Environmental Condition of Property Report dated March 31, 2004 (LANTDIV, 2004) identified new sites at NAPR based on the results of a review of records, an analysis of historic aerial photographs, physical site inspections, and interviews with persons familiar with past and current operations and activities. The new ECP sites had not been previously identified or investigated under existing environmental program areas. A Phase II ECP field investigation was performed in 2004 to conduct environmental sampling to determine if a release/disposal actually occurred at any of the sites recommended for further evaluation in the Phase I ECP and, if so, whether any potential risk to human health was present. The Final Phase II Environmental Condition of Property Report recommended additional sampling (to be undertaken as part of the RCRA Program) at several sites to permit a more detailed assessment (NAVFAC Atlantic, 2005).

The United States Environmental Protection Agency (USEPA) issued a RCRA 7003 Administrative Order (Environmental Protection Agency [EPA] Docket No. RCRA-02-2007-7301), identifying a number of SWMUs (including SWMU 68) as having documented releases of solid and/or hazardous waste and hazardous constituents, and required follow-on actions, as specified in the Administrative Order. Following a public comment period, the Consent Order became effective on January 29, 2007 (USEPA 2007).

Ownership of the airfield parcel at NAPR (Ofstie Airfield) was transferred from the United States Navy to the Puerto Rico Ports Authority on February 7, 2008. The Ports Authority developed the airfield into an operational regional airport. However, in accordance with the Administrative Order, the Covenant Deferral Request and Quitclaim Deed of Transfer, the US Navy maintains responsibility for the investigation and cleanup of SWMU 68.

Historic sampling results indicate that several constituents are of concern for SWMU 68. The following subsections provide a brief discussion of the background for SWMU 68. The locations of SWMU 68 is shown on Figures 1-2 and 1-3 of the Work Plan and site drawings are shown in Appendix A of the Work Plan.

1.2 SWMU 68

SWMU 68 – the Former Southern Fire Training Area (also known as ECP Site 14), is located at the southwest end of the Ofstie Airfield within a flat lying open area surrounded by secondary growth vegetation as shown on Figures 1-2 and 1-3 and Appendix A of the Work Plan. SWMU 68 covers approximately 18 acres and includes a circular area formerly bisected by an east-west running road.

The Aerial Photography Analysis (APA) presented in the Phase I ECP Report (LANTDIV, 2004) identified this area as Photo Identified (PI) Site 19, due to the observation of a circular, graded area with an aircraft fuselage and two stained areas consistent with a fire training area from 1961-1964. The Phase I ECP records review did not identify a fire training area at this location. However, interviews conducted during the Phase I ECP confirmed former use of the area for fire training; dates of usage and fuel used are unknown but were suspected to be in the 1950s and

1960s. The physical site inspection conducted during the Phase I ECP identified a disturbed circular area consistent with that of a fire training area, but no stressed vegetation or stained soils were observed.

A Phase I RCRA Facility Investigation (RFI) was conducted at SWMU 68, and is documented in the Final Phase I RFI Report (Baker, 2008). Overall, very little impact on the environment was found during the Phase I RFI at SWMU 68. However, because concentrations of lead, copper and zinc from the ECP investigation indicated the presence of contamination in the surface soil above their ecological screening values and respective background levels, and nearby surface soil samples from the Phase I RFI had relatively low concentrations with no exceedances for these metals, a very limited corrective measure for surface soil (excavation and disposal) was recommended in the Phase I RFI to address potential ecological risks at this site. Corrective Action Objectives (CAOs) for these compounds were developed in the Phase I RFI.

A Corrective Measures Study (CMS) Final Report (Baker, 2009b) was prepared to document the proposed corrective measure plan.

2.0 SCOPE AND OBJECTIVES

The Scope of Work (SOW) for this project includes activities to accomplish the corrective measure at SWMU 68 at Naval Activity Puerto Rico, Ceiba, Puerto Rico. As indicated in the project Work Plan, RWEC will provide all services, materials, and labor to accomplish this corrective measure. Sampling activities will include: soil characterization sampling in the ditch southeast of sample point 14E-01, the excavated soil for disposal requirements, and confirmation sample results to indicate contaminant concentrations are below remedial goals in order to discontinue excavation activities and restore excavations.

2.1 Corrective Measure Objectives

The objective of the corrective measure is to remove contaminated soil from SWMU 68 which currently poses an unacceptable risk to human and ecological receptors. Development of the CAOs is discussed in the Final CMS Final Report for SWMU 68 (Baker, 2009b). The following table summarizes the corrective measure goals for SWMU 68.

Media	Chemical	Final Corrective Action Objective (mg/kg)
Surface Soil	Copper	168
	Lead	87
	Zinc	120

3.0 FIELD ACTIVITIES AND SAMPLING METHODS

The following sections provide collection procedures for obtaining identification, confirmation, and characterization samples. Surface soil sampling will be conducted in the ditch area located southeast of sample point 14E-01 to identify whether contamination exists in that area. Further, confirmation and characterization sampling will be conducted during the soil removal planned at two defined areas on SWMU 68, as located on Figure 3-1. Standard Operating Procedures (SOPs) for environmental sampling can be found in Appendix A.

3.1 Sample Point 14E-01 Ditch Sampling

Surface soil sampling will be conducted at location(s) within the ditch (also referred to as the 1961 drainage feature) located southeast of sample point 14E-01. The location of the ditch and the proposed sample locations are depicted on Figure 3-1. The exact location of the samples will be determined during the field event. A minimum of two samples will be taken from the area and analyzed for parameters as specified in Table 3-1.

3.2 Soil Confirmation and Characterization Sampling

The following subsections provide details of the field activities associated with the removal action at SWMU 68. Table 3-1 details the sampling frequency and laboratory analyses to be performed. All surface soil samples for this project will be collected by stainless steel spoon or trowel. Subsurface soil samples will be collected by stainless steel spoon, trowel or bucket auger.

3.2.1 SWMU 68

As shown on Figure 3-1, two areas of surface soil contamination, extending 50 ft by 50 ft (area 68A on Table 3-1; COCs are copper and lead) and 50 ft by 100 ft (area 68B on Table 3-1; COCs are lead and zinc), will be excavated to a depth of approximately 2 ft below ground surface (bgs), as shown in Appendix A of the Work Plan. RWEC will excavate the predetermined locations to the surveyed boundaries and planned depth. RWEC will collect confirmation samples from the sidewall of the excavation at a frequency of one sample for 25 lineal ft of sidewall to confirm removal of copper, lead, and zinc impacted soil to levels below the CAOs. This results in the collection of eight confirmation samples from an estimated 200 lineal ft of excavation sidewall in area 68A and 12 confirmation samples from an estimated 300 lineal ft of sidewall in area 68B.

The CAOs from the EPA approved Final CMS identify potential risk to ecological (avian) receptors to surface soil. Since soil below depths greater than 2.0 feet bgs do not represent significant exposure points for ecological receptors no additional excavation beyond the 2.0 ft bgs is required. No human health risks were indentified for the surface or subsurface soils or groundwater for the site. No ecological risks were identified in the subsurface soils for the site. Therefore, confirmation samples for excavation pit bottoms will not be collected because the pathway (top two feet of surface soil) has been removed and CAO has been satisfied.

All samples will be analyzed by the laboratory on a quick turnaround time (TAT) basis (48 hours) to minimize the amount of time that the excavations remain open. RWEC will communicate the results of the analyses to the Navy Technical Representative (NTR) for determination of requirements for over-excavation. If over-excavation is required, the NTR will notify the Contracting Officers Representative (COR) and coordinate those activities with cooperation/coordination between both RWEC and the COR. No additional excavation will be

conducted until written authorization has been provided by the COR. If impacts to a "sensitive area" are considered possible, excavation will be stopped and the COR will be notified.

If over-excavation is required, RWEC will excavate horizontally (in two-foot increments). Vertical sampling will be conducted at the limits of the excavation and in the center of each excavation to ensure contamination has been removed. When the confirmation sampling results indicate that the extent of contaminated soil has been removed, RWEC will communicate the final sampling results to the NTR.

The NTR will approve the completed excavation based on the confirmation sample analytical results.

3.2.2 Waste Characterization

SWMU 68 has been characterized as described in the RFI and CMS. Surface soil characterization information will be used to manifest excavated soils for disposal.

3.2.3 Backfill

Necessary backfill will be analyzed as summarized in Table 3-1. Sampling will be performed to confirm that the backfill is "clean" and below regulatory requirements for contaminants. Approximately three samples will be taken using a stainless steel spoon or trowel. Samples will be analyzed for copper, lead, and zinc. The required chemical and physical characteristics and testing methods for backfill and topsoil are provided in the Technical Specifications Sections 02 61 13 Part 2.1; 31 23 00.00 20 Parts 1.6, 2.1.1, 2.1.4, 2.1.5, and 2.1.6; and 32 92 19 Part 2.2.2. In addition, the primary specifications for backfill are as follows:

- The topsoil will contain from 5 percent to 8 percent organic matter;
- The maximum particle size will be ¾ inch with maximum 3 percent retained on ¼-inch screen;
- The composition of the fill will be 25 percent to 50 percent silt, 10 percent to 30 percent clay, 20 percent to 35 percent sand;
- The pH of the soil will be from 5 to 7.6 and will have a maximum of 600 parts per million (ppm) soluble salts.

3.3 Laboratory Analysis

Samples will be packed in ice and shipped next day air to the “fixed base” laboratory. At least one member of the field team will remain on the island until verification by the laboratory of receipt of all shipments. This will minimize any potential re-sampling costs associated with mobilization. Tracking numbers for each shipment will be forwarded to the project manager for assisting in verification of receipt.

All analyses at the laboratory will be performed using current methodologies as presented in Table 3-2. All analytical work performed on the mainland of the United States must be certified by a licensed Puerto Rico chemist. The specific laboratory and third party validator, as well as a certified licensed chemist from Puerto Rico, will be determined at a later date. Standard Operating Procedures (SOP) used by the analytical laboratory will be requested from the laboratory after selection.

3.4 Data Validation

All mainland laboratory data generated by the investigation of the ditch samples may be subjected to independent, third party, validation. The USEPA Region II Data Validation Standard Operating Procedures will be followed. The specific data validator will be determined at a later

date if necessary. However, confirmation sample data obtained from the excavations will not be validated.

3.5 Decontamination of Sampling Tools

All non-dedicated equipment that may directly or indirectly contact samples will be decontaminated in a designated decontamination area. In addition, RWEC will prevent the decontaminated sampling equipment from coming into contact with potentially contaminated substances such as oil, engine exhaust, corroded surfaces, and dirt. Decontamination procedures will be conducted as follows:

Dry Decontamination

- As a first measure in decontamination, using shovels and brooms, remove large dirt clods and debris. If possible, lift and spin tracks to loosen material

- Collect solids and combine with waste soil.

Wet Pressure-Washing Decontamination

Wherever possible, disposable equipment will be used to minimize the amount of decontamination that will be required.

For hand-auger sampling, it is not possible to exclusively use disposable sampling equipment. Rods, flights, and spoons will require field decontamination between sampling locations and between actual samples when more than one sample is to be collected at a given location. Decontamination of reusable sampling equipment that comes in contact with samples will be performed to prevent the introduction of extraneous material into samples, and to prevent cross-contamination between samples.

To prevent possible contamination from sampling equipment, all sampling devices will be decontaminated and sealed before initiation of sample collection. To the greatest extent possible, sampling equipment will be field decontaminated. The following procedures will be used for field decontamination of reusable sampling equipment and personal protective equipment:

- Once dry decontamination has been completed, wet decontamination will be performed in an area that is covered with plastic sheeting and is bermed to contain and collect all fluids;

- Using a pressure washer, direct-spray all areas that have been exposed to contaminated soils including tires, tracks, and buckets. Make sure all visible dirt is removed;

- Collect and containerize waste solids and liquids. Solids will be combined with waste soil, and liquids will be containerized in 55-gallon drums and staged;

- To prevent possible contamination from sampling equipment, all sampling devices will be decontaminated and sealed before initiation of sample collection. To the greatest extent possible, sampling equipment will be field decontaminated. The following procedures will be used to decontaminate field sampling equipment at least

24 hours before sampling:

- Rinse with potable water. Change the water frequently.
- Wash with the non-phosphate detergent and water solution. Dilute the non-phosphate detergent as directed by the manufacturer.
- Rinse with potable water. Change the water frequently.
- Triple rinse with pesticide-grade (99 percent or better) isopropyl alcohol.
- A rinse with nitric acid/deionized water solution. The solution will be made from 10 percent reagent-grade nitric acid and deionized water.
- Triple rinse with deionized water (DI). Rinsing will be done by applying the DI from a stainless steel Hudson-type sprayer or squeeze bottle made of Nalgene™ or Teflon™ (or equivalent) while holding equipment over a 5-gallon bucket.
- Allow equipment to air dry at least 24 hours. Then, wrap equipment with aluminum foil and cover with plastic. Rinsate will be placed in drums or tanks and staged for disposal.
- All containerized fluids will be sampled and analyzed for disposal purposes.

3.6 Decontamination Fluids

Cleaning of excavation (e.g., backhoe bucket) and sampling equipment will generate a limited amount of decontamination fluids. These decontamination fluids will consist of wastewater containing wash water, detergent, and trace soils. Decontamination fluids will be collected, containerized, sampled for RCRA hazardous waste characteristics and staged at an onsite waste accumulation point to be designated by the base point of contact. Appropriate disposal will be arranged by RWEC, based on the results of the waste characterization analysis.

3.7 Miscellaneous Wastes

Personal Protective Equipment (PPE) used during field activities (including latex or nitrile gloves, Tyvek, paper towels, etc.) will be double-bagged and disposed of as solid waste.

3.8 Storage. Transportation. and Disposal of Samples

Sample shipment manifesting will be in accordance with 40 Code of Federal Regulations (CFR) 261, 40 CFR 262, 40 CFR 268, 49 CFR 172, and 49 CFR 178. Appropriate disposal of samples according to regulations will be handled by the laboratory as part of their services under their subcontract. The following frequency of quality control samples will be collected:

- Duplicate sample (matrix spike), one per ten samples;
- Duplicate sample (matrix spike duplicate), one per 20 samples;
- Field blank, one per day of sampling (if analyzing for volatiles); and
- Trip blank, one per cooler shipped to the fixed base laboratory (if analyzing for volatiles).

3.8.1 Waste Storage Areas

Appropriate waste storage containers and containers of hazardous remediation wastes will be stored in a temporary accumulation area designated by the Navy. If the Navy has not designated an accumulation area, RWEC will temporarily store hazardous wastes in a secure area. Hazardous waste storage areas will contain emergency equipment including fire extinguishers, decontamination equipment, and an alarm system (if radio equipment is not available to all staff working in the storage area). Spill control equipment (e.g., sorbent pads) will be available in all waste storage areas and where liquids are transferred from one vessel to another.

Project wastes will be stored in one of the following settings and according to the following requirements:

3.8.1.1 Drums/Small Containers

- Drums and small containers of hazardous waste will be transported to the temporary accumulation areas on wood pallets and will be secured together with nonmetallic bonding.
- Drums will be inspected and inventoried upon arrival on site for signs of contamination and/or deterioration.
- Adequate aisle space (e.g., 30 inches) will be provided for containers such as 55-gallon drums to allow the unobstructed movement of personnel and equipment. A row of drums should be no more than two drums wide.
- Drums may not be stacked more than two high.
- Each drum will be provided with its own label.
- Drums will remain covered except when removing or adding waste to the drum. Covers will be properly secured at the end of each workday.
- Drums will be disposed of with the contents. If the contents are removed from the drums for offsite transportation and treatment or disposal, the drums will be decontaminated before reuse or before leaving the site.

3.8.1.2 Portable Tanks

- Only non-stationary tanks (such as cargo tank or other wheeled tank) will be used to accumulate hazardous waste.
- Tanks will be provided with secondary containment.
- Tanks will be inspected upon arrival on site for signs of deterioration and contamination. Any tank arriving onsite with contents will be rejected.
- Tanks will be provided with covers.
- Each tank will be labeled.

3.8.1.3 Clean Backfill Stockpiles

The following procedures will be followed when stockpiling soils:

- Stockpiles will be located near the excavation areas and within an area of existing contamination.
- Stockpiles will be provided with a liner, cover, and perimeter berm to prevent release or infiltration of liquids. The perimeter berm, typically hay bales placed beneath the liner, will be constructed to allow for collection of any free liquids draining from the stockpile.
- Accumulated free liquids will be pumped (or otherwise removed) to a container.
- Covers will be provided as necessary to prevent wind dispersion or runon/runoff from precipitation events.
- Minimum 6-millimeter (mil) polyethylene sheeting will be used for liners and covers.
- The liner must be placed upon a foundation or base capable of providing support to the liner and resistance to pressure gradients above and below the liner to prevent failure.
- Covers and perimeter berms will be secured in place when not in use and at the end of each workday.
- Construction materials for the stockpiles that contact waste will be disposed of as contaminated debris.
- A log documenting accumulation dates will be maintained for soils and other waste stored onsite in stockpiles.

3.8.1.4 Waste Storage Containers

- Appropriate waste storage containers will be inspected upon arrival on site. Any appropriate waste storage containers arriving with contents will be rejected.
- Appropriate waste storage containers for hazardous soils will be provided with covers and disposable liners.
- Liners will be disposed of as contaminated debris.
- When not in use, securely fastened covers will be installed on all appropriate waste storage containers.
- Old labels will be removed.
- Appropriate waste storage containers will be inspected by the transporter after removal of the liner and decontaminated in the event of evidence of liner failure.
- Appropriate waste storage containers will be sloped so that any water collecting in

the container will collect in one corner. Any water collecting in the Appropriate waste storage container will be containerized and sampled for analysis for parameters identified in Table 3-1.

3.9 Spill Cleanup Verification

In the event of a spill or release of a hazardous substance, pollutant, contaminant, or oil, RWEC will notify the Navy immediately. The Navy will, in turn, notify the regulatory agencies. Immediate containment actions will be taken to minimize the effect of any spill or leak. Cleanup will be in accordance with applicable federal, state, and local regulations. As directed by the Navy, additional sampling and testing will be performed to verify that spills have been cleaned up.

3.10 Waste Disposal

All wastes generated will be shipped under proper manifest or bill of lading by a licensed transporter. If any materials are determined to be hazardous, RWEC will request an EPA identification number from the EPA. Hazardous material will be transported off site in accordance with the requirements of 49 CFR Sections 171, 172, 173, 178, and 179. Hazardous materials will be stored on site no longer than 90 days in accordance with 40 CFR 262 to avoid classification as a RCRA storage unit.

Hazardous materials will be marked with a hazardous waste label identifying the material description, hazard class, generator, generator's address, and accumulation start date. Manifests will be signed by a Navy representative; under no circumstances will a RWEC representative sign a manifest. Manifests will include the following information, at a minimum:

- Transporter information including name, address, contact, and phone number;
- Generator information including name, address, contact, and phone number;
- Site name and address;
- Description of waste;
- Type of container;
- Quantity of waste.

The selected disposal facility will be licensed to receive and dispose of hazardous waste and will generate certification of disposal upon final disposal. After obtaining all necessary approvals to transport and dispose of the waste, RWEC will remobilize to the site to oversee the removal of the appropriate waste storage containers from the site and to ensure proper manifesting at the departure point. Trucks leaving the site will be cleaned of gross materials to avoid transfer to roadways. Haul routes will be monitored and cleaned of project-associated debris throughout the project duration.

Disposal facility acceptance documentation and return copies of all manifests will be kept on file by RWEC. If a returned manifest is not received within 35 days of shipment date, the disposal facility will be contacted and follow-up notifications made if not received within 45 days

4.0 SAMPLE AND FIELD DOCUMENTATION

Procedures to ensure the custody and integrity of the samples begin at the time of sampling and continue through transport, sample receipt, preparation, analysis and storage, data generation and reporting, and sample disposal. Records concerning the custody and condition of the samples are maintained in field and laboratory record books.

4.1 Field Logbook

The project will have a dedicated logbook. The project name and location, and the project number will be entered on the inside front cover of the logbook. It is recommended that each page in the logbook be numbered and dated. The entries shall be legible and contain accurate and inclusive documentation summarizing an individual's project activities. At the end of all entries for each day, or at the end of a particular event, the sampler should draw a diagonal line and initial indicating the conclusion of the entry. Since field records are the basis for later written reports, language shall be objective, factual, and free of personal feelings or other terminology which might prove inappropriate. Once completed, these field logbooks become accountable documents and must be maintained as part of the official project files. All aspects of sample collection and handling, as well as visual observations, shall be documented in the field logbooks.

Field logs summarizing daily activities and the field logbook will be used to record sampling activities each day. Entries in the field logs will include the following specific information:

- Name of author, date, and times of arrival and departure from the work site;
- Location of sampling activity;
- Purpose of sampling activity;
- Names and affiliations of personnel on site;
- Sample collection or measurement methods;
- Quantity, location, and volume of sample(s) collected;
- Details of the sampling location, including a sketch map illustrating the sample location;
- Date and time of the sample collection and name of collector;
- Sample identification numbers;
- Information regarding sampling changes and/or decisions;
- Documentation for investigation-derived waste (IDW), including types of containers, contents, and approximate volume;
- Field observations and comments.

Sufficient information will be recorded in the field logbook to reconstruct the sampling event, if necessary.

4.2 Sample Naming Convention

A unique sample numbering scheme will be used to identify each sample designated for laboratory analysis. The purpose of this numbering scheme is to provide a tracking system for the retrieval of analytical and field data on each sample. Identifiers will be assigned to all environmental and Quality Control (QC) samples and will appear on the sample labels, chain-of-custody (CoC) forms, field sampling forms, and field logbooks. The typical sample naming convention consists of several parts. The first part is an identifier for the SWMU number (e.g., 68). The second portion is an identified for the sample source (e.g., WL for excavation sidewall sample, FL for excavation floor sample, etc.). The third portion is a sequential number designator. The fourth part of the sample designation identifies the depth interval from which the sample was collected (e.g., -00 indicates a 0.0 to 1.0 feet below ground surface, -01 indicates 1.0 to 3.0 feet bgs, etc.). Sample designations will follow the pattern shown below.

68WL01-00	SMWU 68 Sample
68WL01-00	Excavation Sidewall Sample
68WL01-00	Excavation Sidewall Sample Number (sequential numbering)
68WL01-00	0 to 1 foot bgs (surface soil) sampling interval

4.3 Sample Labels

Sample labels are necessary to prevent misidentification of samples. Each sample container will have a sample label attached, typically provided by the analytical laboratory. The information recorded on the sample label may include, but not be limited to, the following:

- Project Name or Project Number;
- Station Location-The unique sample number identifying this sample;
- Date-A six-digit number indicating the day, month, and year of sample collection (e.g., 12/21/85);
- Time-A four digit number indicating the 24-hour time of collection (for example: 0954 is 9:54a.m., and 1629 is 4:29 p.m.);
- Medium-Water, soil, sediment, sludge, waste, etc.;
- Sample Type-Grab or composite;
- Preservation-Type and quantity of preservation added, if any;
- Analysis-VOCs, SVOCs, BNAs, PCBs, pesticides, metals, cyanide, other;
- Sample By-Printed name or initials of the sampler;
- Remarks-Any pertinent additional information.

4.4 Chain-of-Custody Records

Chain-of-Custody procedures will be followed to ensure a documented, traceable link between measurement results and the sample/parameter that they represent. These procedures are intended to provide a legally acceptable record of sample preparation, storage, and analysis.

To track sample custody transfers before ultimate disposition, sample custody will be documented as follows:

- Enter header information (Project and task number, samplers, and project name).
- Enter sample specific information (sample number, media, sample analysis required and analytical method, grab or composite, number and type of sample containers, and date/time sample was collected).
- Sign, date, and enter the time under "Relinquished by" entry.
- Have the person receiving the sample sign the "Received by" entry. If shipping samples by a common carrier, print the carrier to be used in this space (i.e., Federal Express).
- If a carrier is used, enter the air bill number under "remarks," in the bottom right corner for potential package tracking on line.
- Place the original (top, signed copy of the Chain-of-Custody Record Form) and any internal copies in a plastic zipper-type bag or other appropriate sample shipping package. Retain one copy with field records (usually the bottom carbon copy).
- Sign and date the custody seal, a 1-by 3-inch white paper label with an adhesive backing. The custody seal is part of the chain-of-custody process and is used to prevent tampering with samples after they have been collected in the field. Custody seals are typically provided by the analytical laboratory.
- Place the seal across the shipping container opening so that it will be broken if the container is opened.
- Complete other carrier-required shipping papers (air bill).
- The custody record is completed using waterproof ink. Any corrections are made by drawing a line through and initialing and dating the change, then entering the correct information. Erasures are not permitted.

Common carriers will usually not accept responsibility for handling Chain-of-Custody Record Forms as this necessitates packing the record in the shipping container (enclosed with other documentation in a zipper-type bag). As long as custody forms are sealed inside the shipping container and the custody seals are intact, commercial carriers are not required to sign the custody form.

The laboratory representative who accepts the incoming sample shipment signs and dates the Chain-of-Custody Record, completing the sample transfer process. It is then the laboratory's responsibility to maintain internal logbooks and custody records throughout sample preparation and analysis.

4.5 Documentation Procedures

Original entries recorded in field logbooks, CoC records, and other forms will be written in indelible ink. None of these documents will be altered, destroyed, or discarded, even if they are illegible or contain inaccuracies that require a replacement document.

5.0 REPORTING

Sampling activities will be documented in the Corrective Measures Implementation (CMI) Final Report, to be provided at the completion of the remedial action. The report will include an introduction, summary of action, final health and safety report, summary of record documents, summary of field changes and contract modifications, final documents, a complete set of analytical laboratory results, documentation of offsite transportation and disposal of soil, a quality control summary report and final cost data. The CMI Final Report will also include an evaluation of the corrective measure including the quantities of impacted media removed, problems encountered and solutions implemented. As-built drawings will be included as an appendix to the CMI Final Report.

6.0 REFERENCES

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TABLES

Revised: September 3, 2010

TABLE 3-1

CONFIRMATION AND CHARACTERIZATION SAMPLING SUMMARY
SAMPLING AND ANALYSIS PLAN FOR
CORRECTIVE MEASURE AT SWMU 68
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

			Fixed Based Analytical Lab Analysis						
Area	**Media / Sample ID**	**Sample Depth (ft bgs)**	Copper	Lead	Zinc	TCLP Volitiles*	TCLP Metals*	IRC	**Comment**
Confirmation Soil Samples									
Area A (68A) 14E-03	68ABT01-02	2.0	X	X					
	68ABT02-02	2.0	X	X					
	68ABT03-02	2.0	X	X					
	68ABT04-02	2.0	X	X					
	68AWL01-00	0.0 - 1.0	X	X					
	68AWL02-00	0.0 - 1.0	X	X					
	68AWL03-00	0.0 - 1.0	X	X					
	68AWL04-00	0.0 - 1.0	X	X					
	68AWL05-00	0.0 - 1.0	X	X					
	68AWL06-00	0.0 - 1.0	X	X					
	68AWL07-00	0.0 - 1.0	X	X					
	68AWL08-00	0.0 - 1.0	X	X					
Area B (68B) 14E-01	68BBT01-02	2.0		X	X				
	68BBT02-02	2.0		X	X				
	68BBT03-02	2.0		X	X				
	68BBT04-02	2.0		X	X				
	68BBT05-02	2.0		X	X				
	68BBT06-02	2.0		X	X				
	68BBT07-02	2.0		X	X				
	68BBT08-02	2.0		X	X				
	68BWL01-00	0.0 - 1.0		X	X				
	68BWL02-00	0.0 - 1.0		X	X				
	68BWL03-00	0.0 - 1.0		X	X				
	68BWL04-00	0.0 - 1.0		X	X				
	68BWL05-00	0.0 - 1.0		X	X				
	68BWL06-00	0.0 - 1.0		X	X				
	68BWL07-00	0.0 - 1.0		X	X				
	68BWL08-00	0.0 - 1.0		X	X				
	68BWL09-00	0.0 - 1.0		X	X				
	68BWL10-00	0.0 - 1.0		X	X				
	68BWL11-00	0.0 - 1.0		X	X				
	68BWL12-00	0.0 - 1.0		X	X				
Drainage Historic Characterization Samples									
14E-01 Ditch	68DT01-00	0.0 - 1.0	X	X	X				
	68DT02-00	0.0 - 1.0	X	X	X				
Waste Characterization Composite Sample									
Collected Water	68CL01	NA	X	X	X	X	X	X	Composite from collected water
Backfill Evaluation	Borrow Material	N/A	X	X	X	X	X	X	

*Table 3-2 provides specific analytes for analysis
*TCLP - Toxicity Characteristic Leaching Procedure

Revised: September 3, 2010

TABLE 3-2

METHOD PERFORMANCE LIMITS AND CONTRACT REQUIRED QUANTITATION LIMITS
SAMPLING AND ANALYSIS PLAN FOR
CORRECTIVE MEASURE AT SWMU 68
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Analyte	Quantitation Limits[1]		Method Number	Reporting Limits[2]		Preparation Methods		Method Description
	Water mg/L	Soil mg/kg		Water mg/L	Soil mg/kg	Water	Soil	
Toxicity Characteristic Leaching Procedure Volatiles								
Benzene	NA	20	1311 / 8260B	0.02	NA	NA	1304 / 3010A	Inductively Coupled Plasma
Carbon tetrachloride	NA	20	1311 / 8260B	0.02	NA	NA	1305 / 3010A	Inductively Coupled Plasma
Chlorobenzene	NA	20	1312 / 8260B	0.02	NA	NA	1306 / 3010A	Inductively Coupled Plasma
Chloroform	NA	20	1313 / 8260B	0.02	NA	NA	1307 / 3010A	Inductively Coupled Plasma
1,2-Dichloroethane	NA	20	1314 / 8260B	0.02	NA	NA	1308 / 3010A	Inductively Coupled Plasma
1,1-Dichloroethene	NA	20	1315 / 8260B	0.02	NA	NA	1307 / 3010A	Inductively Coupled Plasma
2-Butanone (MEK)	NA	20	1316 / 8260B	0.2	NA	NA	1308 / 3010A	Inductively Coupled Plasma
Tetrachloroethene	NA	20	1317 / 8260B	0.02	NA	NA	1309 / 3010A	Inductively Coupled Plasma
Trichloroethene	NA	20	1318 / 8260B	0.02	NA	NA	1310 / 3010A	Inductively Coupled Plasma
Vinyl chloride	NA	20	1319 / 8260B	0.02	NA	NA	1311 / 3010A	Inductively Coupled Plasma
Ignitibilty, Reactivity, Corrosivity								
Cyanide 1		1	9014	0.01	0.5	9012A	9012A	Titrimetric
Flashpoint/Ignitability	NA	NA	1010A/1030	NA	NA	NA	NA	Pensky-Martens Closed Cup Tester
pH (s.u.)	NA	NA	9040C/9045D	NA	NA	NA	NA	Electrometric
Sulfide 1		10	9034	1	60	NA	9030B	Titrimetric
Metals								
Copper	20	2.0	6020A	5	1	3010A	3050B	Inductively Coupled Plasma
Lead	5.0	0.5	6020A	1.5	0.4	3010A	3050B	Inductively Coupled Plasma
Zinc	20	2.0	6020A	20	4	3010A	3050B	Inductively Coupled Plasma

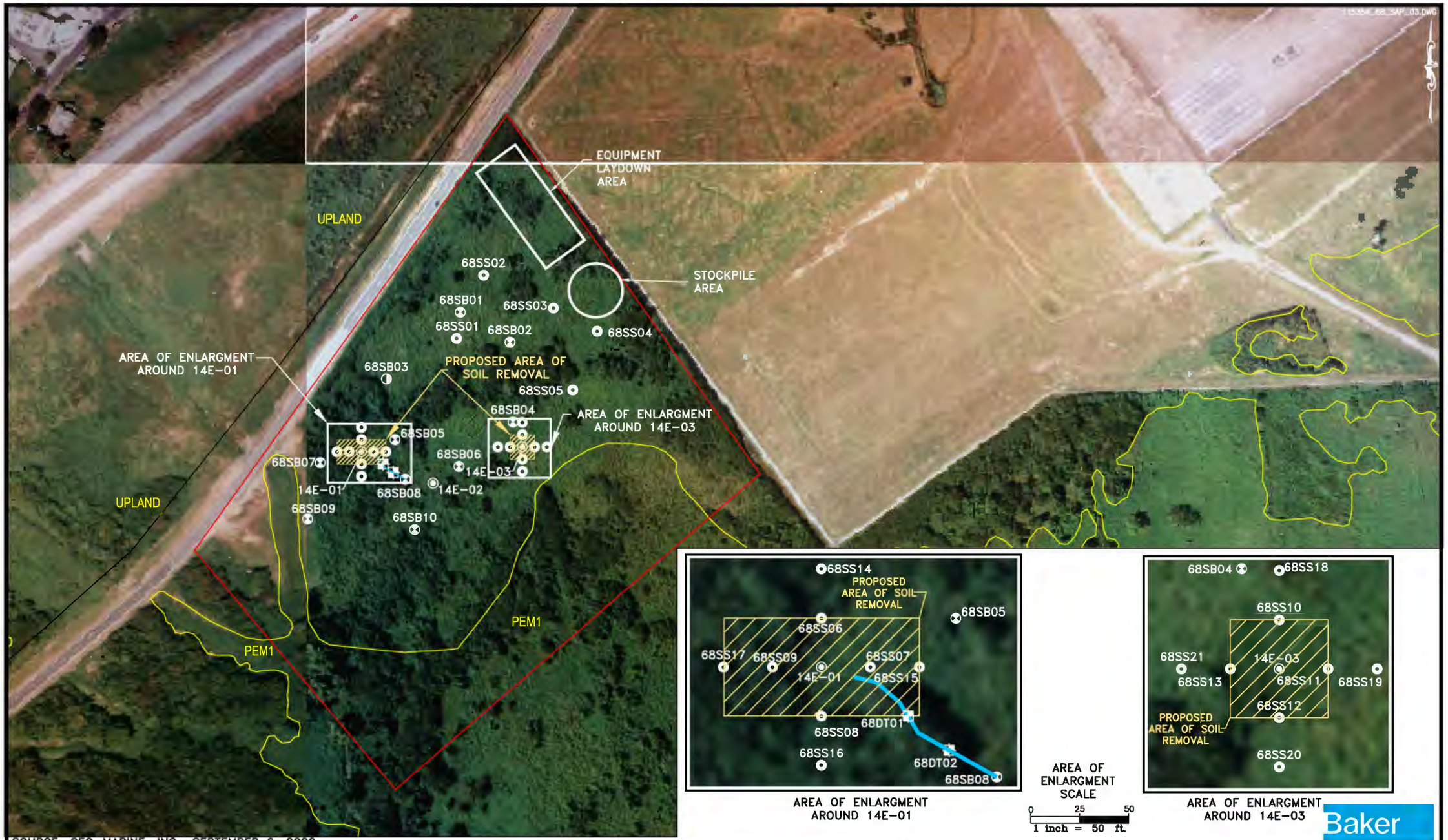
Notes:

[1] Quantitation limits listed for soil/sediment are based on wet weight. The quantitation limits calculated by the laboratory for soil/sediment, calculated on dry weight basis, will be higher.

[2] Reporting limits vary per laboratory. Reporting limits shown shall be sent to laboratory for their use during analysis.

mg/kg - micrograms per kilogram
mg/kg - milligrams per kilogram
mg/kg - micrograms per liter
mg/L - milligrams per liter
NA - Not Applicable

FIGURES



SOURCE: GEO-MARINE, INC., SEPTEMBER 6, 2000.

LEGEND

- SURFACE AND SUBSURFACE SOIL SAMPLE LOCATION (PHASE II ECP INVESTIGATION)
- SURFACE AND SUBSURFACE SOIL AND GROUNDWATER SAMPLE LOCATION (PHASE I RFI NOV. 06)
- SURFACE AND SUBSURFACE SOIL SAMPLE LOCATION (PHASE I RFI NOV. 06)
- SURFACE SOIL (PHASE I RFI SEPT. AND OCT. 07)
- PROPOSED DITCH SAMPLE LOCATION
- 1961 DRAINAGE
- ECP SITE BOUNDARY
- WETLANDS DELINEATION
- PEM1 – WETLANDS DELINEATION IDENTIFICATION CODES

500 0 250 500
1 inch = 500 ft.

FIGURE 3-1
PROPOSED DITCH SAMPLE LOCATION
SWMU 68-FORMER SOUTHERN FIRE TRAINING AREA
SAMPLING AND ANALYSIS PLAN
NAVAL ACTIVITY PUERTO RICO
CEIBA, PUERTO RICO

APPENDIX A
STANDARD OPERATING PROCEDURES

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SOIL AND ROCK SAMPLE ACQUISITION

1.0 PURPOSE

The purpose of this procedure is to describe the handling of rock cores and subsurface soil samples collected during drilling operations. Surface soil sampling also is described.

2.0 SCOPE

The methods described in this SOP are applicable for the recovery of subsurface soil and rock samples acquired by coring operations or soil sampling techniques such as split-barrel sampling and thin-walled tube sampling. Procedures for the collection of surface soil samples also are discussed. This SOP does not discuss drilling techniques or well installation procedures. ASTM procedures for "Penetration Test and Split-Barrel Sampling of Soils," "Thin-Walled Tube Sampling of Soils," and "Rock Core Drilling for Site Investigation" and "Direct Push Soil Sampling" are referenced in Section 7.0 of this SOP.

3.0 DEFINITIONS

Thin-Walled Tube Sampler - A thin-walled metal tube (also called Shelby tube) used to recover relatively undisturbed soil samples. These tubes are available in various sizes, ranging from 2 to 5 inches outer diameter (O.D.) and 18 to 54 inches length.

Split-Barrel Sampler - A steel tube, split in half lengthwise (along its axis), with the halves held together by threaded collars at both ends of the tube. Also called a split-spoon sampler, this device can be driven into unconsolidated materials using a drive weight mounted on the drilling string or the drill rig hydraulics. A standard split-spoon sampler (used for performing Standard Penetration Tests) is two inches O.D. and 1-3/8-inches inner diameter (I.D.). This standard spoon is available in two lengths providing either 20-inch (uncommon) or 26-inch (common) internal longitudinal clearance for obtaining 18-inch long (typical for geotechnical) or 24-inch long (typical for environmental) samples, respectively.

Grab Sample - An individual sample collected from a single location at a specific time or period of time generally not exceeding 15 minutes. Grab samples are associated with surface water, groundwater, wastewater, waste, contaminated surfaces, soil, and sediment sampling. Grab samples are typically used to characterize the media at a particular instant in time.

Composite Samples - A sample collected over time that typically consists of a series of discrete (grab) samples which are combined or "composited." Two types of composite samples are listed below:

- Areal Composite: A sample collected from individual grab samples collected on an areal or cross-sectional basis. Areal composites shall be made up of equal volumes of grab samples. Each grab sample shall be collected in an identical manner. Examples include sediment composites from quarter-point sampling of streams and soil samples from grid points.

- Vertical Composite: A sample collected from individual grab samples collected from a vertical cross section. Vertical composites shall be made up of equal volumes of grab samples. Each grab sample shall be collected in an identical manner. Examples include vertical profiles of soil/sediment columns, lakes and estuaries.

- Encore® Sampler – A syringe-type sampler (Encore® being a common brand) used to collect Volatile Organic Compound (VOC) samples in accordance with SW 846 Method 5035. The Encore® sampler is inserted into the soil core using a T-handle. The soil displaces a piston that retains an approximate 5-gram soil core (25-gram size is also available). The sampler is then capped, labeled, and placed in a re-sealable storage bag that comes with the sampler. Typically, two to three Encore® samplers are required for each VOC sample.

4.0 RESPONSIBILITIES

Project Manager - The Project Manager is responsible for ensuring that, where applicable, project-specific plans are in accordance with these procedures, or that other approved procedures are developed. Furthermore, the Project Manager is responsible for development of documentation of procedures that deviate from those presented herein.

Field Team Leader - The Field Team Leader is responsible for selecting and detailing the specific sampling techniques and equipment to be used, and documenting these in accordance with the Sampling and Analysis Plan. It is the responsibility of the Field Team Leader to ensure that these procedures are implemented in the field and to ensure that personnel performing sampling activities have been briefed and trained to execute these procedures.

Drilling Inspector - It is the responsibility of the drilling inspector to follow these procedures, or to follow documented, project-specific procedures as directed by the Field Team Leader and/or the Project Manager. The Drilling Inspector is responsible for the proper acquisition of rock cores and subsurface soil samples.

Sampling Personnel - It is the responsibility of the field sampling personnel to follow these procedures, or to follow documented, project-specific procedures as directed by the Field Team Leader and/or the Project Manager. The sampling personnel are responsible for the proper acquisition, preservation, and shipment of samples to the laboratory.

5.0 PROCEDURES

Subsurface soil and rock samples are used to characterize the three-dimensional subsurface stratigraphy. This characterization can indicate the potential for migration of contaminants from various sites. In addition, definition of the actual migration of contaminants can be obtained through chemical analysis of subsurface soil samples. Where the remedial activities may include in-situ treatment, or the excavation and removal of the contaminated soil, the depth and areal extent of contamination must be known as accurately as possible.

Surface soil samples serve to characterize the extent of surface contamination at various sites and/or the origin of a contaminant release. These samples may be collected during initial site screening to determine gross contamination levels, levels of personal protection for future sampling activities, to gather more detailed site data during design, or to determine the need for, or success of, cleanup actions.

Site construction activities may require that the engineering and physical properties of soil and rock be determined. Soil types, bearing strength, compressibility, permeability, plasticity, and moisture content are some of the geotechnical characteristics that may be determined by laboratory tests of soil samples. Rock quality, strength, stratigraphy, structure, etc. often are needed to design and construct deep foundations or remedial components.

5.1 Subsurface Soil Samples

This section discusses four methods for collecting subsurface soil samples: (1) split-spoon sampling; (2) Shelby tube sampling; (3) bucket auger sampling; and (4) direct push sampling. All four methods yield samples suitable for laboratory analysis. The ASTM procedures for split-spoon sampling, Shelby tube sampling and direct push sampling are referenced in Section 7.0 of this SOP.

5.1.1 Split-Barrel (Split-Spoon) Sampling

The following procedures are to be used for split-spoon, geotechnical soil sampling:

1. Clean out the borehole to the desired sampling depth using equipment that will ensure that the material to be sampled is not disturbed by the operation.

2. Side-discharge or bottom-discharge bits are permissible. The process of jetting through the sampler and then sampling when the desired depth is reached shall not be permitted. Where casing is used, it may not be driven below the sampling elevation.

3. The split-barrel sampler should be driven with blows from a 140-pound hammer falling 30 inches in accordance with ASTM D1586-99, Standard Penetration Test.

4. Repeat this operation at intervals not longer than 5 feet in homogeneous strata, or as specified in the Sampling and Analysis Plan or Work Plan.

5. Record on the Field Test Boring Record and/or field logbook the number of blows required to drive the sampler each six inches of penetration (or fraction there of if refusal is encountered). The first six inches is considered to be a seating drive. The sum of the number of blows required for the second and third six inches of penetration is termed the penetration resistance (N). If the sampler is driven less than 18 inches, the penetration resistance is that for the last one foot of penetration. (If less than one foot is penetrated, the logs shall state the number of blows and the percentage of one foot penetrated.) In cases where samples are driven 24 inches, the sum of second and third six-inch increments will be used to calculate the penetration resistance. (Refusal of the Standard Penetration Test will be noted as 50 blows over an interval equal to or less than 6 inches; the interval driven will be noted with the blow count.)

6. Retrieve the sampler to the surface and remove both ends and one half of the split-spoon such that the soil recovered rests in the remaining half of the barrel, if possible. Describe carefully the recovery (length in feet), composition, structure, consistency, color, condition, etc. of the recovered soil according to SOP F101 before placing into jars without ramming (compacting). Jars with samples not taken for chemical analysis should be tightly closed, to prevent evaporation of the soil moisture. Affix labels to the jar and complete Chain-of-Custody and other required sample data forms (see SOP F302). Protect samples against extreme temperature changes and breakage by placing them in appropriate cartons stored in a protected area.

In addition to collecting soils for geotechnical purposes, split-spoon sampling can be employed to obtain samples for environmental analytical analysis. The following procedures are to be used for split-spoon, environmental soil sampling:

1. Follow sample collection procedures 1 through 6 as outlined in Section 5.1.1.

2. Screen the length of the soil core with a photoionization detector (PID). PID readings are recorded on the Field Test Boring Log. The portion of the core exhibiting the highest PID readings may be selected for VOC analysis, if designated in the Work Plan.

3. If VOC analysis is required, the sample shall be collected immediately after screening with the PID, and shall be collected using SW 846 Method 5035 (syringe-type piston sampler - Encore® or similar). If the Work Plan does not require Method 5035, sample containers for VOCs analyses provided by the laboratory should be filled completely without headspace remaining in the container to minimize volatilization.

4. After VOC sample collection, remove the soil from the split-spoon sampler. Prior to filling laboratory containers, the soil sample should be mixed thoroughly as possible to ensure that the sample is as representative as possible of the sample interval. This is typically performed by mixing the soils in either a disposable pie tin (to avoid the need for decontamination) or a decontaminated stainless steel bowl. Soil samples for VOCs should not be mixed to avoid further volatilization.

5. When all environmental sampling has been completed and the samples have been properly preserved (typically placed on ice in a cooler at approximately 4 degrees Celsius), record all pertinent sampling information such as soil description, sample depth, sample number, sample location, and time of sample collection in the Field Test Boring Record and/or the field logbook. In addition, label, tag, and number the sample bottle(s).

6. Decontaminate the split-spoon sample as described in SOP F501 and SOP F502. Replace disposable latex gloves between sample intervals to prevent cross-contaminating samples.

7. At the completion of sampling activities, pack the samples for shipping to avoid breakage (see SOP F301). Attach a custody seal to the shipping package for quality control purposes. Make sure that Chain-of-Custody Forms (and Sample Request Forms, if necessary) are properly filled out and enclosed within the shipment cooler (see SOP F302).

For obtaining composite soil samples (see Section 3.0), a slightly modified approach is employed. Each individual discrete soil sample from the desired sample interval will be placed into a stainless-steel, decontaminated bowl (or other appropriate container) prior to filling the laboratory sample containers. Special care should be taken to cover the bowl between samples with aluminum foil to minimize volatilization. Immediately after obtaining soils from the desired sampling interval, the sample to be analyzed for VOCs should be collected. However, a composite VOC sample is rarely requested in the environmental industry. In the event that a composite sample is required, care should be taken to obtain a representative sampling of each sample interval. The remaining soils should be thoroughly mixed. Adequate mixing can be achieved by stirring in a circular fashion and occasionally turning the soils over. Once the remaining soils

have been thoroughly combined, samples for analyses other than VOCs should be placed into the appropriate sampling containers.

5.1.2 Thin-Wall (Shelby Tube) Sampling

When it is desired to take undisturbed samples of soil for physical laboratory testing, thin-walled seamless tube samplers (Shelby tubes) will be used. The following method applies:

1. Clean out the hole to the sampling elevation, being careful to minimize the chance for disturbance or contamination of the material to be sampled.

2. The use of bottom discharge bits or jetting through an open-tube sampler to clean out the hole shall not be allowed. Only side discharge bits are permitted.

3. Prior to inserting the tube sampler in the hole, check to ensure that the sampler head contains a check valve. The check valve is necessary to keep water in the rods from pushing the sample out of the tube sampler during sample withdrawal and to maintain suction within the tube to help retain the sample.

4. With the sampling tube resting on the bottom of the hole and the water level in the boring at the natural groundwater level or above, push the tube into the soil by a continuous and rapid motion, without impacting or twisting. In no case shall the tube be pushed further than the length provided for the soil sample. Allow a free space in the tube for cuttings and sludge.

5. After pushing the tube, the sample should sit 5 to 15 minutes prior to removal. Immediately before removal, the sample must be sheared by rotating the rods with a pipe wrench a minimum of two revolutions.

6. Upon removal of the sampler tube from the borehole, measure the length of sample in the tube and also the length penetrated. Remove disturbed material in the upper end of the tube and measure the length of sample again. After removing at least one inch of soil from the lower end and after inserting an impervious disk, seal both ends of the tube with at least a 1/2-inch thickness of liquid (hot) wax applied in a way that will prevent the wax from entering the sample. Newspaper or other types of filler must be placed in voids at either end of the sampler prior to sealing with wax. Place plastic caps on the ends of the sampler, tape them into place, and then dip the ends in wax to seal them.

7. Affix labels to the tubes and record sample number, depth, penetration, and recovery length on the label. Mark the same information and “up" direction on the tube with indelible ink to indicate the top of the sample. Complete chain-of-custody and other required forms (see SOP F302). Do not allow tubes to freeze, and store the samples vertically with the same orientation they had in the ground (i.e., top of sample is up) in a cool place out of the sun at all times. Ship samples protected with suitable resilient packing material to reduce shock, vibration, and disturbance.

8. From soil removed from the ends of the tube, make a careful description using the methods presented in SOP F101.

9. When thin-wall tube samplers are used to collect soil for certain chemical analyses, it may be necessary to avoid using wax, newspaper, or other fillers.

Thin-walled undisturbed tube samplers are restricted in their usage by the consistency of the soil to be sampled. Often very loose and/or wet samples cannot be retrieved by the samplers, and soils with a consistency in excess of very stiff cannot be penetrated by the sampler. Other appropriate devices can be used in conjunction with the tube samplers to obtain undisturbed samples of stiff soils. Using these devices normally increases sampling costs and, therefore, their use should be weighed against the increased cost and the need for an undisturbed sample. In any case, if a sample cannot be obtained with a tube sampler, an attempt should be made with a split-spoon sampler at the same depth so that at least one sample can be obtained for geologic classification purposes.

5.1.3 Bucket (Hand) Auger Sampling

Hand augering is the most common manual method used to collect shallow subsurface samples. Typically, 4-inch auger buckets with cutting heads are pushed and twisted into the ground and removed as the buckets are filled. The auger holes are advanced one bucket at a time. The practical depth of investigation using a hand auger is related to the material being sampled. In sand, augering is usually easily accomplished, but the depth of investigation is controlled by the depth at which sands begin to cave into the augered borehole. At this point, auger boreholes usually begin to collapse and cannot practically be advanced to lower depths, and further samples, if required, must be collected using some type of pushed or driven device. Hand augering may also become difficult in tight clays or cemented sands. At depths approaching 20 feet, twisting of hand auger extensions becomes so severe that in resistant materials powered methods must be used.

When a vertical sampling interval has been established, one auger bucket is used to advance the auger borehole to the first desired sampling depth. If the sample at this location is to be a vertical composite of all intervals, the same bucket may be used to advance the borehole, as well collect subsequent samples in the same borehole. However, if discrete grab samples are to be collected to characterize each depth, a decontaminated bucket must be placed on the end of the auger extension immediately prior to collecting the next sample. The top and bottom several inches of soil should be removed from the bucket to minimize the chances of cross-contamination of the sample from fall-in of material from the upper portions of the hole. The bucket auger should be decontaminated between samples as outlined in SOP F502.

In addition to hand augering, powered augers can be used to advance a boring for subsurface soil collection. However, this type of equipment is technically a sampling aid and not a sampling device, and 20 to 25 feet is the typical maximum depth range for this equipment. It is used to advance a borehole to the required sample depth, at which point a hand auger is usually used to collect the sample.

5.1.4 Direct Push Sampling

Direct push sampling has become a widely used technique for collecting environmental samples of soil and groundwater. There are multiple sampling devices and different sized samplers used in direct push methods. This is a general procedure for sampling and could change depending on work plan and type of sampling being done.

1. The sampler should be driven to desired depth for sample.

2 Bring the sampler to the surface and remove the acetate soil liner from the stainless steel outer sampler. Record all pertinent sampling information such as soil description, sample depth, sample number, sample location, and time of sample collection in the Field Test Boring Record and/or field logbook. In addition, label, tag, and number the sample bottle(s). Affix labels to the jar and complete Chain-of-Custody and other required sample data forms (see SOP F302).

3. After recording the pertinent information, slice the liner with a cutting tool or drill small holes along the length (axis) of the liner in order to screen the soil core with the PID. PID readings are also recorded on the Field Test Boring Log. The portion of the core exhibiting the highest PID readings may be selected for VOC analysis, if required.

4. If VOC analysis is required, they shall be collected immediately after screening with the PID, and shall be collected using SW 846 Method 5035 (Encore® or similar). If the Work Plan does not require Method 5035, sample containers for VOCs analyses should be filled completely without headspace remaining in the container to minimize volatilization. After VOC sample collection, remove the soil from the liner. Prior to filling laboratory containers, the soil sample should be mixed thoroughly as possible to ensure that the sample is as representative as possible of the sample interval. Soil samples for volatile organic compounds should not be mixed. Further, sample containers for volatile organic compounds analyses should be filled completely without headspace remaining in the container to minimize volatilization.

5. Pack the samples for shipping (see SOP F301). Attach seal to the shipping package. Make sure that Chain-of-Custody Forms and Sample Request Forms are properly filled out and enclosed or attached (see SOP F302).

6. Decontaminate the sampler as described in SOP F501 and SOP F502. Replace disposable latex gloves between sample stations to prevent cross contaminating samples.

5.2 Surface Soil Samples

Surface soils are generally classified as soils between the ground surface and 6 to 12 inches below ground surface (Note: the depth considered to be "surface soil" varies by regulatory agency; if the Work Plan does not specify the depth for surface soil samples, verify the appropriate sample depth with the Project Manager). For loosely packed surface soils, stainless steel (organic analyses) or plastic (inorganic analyses) scoops or trowels, can be used to collect representative samples. For densely packed soils or deeper soil samples, a hand or power soil auger may be used.

The following methods are to be used:

1. Use a soil auger for deep samples (greater than 12 inches) or a scoop or trowel for surface samples. Remove debris, rocks, twigs, and vegetation before collecting the sample.

2. Immediately transfer the sample to the appropriate sample container. Attach a sample identification label (completed in indelible ink) to the sample container. Record all required information in the field logbook (SOP F303) and on the chain-of-custody record (SOP F302), and other required forms.

3. Classify and record a description of the sample, as discussed in SOP F101. Descriptions for surface soil samples should be recorded in the field logbook; descriptions for soil samples collected with power or hand augers shall be recorded on a Field Test Boring Record.

4. Store the sampling utensil in a plastic bag until decontamination or disposal. Use a new or a decontaminated sampling utensil for each sample collected.

5. Preserve, pack, and ship the surface soil samples as described in SOP F301.

6. Mark the location with a numbered stake, pin flag, or similar if possible and locate sample points on a sketch of the site or on a sketch in the field logbook. If available for the project, collect the sample location using GPS technology for future placement on a digitized, scaled base map.

7. When a representative composited sample is to be prepared (e.g., samples taken from a gridded area or from several different depths), it is best to composite individual samples in the laboratory where they can be more precisely composited on a weight or volume basis. If this is not possible, the individual samples (all of equal volume, i.e., the sample bottles should be full) should be placed in a stainless steel bowl (or other appropriate container), mixed thoroughly using a decontaminated stainless steel spatula or trowel, and a composite sample collected. In some cases, as delineated in project-specific sampling and analysis plans, laboratory compositing of the samples may be more appropriate than field compositing. Samples to be analyzed for parameters sensitive to volatilization should be composited and placed into the appropriate sample bottles immediately upon collection. However, as presented previously, the request for a composited VOC soil sample is observed in a Work Plan.

5.3 Rock Cores

Once rock coring has been completed and the core recovered, the rock core must be carefully removed from the barrel, placed in a core tray (previously labeled “top" and “bottom" to avoid confusion), classified, and measured for percentage of recovery, as well as the rock quality designation (RQD) (see SOP F101). If split-barrels are used, the core may be measured and classified in the split barrel after opening and then transferred to a core box.

Each core shall be described and classified on a Field Test Boring Record using a uniform system as presented in SOP F101. If moisture content will be determined or if it is desirable to prevent drying (e.g., to prevent shrinkage of hydrated formations) or oxidation of the core, the core must be wrapped in plastic sleeves immediately after logging. Each plastic sleeve shall be labeled with indelible ink. The boring number, run number and the footage represented in each sleeve shall be included, as well as the top and bottom of the core run.

After sampling, rock cores must be placed in the sequence of recovery in wooden or plastic core boxes provided by the drilling contractor. Rock cores from different borings shall not be placed in the same core box. The core boxes should be constructed to accommodate 10 to 20 linear feet of core and should be constructed with hinged tops secured with screws, and a latch (usually a hook and eye) to keep the top securely fastened. Wood partitions shall be placed at the end of each core run and between rows. The depth

from the surface of the boring to the top and bottom of the drill run and the run number shall be marked on the wooden partitions with indelible ink. The order of placing cores shall be the same in all core boxes (left to right, top row to bottom row). The top of each core obtained should be clearly and permanently marked on each box. The width of each row must be compatible with the core diameter to prevent lateral movement of the core in the box. Similarly, any empty space in a row shall be filled with an appropriate filler material or spacers to prevent shifting of the cores in the box during transportation.

The inside and outside of the core-box lid shall be marked with indelible ink to show all pertinent data pertaining to the box's contents. At a minimum, the following information must be included:

- Project name and number
- Date
- Boring number
- Footage (depths)
- Run number(s)
- Recovery
- Rock Quality Designation (RQD)
- Box number (x of x)

It is also useful to draw a large diagram of the core in the box, on the inside of the box top. This provides more room for elevations, run numbers, recoveries, comments, etc., than could be entered on the upper edges of partitions or spaces in the core box.

For easy retrieval when core boxes are stacked, the sides and ends of the box should also be labeled and include project name, boring number, top and bottom depths of core and box number.

Due to the weight of the core, a filled core box should always be handled by two people. Core boxes stored on site should be protected from the weather. The core boxes should be removed from the site in a careful manner as soon as possible. Exposure to extreme heat or cold should be avoided whenever possible. Arrangements should be made to dispose of or return the core samples to the client at the completion of the project.

6.0 QUALITY ASSURANCE RECORDS

Where applicable, Field Test Boring Records and Test Boring Records will serve as the quality assurance records for subsurface soil samples, rock cores and near-surface soil samples collected with a hand or power auger. Observations shall be recorded in the Field Logbook as described in SOP F303. Chain-of-Custody records shall be completed for samples collected for laboratory analysis as described in SOP F101 and SOP F302.

7.0 REFERENCES

1. American Society for Testing and Materials, 1999. Standard Method for Penetration Test and Split-Barrel Sampling of Soils. ASTM Method D1586-99, Annual Book of Standards, ASTM, Philadelphia, Pennsylvania.

2. American Society for Testing and Materials, 2000. Standard Practice for Thin-Walled Tube Sampling of Soils for Geotechnical Purposes. Method D1587-00, Annual Book of Standards, ASTM, Philadelphia, Pennsylvania.

3. American Society for Testing and Materials, 1999. Standard Practice for Rock Core Drilling and Sampling for Site Investigation. Method D2113-99, Annual Book of Standards ASTM, Philadelphia, Pennsylvania.

4. American Society for Testing and Materials, 1999. Standard Practice for Direct Push Soil Sampling for Environmental Site Characterizations. Method D6282-98, Annual Book of Standards ASTM, Philadelphia, Pennsylvania.

5. U. S. EPA, 1991. Standard Operating Procedures and Quality Assurance Manual. Environmental Compliance Branch, U. S. EPA, Environmental Services Division, Athens, Georgia

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SURFACE WATER AND SEDIMENT SAMPLE ACQUISITION

1.0 PURPOSE

This procedure describes methods and equipment commonly used for collecting environmental samples of surface water and aquatic sediment either for on-site examination and chemical testing or for laboratory analysis.

2.0 SCOPE

The information presented in this SOP is generally applicable to all environmental sampling of surface waters (Section 5.2) and aquatic sediments (Section 5.3), except where the analyte(s) may interact with the sampling equipment.

Specific sampling problems may require the adaptation of existing equipment or design of new equipment. Such innovations shall be documented and presented in the Sampling and Analysis Plan (SAP) and/or Work Plan.

3.0 DEFINITIONS

Grab Sample - An individual sample collected from a single location at a specific time or period of time generally not exceeding 15 minutes.

Composite Sample - A sample collected over time that typically consists of a series of discrete or grab samples which are combined or composited.

4.0 RESPONSIBILITIES

Project Manager - The Project Manager is responsible for ensuring that project-specific plans are in accordance with these procedures, where applicable, or that other, approved procedures are developed. The Project Manager is responsible for development of documentation for procedures which deviate from those presented herein.

Field Team Leader - The Field Team Leader is responsible for selecting and detailing the specific surface water and/or sediment sampling techniques and equipment to be used, and documenting these in the SAP and/or Work Plan. It is the responsibility of the Field Team Leader to ensure that these procedures are implemented in the field and that personnel performing sampling activities have been briefed and trained to execute these procedures.

Sampling Personnel - It is the responsibility of the field sampling personnel to follow these procedures, or to follow documented, project-specific procedures as directed by the Field Team Leader and/or the Project Manager. The sampling personnel are responsible for the proper acquisition of surface water and sediment samples, and their subsequent preservation and shipment to a designated laboratory.

5.0 PROCEDURES

Collecting a representative sample from surface water or sediments can be difficult due to water movement, stratification, and/or patchiness. To collect representative samples, one must standardize sampling bias related to site selection, sampling frequency, sample collection, sampling devices, and sample handling, preservation, and identification.

Representation is a qualitative description of the degree to which an individual sample accurately reflects population characteristics or parameter variations at a sampling point. It is, therefore, an important quality not only of assessment and quantification of environmental threats posed by the site, but also for providing information for engineering design and construction. Proper sample location, selection, and collection methods are important to ensure that a truly representative sample has been collected. Regardless of scrutiny and quality control applied during laboratory analyses, reported data are only as good as the confidence that can be placed on the representation of the samples.

5.1 Defining the Sampling Program

Many factors must be considered in developing a sampling program for surface water or sediments including study objectives, accessibility, site topography, flow, mixing and other physical characteristics of the water body, point and diffuse sources of contamination, and personnel and equipment available to conduct the study. For waterborne constituents, dispersion depends on the vertical and lateral mixing within the body of water. For sediments, dispersion depends on bottom current or flow characteristics, sediment characteristics (density, particle size) and geochemical properties (which effect adsorption/desorption). Therefore, the sampling plan must reflect not only the mixing characteristics of streams and lakes, but also the role of fluvial-sediment transport, deposition, and chemical sorption.

5.1.1 Sampling Program Objectives

The objective of surface water sampling is to determine the surface water quality entering, leaving or remaining within the site. The scope of the sampling program must consider the sources and potential pathways for transport of contamination to or within a surface water body. Sources may include point sources (leaky tanks, outfalls, etc.) or non-point sources (e.g., spills). The major pathways for surface water contamination (not including airborne deposition) are: (a) overland runoff; (b) leachate influx to the water body; (c) direct waste disposal (solid or liquid) into the water body; and (d) groundwater flow influx to the water body. The relative importance of these pathways, and therefore the design of the sampling program, is controlled by the physiographic and hydrologic features of the site, the drainage basin(s) which encompass the site, and the history of site activities.

Physiographic and hydrologic features to be considered include slopes and runoff direction, areas of temporary flooding or pooling, tidal effects, artificial surface runoff controls such as berms or drainage ditches (when constructed relative to site operation), and locations of springs, seeps, marshes, etc. In addition, the obvious considerations such as the location of man-made discharge points to the nearest stream (intermittent or flowing), pond, lake, estuary, etc., shall be considered.

A more subtle consideration in designing the sampling program is the potential for dispersion of dissolved or sediment-associated contaminants away from the source. The dispersion could lead to a more homogeneous distribution of contamination at low or possibly non-detectable concentrations. Such dispersion does not,

however, always readily occur throughout the entire body of water; the mixing may be limited to specific flow streams within the water body. For example, obtaining a representative sample of contamination from the center of a channel immediately below an outfall or a tributary is difficult because the inflow frequently follows a stream bank with little lateral mixing for some distance. Sampling alternatives to overcome this situation are: (1) move the site far enough downstream to allow for adequate mixing, or (2) collect integrated samples in a cross section. Also, non-homogeneous distribution is a particular problem with regard to sediment-associated contaminants which may accumulate in low-energy environments while higher-energy areas (main stream channels) near the source may show no contaminant accumulation.

The distribution of particulates within a sample itself is an important consideration. Many organic compounds are only slightly water soluble and tend to adsorb on particulate matter. Nitrogen, phosphorus, and heavy metals also may be transported by particulates. Surface water samples will be collected with a representative amount of suspended material with transfer from the sampling device including a proportionate amount of the suspended material.

The first step in selecting sampling locations is to review site history, define hydrologic boundaries and features of the site, and identify the sources, pathways and potential distribution of contamination based on these considerations. After performing these tasks, the numbers, types, and general locations of samples up gradient, on site, and down gradient can then be identified.

5.1.2 Location of Sampling Stations

Accessibility is the primary factor affecting sampling costs. The desirability and utility of a sample for analysis and description of site conditions must be balanced against the costs of collection as controlled by accessibility. Wading or sampling from a stream bank often is sufficient for springs, seeps, and small streams. Bridges or piers are the first choice for locating a sampling station on a larger stream or small river; they provide ready access and also permit the sampling technician to sample any point across the stream or river. A boat or pontoon (with an associated increase in cost) may be needed to sample locations on lakes and reservoirs (especially if a sample grid is utilized), as well as those on larger rivers. Frequently, however, a boat will take longer to cross a water body and will hinder manipulation of the sampling equipment.

If it is necessary to wade into the water body to obtain a sample, the sampler shall be careful to minimize disturbance of bottom sediments and must enter the water body downstream of the sampling location. If necessary, the sampling technician shall wait for the sediments to settle before taking a sample. Use of boats or wading to collect samples requires the use of U. S. Coast Guard approved personal flotation devices (PFDs).

Sampling in marshes or tidal areas may require the use of an all-terrain-vehicle (ATV). The same precautions mentioned above with regard to sediment disturbance will apply.

The availability of stream flow and sediment discharge records can be an important consideration in choosing sampling sites in streams. Stream flow data in association with contaminant concentration data are essential for estimating the total contaminant load carried and/or deposited by the stream. If a gauging station is not conveniently located on a selected stream, obtaining stream flow data by direct or indirect methods shall be explored.

5.1.3 Frequency of Sampling

The sampling frequency and the objectives of the sampling event will be defined by the Sampling and Analysis Plan and/or Work Plan. If valid data are available on the distribution of the contaminant between the solid and aqueous phases, it may be appropriate to sample only one phase, although this often is not recommended. If samples are collected primarily for monitoring purposes, consisting of repetitive, continuing measurements to define variations and trends at a given location, water samples shall be collected at established and consistent intervals, as specified in the Sampling and Analysis Plan and/or Work Plan (often monthly or quarterly), and during droughts and floods. Samples of sediment shall be collected from fresh deposits at least yearly, and preferably during both spring and fall seasons.

The variability in available water quality data over an extended period of time (if available) shall be evaluated before deciding on the number and collection frequency of samples required to maintain an effective monitoring program.

5.2 Surface Water Sample Collection

This section presents methods for collection of samples from various surface water bodies, as well as a description of types of surface water sampling equipment. The guidance in this section should be used to develop specific sampling procedures based on site conditions and investigation goals. A summary of sampling techniques and procedures is given in Section 5.2.5.

5.2.1 Streams, Rivers, Outfalls and Drainage Features (Ditches, Culverts)

Methods for sampling streams, rivers, outfalls, and drainage features at a single point vary from the simplest of hand sampling procedures to the more sophisticated multi-point sampling techniques known as the equal-width-increment (EWI) method or the equal-discharge-increment (EDI) method.

Samples from different depths or cross-sectional locations, collected during the same sampling episode, shall be composited. However, samples collected along the length of the watercourse or at different times may reflect differing inputs or dilutions and shall not be composited. Generally, the number and type of samples to be collected depend on the water body's width, depth, discharge, and amount of suspended sediment. With a greater number of individual points sampled, it is more likely that a composite sample will truly represent the overall characteristics of the water.

In small streams less than about 20 feet wide, a sampling location can generally be found where the water is well mixed. In such cases, a single grab sample collected at mid-depth in the center of the channel is adequate to represent the entire cross section.

For larger streams greater than three feet in depth, two samples at each station shall be collected from just below the surface, and just above the bottom.

5.2.2 Lakes, Ponds and Reservoirs

Lakes, ponds, and reservoirs have a much greater tendency to stratify according to physical or chemical differences than rivers and streams. The relative lack of mixing requires that more samples be obtained to provide a true representation of the quality of the water body. The number of water sampling locations on a lake, pond, or impoundment will vary with the size and shape of the basin. In ponds and small lakes, a single vertical composite at the deepest point may be sufficient. Similarly, the measurement of DO, pH, temperature, etc., is conducted on each aliquot of the vertical composite. In naturally-formed ponds, the deepest point may have to be determined empirically; in impoundments, the deepest point is usually near the dam.

In lakes and larger reservoirs, several vertical grab samples shall be composited to form a single sample. These vertical samples often are collected along a transect or grid. In some cases, it may be of interest to form separate composites of epilimnetic and hypolimnetic zones. In a stratified lake, the epilimnion is the thermocline which is exposed to the atmosphere. The hypolimnion is the lower, "confined" layer which is only mixed with the epilimnion and vented to the atmosphere during seasonal "overturn" (when density stratification disappears). These two zones may thus have very different concentrations of contaminants if input is only to one zone, if the contaminants are volatile (and therefore vented from the epilimnion but not the hypolimnion), or if the epilimnion only is involved in short-term flushing (i.e., inflow from or outflow to shallow streams). Normally, however, a composite sample consists of several vertical samples collected at various depths.

As it is likely that poor mixing may occur in lakes with irregular shape (with bays and coves that are protected from the wind), separate composite samples may be needed to adequately represent water quality. Similarly, additional samples are recommended where discharges, tributaries, land use characteristics, and other such factors are suspected of influencing water quality.

Many lake measurements now are made in-situ using sensors and automatic readout or recording devices. Single and multi-parameter instruments are available for measuring temperature, depth, pH, oxidation-reduction potential (ORP), specific conductance, dissolved oxygen, some cations and anions, and light penetration.

5.2.3 Estuaries

Estuarine areas are by definition among those zones where inland freshwaters (both surface and ground) mix with marine waters. Estuaries generally are categorized into three types dependent upon freshwater inflow and mixing properties. Knowledge of the estuary type is necessary to determine sampling locations:

- Mixed estuary - characterized by the absence of a vertical halocline (gradual or no marked increase in salinity in the water column) and a gradual increase in salinity seaward. Typically this type of estuary is shallow and is found in major freshwater sheetflow areas. Being well mixed, the sampling locations are not critical in this type of estuary.

- Salt wedge estuary - characterized by a sharp vertical increase in salinity and stratified freshwater flow along the surface. In these estuaries the vertical mixing forces cannot override the density differential between fresh and saline waters. In effect, a salt wedge tapering inland moves horizontally, back and forth, with the tidal phase. If contamination is

being introduced into the estuary from upstream, water sampling from the salt wedge may miss it entirely.

- Oceanic estuary - characterized by salinities approaching full strength oceanic waters. Seasonally, freshwater inflow is small with the preponderance of the fresh-saline water mixing occurring near, or at, the shore line.

Sampling in estuarine areas normally is based upon the tidal phases, with samples collected on successive slack tides (i.e., when the tide turns). Estuarine sampling programs shall include vertical salinity measurements coupled with vertical dissolved oxygen and temperature profiles.

5.2.4 Surface Water Sampling Equipment

The selection of sampling equipment depends on the site conditions and sample type required. The most frequently used samplers are:

- Dip sampler
- Weighted bottle
- Kemmerer
- Depth-Integrating Sampler

The dip sampler and the weighted bottle sampler are used most often.

The criteria for selecting a sampler include:

- Disposable or easily decontaminated
- Inexpensive (if the item is to be disposed of)
- Ease of operation
- Nonreactive/noncontaminating - Teflon-coating, glass, stainless steel or PVC sample chambers are preferred (in that order)

Each sample (grab or each aliquot collected for compositing) shall be measured for: specific conductance; temperature; pH; and dissolved oxygen (optional) as soon as it is recovered. These analyses will provide information on water mixing/stratification and potential contamination.

5.2.4.1 Dip Sampling

Surface water often is sampled by filling a container, either attached to a pole or held directly, from just beneath the surface of the water (a dip or grab sample). Constituents measured in grab samples are only indicative of conditions near the surface of the water and may not be a true representation of the total concentration that is distributed throughout the water column and in the cross section. Therefore, whenever possible, it is recommended to augment dip samples with samples that represent both dissolved and suspended constituents, and both vertical and horizontal distributions. Dip sampling often is the most appropriate sampling method for springs, seeps, ditches, and small streams.

5.2.4.2 Weighted Bottle Sampling

A grab sample also can be taken using a weighted holder that allows a sample to be lowered to any desired depth, opened for filling, closed, and returned to the surface. This allows discrete sampling with depth. Several of these samples can be combined to provide a vertical composite sample. Alternatively, an open bottle can be lowered to the bottom and raised to the surface at a uniform rate so that the bottle collects sample throughout the total depth and is just filled on reaching the surface. The resulting sample using either method will roughly approach what is known as a depth-integrated sample.

A closed weighted bottle sampler consists of a stopped glass or plastic bottle, a weight and/or holding device, and lines to open the stopper and lower or raise the bottle. The procedure for sampling is as follows:

- Gently lower the sampler to the desired depth so as not to remove the stopper prematurely (watch for bubbles).
- Pull out the stopper with a sharp jerk of the sampler line.
- Allow the bottle to fill completely, as evidenced by the absence of air bubbles.
- Raise the sampler and cap the bottle.
- Decontaminate the outside of the bottle. The bottle can be used as the sample container (as long as original bottle is an approved container).

5.2.4.3 Kemmerer

If samples are desired at a specific depth, and the parameters to be measured do not require a Teflon®-coated sampler, a standard Kemmerer sampler may be used. The Kemmerer sampler is a brass, stainless steel or acrylic cylinder with rubber stoppers that leave the ends open while being lowered in a vertical position to allow free passage of water through the cylinder. A weighted “messenger” is sent down the line when the sampler is at the designated depth, to cause the stoppers to close the cylinder, which is then raised. Water is removed through a valve to fill sample bottles.

5.2.5 Surface Water Sampling Techniques

Most samples taken during site investigations are grab samples. Typically, surface water sampling involves immersing the sample container directly in the body of water. The following suggestions are applicable to sampling springs, seeps, ditches, culverts, small streams and other relatively small bodies of water, and are presented to help ensure that the samples obtained are representative of site conditions:

- The most representative samples will likely be collected from near mid-stream, the center of flow in a culvert, etc.
- Downstream samples shall be collected first, with subsequent samples collected while moving upstream. Care shall be taken to minimize sediment disturbance while collecting surface water samples. If necessary, sediment samples shall be collected after the corresponding surface water sample.

- Samples may be collected either by immersing the approved sample container or decontaminated glassware into the water.

- Care shall be taken to avoid excessive agitation of the water which may result in the loss of volatile constituents. Additionally, samples for volatile organic analyses shall be collected first, followed by the samples for other constituents.

- Measurements for temperature, pH, specific conductance, or other field parameters, as appropriate, shall be collected immediately following sample collection for laboratory analyses.

- All samples shall be handled as described in SOP F301.

- The sampling location shall be marked via wooden stake or pin flag placed at the nearest bank or shore. The sampling location number shall be marked with indelible ink on the stake or pin flag.

- The following information shall be recorded in the field logbook:

  - Project location, date and time.
  - Weather.
  - Sample location number and sample identification number.
  - Flow conditions (i.e., high, low, in flood, etc.) and estimate of flow rate.
  - Visual description of water (i.e., clear, cloudy, muddy, etc.).
  - On-site water quality measurements.
  - Sketch of sampling location including boundaries of water body, sample location (and depth), relative position with respect to the site, location of wood identifier stake.
  - Names of sampling personnel.
  - Sampling technique, procedure, and equipment used.

General guidelines for collection of samples from larger streams, ponds or other water bodies are as follows:

- The most <u>representative</u> samples are obtained from mid-channel at mid-stream depth in a well-mixed stream.

- For sampling running water, the farthest downstream sample should be obtained first and subsequent samples be collected progressing upstream. In addition, samples should also be collected progressing from zones suspected of low contamination to zones of high contamination.

- To sample a pond or other standing body of water, the surface area may be divided into grids. A series of samples taken from each grid is combined into one composite sample, or several grids are selected at random.

- Care should be taken to avoid excessive agitation of the water that would result in the loss of volatile constituents.

- When obtaining samples in 40 ml septum vials for volatile organics analysis, it is important to exclude any air space in the top of the bottle and to be sure that the Teflon liner faces inward. The bottle can be turned upside down to check for air bubbles after the bottle is filled and capped. Do not overfill pre-preserved vials, which can wash out the preservative. Furthermore, if air bubbles do form, do not empty out the entire vial prior to refilling. This too may wash out any preservative previously placed into the bottle.

- Do not sample at the surface unless sampling specifically for a known constituent which is immiscible and on top of the water. Instead, the sample container should be inverted, lowered to the approximate depth, and held at about a 45-degree angle with the mouth of the bottle facing upstream.

- Measurements for temperature, pH, specific conductance, and/or other field parameters, as appropriate, shall be collected immediately following sample collection for laboratory analysis.

- All samples shall be handled as described in SOP F301.

- Items to be recorded in the field logbook are the same as those described above for small streams.

5.3 Sediment Sampling

Sediment samples usually are collected at the same locations as surface water samples. If only one sediment sample is to be collected, the sample location shall be approximately at the center of the water body. If, however, multiple samples are required, sediment samples should be collected along a cross section to characterize the bed material. A common procedure for obtaining multiple samples is to sample at quarter points along the cross section of flow. As with surface water samples, sediment samples should be collected from downstream to upstream.

5.3.1 Sampling Equipment and Techniques

A bottom-material sample may consist of a single scoop, core, or may be a composite of several individual samples in the cross section. Sediment samples may be obtained using on-shore or off-shore techniques.

When boats are used for sampling, U. S. Coast Guard approved personal flotation devices must be provided and two individuals must undertake the sampling. An additional person shall remain on-shore in visual contact at all times.

The following samplers may be used to collect sediment samples:

- Scoop sampler
- Dredge samplers
- Bucket/hand auger

- Stainless steel spoon or trowel

5.3.1.1 Scoop Sampler

A scoop sampler consists of a pole to which a jar or scoop is attached. The pole may be made of bamboo, wood or aluminum and be either telescoping or of fixed length. The scoop or jar at the end of the pole is usually attached using a clamp.

If the water body can be sampled from the shore or if it can be waded, the easiest and "cleanest" way to collect a sediment sample is to use a scoop sampler. This reduces the potential for cross contamination. This method is accomplished by reaching over or wading into the water body and, while facing upstream (into the current), scooping in the sample along the bottom in the upstream direction. It is very difficult not to disturb fine-grained materials of the sediment-water interface when using this method.

5.3.1.2 Dredges

Dredges are generally used to sample sediments which cannot easily be obtained using coring devices (i.e., coarse-grained or partially-cemented materials) or when large quantities of materials are required. Dredges generally consist of a clam shell arrangement of two buckets. The buckets may either close upon impact or be activated by use of a weighted messenger. Most dredges are heavy (up to several hundred pounds) and require use of a winch and crane assembly for sample retrieval. There are three major types of dredges: Peterson, Eckman and Ponar dredges.

The Peterson dredge is used when the bottom is rocky, in very deep water, or when the flow velocity is high. The dredge shall be lowered very slowly as it approaches bottom, because it can force out and miss lighter materials if allowed to drop freely.

The Eckman dredge has only limited usefulness. It performs well where bottom material is unusually soft, as when covered with organic sludge or light mud. It is unsuitable, however, for sandy, rocky, and hard bottoms and is too light for use in streams with high flow velocities.

The Ponar dredge is a Peterson dredge modified by the addition of side plates and a screen on the top of the sample compartment. The screen over the sample compartment permits water to pass through the sampler as it descends thus reducing the "shock wave" and permits direct access to the secured sample without opening the closed jaws. The Ponar dredge is easily operated by one person in the same fashion as the Peterson dredge. The Ponar dredge is one of the most effective samplers for general use on all types of substrates. Access to the secured sample through the covering screens permits subsampling of the secured material with coring tubes or Teflon scoops, thus minimizing the chance of metal contamination from the frame of the device.

5.3.1.3 Bucket (Hand) Auger

Bucket (hand) augering is a viable method for collecting sediment samples in narrow, intermittent streams or tidal flats. Typically, a 4-inch auger bucket with a cutting head is pushed and twisted into the ground and removed as the bucket is filled. The auger hole is advanced one bucket at a time, to a depth specified in the project plans.

When a specific vertical sampling interval is required, one auger bucket is used to advance the auger hole to the first desired sampling depth. If the sample at this location is to be a vertical composite of all intervals, the same bucket may be used to advance the hole, as well collect subsequent samples in the same hole. However, if discrete grab samples are to be collected to characterize each depth, a new or decontaminated bucket must be placed on the end of the auger extension immediately prior to collecting the next sample. The top several inches of sediment should be removed from the bucket to minimize the chances of cross contamination of the sample from collapsed material from the upper portions of the borehole. The bucket auger should be decontaminated between samples as outlined in SOP F502.

5.3.1.4 Stainless Steel Spoon or Trowel

For loosely packed sediments, a stainless steel scoop or trowel can be used to collect a representative sediment sample, in narrow intermittent streams or tidal flats.

Use the scoop or trowel to collect the sample from the desired depth. Remove heavy debris, rocks, and twigs before collecting the sample. Immediately transfer the sample to the appropriate sample container. Attach a label completed in indelible ink. Record all required information in the field logbook, chain-of-custody record, and other required forms.

5.3.2 Sediment Sampling Procedure

The following general procedure should be used, where applicable, for sampling sediment from springs, seeps, small streams, ditches, or other similar small bodies of water. Procedures for sampling larger bodies of water (i.e., rivers, lakes, estuaries, etc.) should be developed on a project-specific basis, as needed.

- Sediment samples shall be collected only after the corresponding surface water sample has been collected, if one is to be collected.
- Sediment samples shall be collected from downstream locations to upstream locations.
- Samples shall be collected by excavating a sufficient amount of bottom material using a scoop, sample container, spoon, trowel, or auger. Samples should be collected with the sampling device facing upstream and the sample collected from downstream to upstream. Care should be taken to minimize the loss of fine-grained materials from the sample.
- The sample shall be transferred to the appropriate sample containers. Sampling personnel shall use judgment in removing large plant fragments to limit bias caused by bio-organic accumulation.
- All samples shall be preserved and handled as described in SOP F301.
- The sampling location shall be marked via a wooden stake or pin flag placed at the nearest bank or shore. The sample location number shall be marked on the stake or pin flag with indelible ink.
- The following information shall be recorded in the field logbook:

- Project location, date and time.
- Weather.
- Sample identification number.
- Flow conditions.
- Sketch of sampling location including boundaries of water body, sample location, water depth, sample collection depth, relative position with respect to the site, location of wooden identifier stake.
- Chemical analyses to be performed.
- Description of sediment

6.0 QUALITY ASSURANCE RECORDS

The description of the sampling event in the field logbook shall serve as a quality assurance record. Other records include chain-of-custody and sample analysis request forms as discussed in SOP F302.

7.0 REFERENCES

1. Feltz, H. R., 1980. Significance of Bottom Material Data in Evaluating Water Quality in Contaminants and Sediments. Ann Arbor, Michigan, Ann Arbor Science Publishers, Inc., V. 1, p. 271-287.

2. Kittrell, F. W., 1969. A Practical Guide to Water Quality Studies of Streams. U.S. Federal Water Pollution Control Administration, Washington, D.C., 135p.

3. U.S. EPA, 1991. Standard Operating Procedures and Quality Assurance Manual. Environmental Compliance Branch, USEPA Environmental Services Division, Athens, Georgia.

4. U.S. Geological Survey, 1977. National Handbook of Recommended Methods for Water-Data Acquisition. Office of Water Data Coordination, USGS, Reston, Virginia.

APPENDIX D
QUALITY CONTROL FORMS

CQC TEST REPORT LIST

CQC REPORT # _____ SH _____ OF _____ DATE_____

CONTRACTOR: _____ CONTRACT #: _____

PROJECT TITLE: _____ LOCATION: _____

SPEC REF OR DWG#	TYPE OF TEST	DATE PERFORMED	RESULTS	REMARKS

Note: This form shall be used by the Contractor to track CQC Testing. Provide attachments as required.

RWEC

DAILY QUALITY CONTROL REPORT

Daily Report No. Date:

Contract No.:

Contract Title:

Weather: Precipitation: Temp.: Min. Max.

1. Contract/Subcontractors and Area of Responsibility:

NUMBER	TRADE	HOURS	EMPLOYER	LOCATION/DESCRIPTION WORK

2. Equipment: (Not hand tools)

Plant/Equipment	Arrival Date	Departure Date	Date of Safety Check	Hours Used	Hours Idle	Hours Repair

3. Work Performed Today: (Indicate location and description of work performed by prime and/or subcontractors. When network analysis is used, identify work by activity number).
RWEC

4. Control Activities Performed:

Preparatory Inspections: (Identify feature of work and attach minutes).

Initial Inspection: (Identify feature of work and attach minutes). All equipment inspections are performed upon arrival.

Follow-up Inspection: (List inspections performed, results of inspection compared to specification requirements, and corrective actions taken when deficiencies are noted).

5. Tests Performed and Test Results:

6. Material Received: (Note inspection results and storage provided)

				Inspection Results		
Item	**Quantity**	**Description**	**Storage Provided**	**Accept**	**Reject**	**Comments**

7. Submittals Reviewed:

(a) **Submittal No.** (b) **Spec/Plan Reference** (c) **By Whom** (d) **Action**

8. Offsite Surveillance Activities, Including Action Taken:

9. Job Safety: (List items checked, results, instructions and corrective actions taken). Standard operation procedures were used. RWEC:

10. Remarks: (Instructions received or given. Conflict(s) in plans and /or specifications. Delays encountered). RWEC anticipates delays during and after every rainstorm.

Contractor's Verification: On behalf of the Contractor, I certify this report is complete and correct, and all materials and equipment used and work performed during this reporting period are in compliance with the contract plans and specifications, to the best of my knowledge, except as may be noted above.

_____ _____

Name and Title Date

FIELD INSPECTION REPORT

Contract No.:	**Client:**	**Report No.:**
Prepared By:	**Location:**	**Date:**

Description

Visual ~ **NDE ~** **In Progress ~**

Dimensional ~ **Other ~** **Final ~**

Reference Drawing/Standard

Findings

Sketch

Inspector **Date**

RWEC **HC 72 Box 3744** **Naranjito, P.R. 00719** Phone: 787-857-8832 Fax: 787-857-6068	Variance No: Date of Issue: Page 1 of 1
Project Name:	Contract Number:

- Field Variance Report -

I. Type of Variance:

	Differing Site Condition		Error/Omission on Drawings/Specifications
	Change in Regulatory Requirement		Design Change
	Change in Quantity		Factors Affecting Completion Date
	Other:		

II. Drawing/Specification:

III. Description:

Originated by:	Date Prepared:
To Be Performed by:	Date:
To be Verified by:	Date:

IV. Justification for Variance:

V. Impact to Schedule	VI. Estimated Cost Variance: Estimated Fee Adjustment: Estimated Cost + Fee Variance:

VII. Reference Documents:

- Signatures -

Requested by: Date	Project Manager Approval: Date
Approved by: Date	QA Approval: Date

INITIAL AND FOLLOW-UP PHASE CHECKLIST

☐ INITIAL
☐ FOLLOW-UP

Contract No.: _____ **Date:** _____

Specification Paragraph or Section: _____

Description and Location of Work Inspected: _____

REFERENCE CONTRACT DRAWINGS: _____

A. PERSONNEL PRESENT:

NAME	POSITON	COMPANY
1.		
2.		
3.		
4.		

B. MATERIALS AND EQUIPMENT BEING USED ARE IN STRICT COMPLIANCE WITH THE CONTRACT PLANS AND SPECIFICATIONS: YES _____ NO _____

IF NOT, EXPLAIN:

_____

_____

_____

C. PROCEDURES AND/OR WORK METHODS WITNESSED ARE IN STRICT COMPLIANCE WITH THE CONTRACT SPECIFICATIONS: YES _____ NO _____

IF NOT, EXPLAIN:

_____

_____

_____

D. WORKMANSHIP IS ACCEPTABLE: YES _____ NO_____

STATE AREAS WHERE IMPROVEMENT IS NEEDED:

_____

_____

E. TESTS PERFORMED:_____

F. SAFETY VIOLATIONS NOTED: YES _____ NO _____

IF YES, CORRECTIVE ACTION TAKEN:

_____

_____

G IS REINSPECTION REQUIRES: YES NO

IF SO, LIST ITEMS OR AREAS REQUIRING REINSPECTION:

_____

_____

_____

Quality Control Representative

LIST OF OUTSTANDING DEFICIENCIES

Sheet ___ of ____ DATE: _____

PROJECT TITLE: _____ CONTRACTOR: _____

LOCATION: _____ CQC REPORT #: _____ CONTRACT # _____

SPEC REF OR DWG #	LOCATION ON PROJECT	DESCRIPTION OF DEFICIENCY	DATE FOUND	DATE TO BE CORRECTED	DATE CORRECTED	REMARKS

Note: This form shall be used by the Contractor to track outstanding construction deficiencies.

Page _____ of _____
Date: _____

NONCONFORMANCE REPORT

Project Name:_____ Project Number:_____

Non-Conformance:

Identified by: _____ Date: _____

Corrective Action Required to Rectify
and to Prevent Recurrence:

Prepared By: _____
Date: _____

To Be Performed By: _____ Date: _____

Must Correction by Verified? Yes _____ No _____
To Be Verified By: _____

Corrective Action Taken:

Performed By: _____ Date: _____

Verified By: _____ Date: _____

_____
Name

Quality Control Officer
Title

_____
Signature

PREPARATORY INSPECTION OUTLINE

Contract No.: _____ **Date:** _____

Title and No. of Technical Section: _____

Reference Contract Drawings: _____

A. PLANNED ATTENDANTS:

NAME	POSITION	COMPANY

B. SUBMITTALS REQUIRED TO BEGIN WORK:

ITEM	SUBMITTAL #	ACTION CODE

I HEREBY DECLARE THAT THE ABOVE-REQUIRED MATERIALS DELIVERED TO THE JOBSITE ARE CERTIFIED TO BE THE SAME AS THOSE SUBMITTED AND APPROVED.

_____

Quality Control Representative

C. EQUIPMENT TO BE USED IN EXECUTING WORK:

a._____

b._____

c._____

D. WORK AREAS EXAMINED TO ASCERTAIN THAT ALL PRELIMINARY WORK HAS BEEN COMPLETED:

_____

_____

E. METHODS AND PROCEDURES FOR PERFORMING QUALITY CONTROL -INCLUDING SPECIFIC TESTING REQUIREMENTS:

_____

_____

THE ABOVE METHODS AND PROCEDURES OUTLINED ARE CERTIFIED TO COMPLY WITH THE CONTRACT REQUIREMENTS AND WILL BE PERFORMED AS PLANNED AND SPECIFIED.

_____

Quality Control Representative

RECORD OF PREPARATORY AND INITIAL INSPECTIONS

Date of Inspection	Type of Inspection	Definable Feature of Work (Describe)	Report Numbers		Persons Attending Inspection	Was Material and/or Equipment Physically Inspected?
			QA	QA		

Note: This form shall be used by the Contractor to track prep/init inspections. Attach additional results or comments as required.

TRANSMITTAL OF SHOPDRAWINGS, EQUIPMENT DATA, MATERIAL SAMPLES, OR MANUFACTURER'S CERTIFICATES OF COMPLIANCE (*Read instructions on page two prior to initiating this form*)	DATE: Mo / Day / Yr / /	TRANSMITTAL NO --

SECTION I - REQUEST FOR APPROVAL OF THE FOLLOWING ITEMS (*This section will be initiated by the contractor*)

TO:	**FROM:**	**CONTRACT NO .** DAC	**CHECK ONE:** ☐ **THIS IS A NEW SUBMITTAL** ☐ **THIS IS A RESUBMITTAL OF TRANSMITTAL**
SPECIFICATION SEC NO.(Cover only one section with each transmittal)	**PROJECT TITLE AND LOCATION**		

ITEM NO. a.	DESCRIPTION OF ITEM SUBMITTED (Type size, model number/etc.) b.	MFG OR CONTR. CAT., CURVE DRAWING OR BROCHURE NO. (See instruction no. 8) c.	NO. OF COPIES d.	CONTRACT DOCUMENT SPEC. PARA NO. e.	REFERENCE DRAWING SHEET NO. f.	FOR CONTRACTOR USE CODE g.	VARIATION (See instruction No. 6) h.	FOR CE USE CODE i.

REMARKS

I certify that the above submitted items have been reviewed in detail and are correct and in strict compliance with the contract drawings and specifications except as other wise stated.

_____
NAME AND SIGNATURE OF THE CONTRACTOR

SECTION II - APPROVAL ACTION

ENCLOSURES RETURNED (List by Item No.)	NAME, TITLE OF APPROVING AUTHORITY	DATE

INSTRUCTIONS

1. Section I will be initiated by the Contractor in the required numbers of copies.

2. Each transmittal shall be numbered consecutively in the space provided for “Transmittal No.”. This number in addition to the contract number, will form a serial number for identifying each submittal. For new submittals or resubmittals mark the appropriate box; on resubmittals, insert transmittal number of last submission as well as the new submittal number.

3. The “Item No.” will be the same “Item No.” as indicated on ENG FORM 4288 for each entry on this form.

4. Submittals requiring expeditious handling will be submitted under a separate form.

5. Separate transmittal form will be used for submittals under separate sections of the specifications.

6. A check shall be placed in the “Variation” column when a submittal is not in accordance with the plans and specifications -- also a written statement to that effect shall be included in the space provided for “Remarks”.

7. Form is self transmitting, letter of transmittal is not required.

8. When a sample of a material or Manufacturer’s Certificate of Compliance is transmitted, indicate “Sample” or “Certificate” in column c, Section I

9. U.S. Army Corps of Engineers approving authority will assign action codes as indicated below in space provided in Section I, column I to each item submitted. In addition they will ensure enclosures are indicated and attached to the form prior to return to the contractor. The Contractor will assign action codes as indicated in Section I, Column g, to each item submitted.

THE FOLLOWING ACTION CODES ARE GIVEN TO ITEMS SUBMITTED

A -- Approved as submitted
B -- Approved, except as noted on drawings.
C -- Approved except as noted on drawings. Refer to attached sheet resubmission required.
D -- Will be returned by separate correspondence.
E -- Disapproved (See Attached)
F -- Receipt acknowledged
FX -- Receipt acknowledged, does not comply as noted with contract requirements
G -- Other (*Specify)*

10. Approval of items does not relieve the contractor from complying with all the requirements of the contract plans and specifications.

APPENDIX E
SUBMITTAL REGISTER

TRANSMITTAL OF SHOPDRAWINGS, EQUIPMENT DATA, MATERIAL SAMPLES, OR MANUFACTURER'S CERTIFICATES OF COMPLIANCE (*Read instructions on page two prior to initiating this form*)	DATE: Mo / Day / Yr / /	TRANSMITTAL NO --

SECTION I - REQUEST FOR APPROVAL OF THE FOLLOWING ITEMS (*This section will be initiated by the contractor*)

TO:	**FROM:**	**CONTRACT NO .** DAC	**CHECK ONE:** ☐ **THIS IS A NEW SUBMITTAL** ☐ **THIS IS A RESUBMITTAL OF TRANSMITTAL**
SPECIFICATION SEC NO.(Cover only one section with each transmittal)	**PROJECT TITLE AND LOCATION**		

ITEM NO. a.	DESCRIPTION OF ITEM SUBMITTED (Type size, model number/etc.) b.	MFG OR CONTR. CAT., CURVE DRAWING OR BROCHURE NO. (See instruction no. 8) c.	NO. OF COPIES d.	CONTRACT DOCU SPEC. PARA NO. e.	REFERENCE MENT DRAWING SHEET NO. f.	FOR CONTRACTOR USE CODE g.	VARIATION (See instruction No. 6) h.	FOR CE USE CODE i.

REMARKS

I certify that the above submitted items have been reviewed in detail and are correct and in strict compliance with the contract drawings and specifications except as other wise stated.

NAME AND SIGNATURE OF THE CONTRACTOR

SECTION II - APPROVAL ACTION

ENCLOSURES RETURNED (List by Item No.)	NAME, TITLE OF APPROVING AUTHORITY	DATE

INSTRUCTIONS

1. Section I will be initiated by the Contractor in the required numbers of copies.

2. Each transmittal shall be numbered consecutively in the space provided for “Transmittal No.”. This number in addition to the contract number, will form a serial number for identifying each submittal. For new submittals or resubmittals mark the appropriate box; on resubmittals, insert transmittal number of last submission as well as the new submittal number.

3. The “Item No.” will be the same “Item No.” as indicated on ENG FORM 4288 for each entry on this form.

4. Submittals requiring expeditious handling will be submitted under a separate form.

5. Separate transmittal form will be used for submittals under separate sections of the specifications.

6. A check shall be placed in the “Variation” column when a submittal is not in accordance with the plans and specifications -- also a written statement to that effect shall be included in the space provided for “Remarks”.

7. Form is self transmitting, letter of transmittal is not required.

8. When a sample of a material or Manufacturer’s Certificate of Compliance is transmitted, indicate “Sample” or “Certificate” in column c, Section I

9. U.S. Army Corps of Engineers approving authority will assign action codes as indicated below in space provided in Section I, column I to each item submitted. In addition they will ensure enclosures are indicated and attached to the form prior to return to the contractor. The Contractor will assign action codes as indicated in Section I, Column g, to each item submitted.

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A -- Approved as submitted
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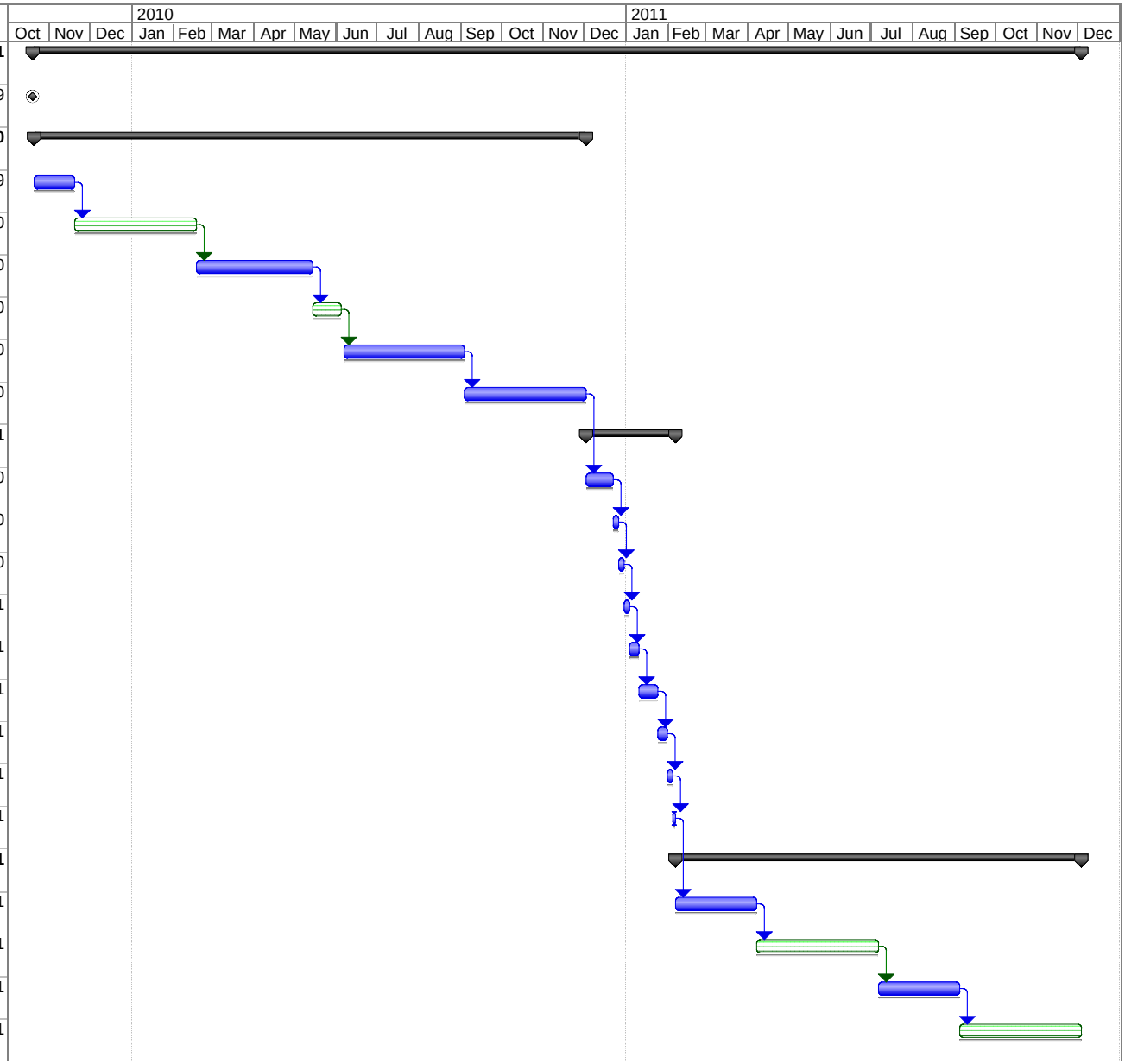
C -- Approved except as noted on drawings. Refer to attached sheet resubmission required.
D -- Will be returned by separate correspondence.
E -- Disapproved (See Attached)
F -- Receipt acknowledged
FX -- Receipt acknowledged, does not comply as noted with contract requirements
G -- Other (*Specify)*

10. Approval of items does not relieve the contractor from complying with all the requirements of the contract plans and specifications.

APPENDIX F
PROJECT SCHEDULE

APPENDIX A
CONSTRUCTION SCHEDULE
SWMU 68 - FORMER SOUTHERN FIRE TRAINING AREA
BASIS OF DESIGN
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

ID	Task Name	Duration	Start	Finish
1	**SWMU 68 - CMI**	**554 days**	**10/20/09**	**12/3/11**
2	Notice to Proceed	1 eday	10/20/09	10/21/09
3	**CMI Design Package and Project Plans**	**292 days**	**10/20/09**	**12/2/10**
4	Draft Documents	30 edays	10/20/09	11/19/09
5	Regulator Review	90 edays	11/19/09	2/17/10
6	Final Documents	86 edays	2/17/10	5/14/10
7	Regulator Review	21 edays	5/14/10	6/4/10
8	Revised Final Documents	65 days	6/7/10	9/3/10
9	Regulator Review and Approval	90 edays	9/3/10	12/2/10
10	**Corrective Action**	**46 days**	**12/2/10**	**2/6/11**
11	Mobilization	20 edays	12/2/10	12/22/10
12	Wetland Delineation	4 edays	12/22/10	12/26/10
13	Field Staking of Contaminated Areas	4 days	12/27/10	12/30/10
14	ROICC/NTR Approval of Field Staked Areas	2 days	12/31/10	1/3/11
15	Excavation and Staging	7 edays	1/3/11	1/10/11
16	Confirmation and Characterization Sampling and Analysis	14 edays	1/10/11	1/24/11
17	Transportation and Off-Site Disposal	7 edays	1/24/11	1/31/11
18	Backfill and Revegetation	4 edays	1/31/11	2/4/11
19	Demobilization	2 edays	2/4/11	2/6/11
20	**CMI Closeout Report**	**215 days**	**2/6/11**	**12/3/11**
21	Draft Closeout Report	60 edays	2/6/11	4/7/11
22	Regulator Review	90 edays	4/7/11	7/6/11
23	Final Closeout Report	60 edays	7/6/11	9/4/11
24	Regualtor Review and Approval	90 edays	9/4/11	12/3/11



APPENDIX G
SITE SPECIFIC HEALTH AND SAFETY PLAN

FINAL
SITE SPECIFIC HEALTH AND SAFETY PLAN
SWMU 68

NAVAL ACTIVITY PUERTO RICO
EPA I.D. NO. PR2170027203
CEIBA, PUERTO RICO

MAY 14, 2010

Prepared for:

DEPARTMENT OF THE NAVY
NAVFAC SOUTHEAST
North Charleston, SC

Under:

Contract No. N69450-08-C-0093

Prepared by:

RIGHT WAY ENVIRONMENTAL CONTRACTORS, INC.
Navanjito, Puerto Rico 00719

and

MICHAEL BAKER JR., INC.
Moon Township, Pennsylvania

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LIST OF ACRONYMS AND ABBREVIATIONS

AHA	Activity Hazard Analysis
BAC	Blood Alcohol Concentration
Baker	Michael Baker Jr., Inc.
cc/min	
CFR	Code of Federal Regulation
CPR	Cardiopulmonary Resuscitation
CRZ	Contamination Reduction Zone
°C	Degrees Celsius
dBA	A-Weighted Decibel
DEET	N, N-diethyl-Meta-toluamide
DF	Dengue Fever
DHF	Dengue Hemorrhagic Fever
DRO	Diesel Range Organics
DSS	Dengue Shock Syndrome
ECP	Environmental Condition of Property
EMA	Emergency Management Agency
EMS	Emergency Response Service
EPA	Environmental Protection Agency
ERCP	Emergency Response Contingency Plan
eV	Electron Volt
EZ	Exclusion Zone
f/b	Flash/Bang
FOD	Frequency of Detection
°F	Degrees Fahrenheit
HAZWOPER	Hazardous Waste Operations and Emergency Response
HBV	hepatitis B virus
HCV	hepatitis C virus
HIV	human immunodeficiency virus
HSC	Health and Safety Coordinator
HSM	Health and Safety Manager
LEL	Lower Explosive Limit
LEPC	Local Emergency Planning Commission
MHR	Maximum Heart Rate
mph	Miles per Hour
MSDS	Material Safety Data Sheet
MU	Meter Unit
NAPR	Naval Activity Puerto Rico
NAVFAC	Naval Facilities Engineering Command
NIOSH	National Institute for Occupational Safety and Health
NRR	Noise Reduction Rating
NSRR	Naval Station Roosevelt Roads

LIST OF ACRONYMS AND ABBREVIATIONS
(Continued)

OPIM	Other potentially infectious materials
OSHA	Occupational Safety and Health Administration
PEL	Permissible Exposure Level
PID	Photoionization Detector
PM	Project Manager
PPE	Personal Protection Equipment
ppm	Parts per Million
PVC	Polyvinyl Chloride
RCRA	Resource Conservation and Recovery Act
RFI	RCRA Facility Investigation
RWEC	Right Way Environmental Contractors, Inc.
SARA	Superfund Amendments and Reauthorization Act
SS	Site Supervisor/Site Safety Officer
HSM	Site Safety and Health Officer
SSHSP	Site Specific Health and Safety Plan
SSO	Site Safety Officer
SWMU	Solid Waste Management Unit
SZ	Support Zone
TLV	Threshold Limit Value
T & D	Transportation and Disposal
TWA	Time Weighted Average
USACE	United States Army Corps of Engineers
USCG	United States Coast Guard
VOC	Volatile Organic Compound

1.0 INTRODUCTION

1.1 Objective

The objective of this plan is to provide a mechanism for establishing safe working conditions during the soil removal activities performed at Solid Waste Management Unit (SWMU) 68. The safety organization, procedures, and protective equipment have been established based upon an analysis of potential hazards. Specific hazard control methodologies have been evaluated and selected to minimize the potential of accident or injury.

1.2 Policy Statement

The policy of Right Way Environmental Contractors, Inc. (RWEC) is to provide a safe and healthful work environment for all employees. RWEC considers no phase of operations or administration to be of greater importance than injury and illness prevention. Safety takes precedence over expediency and shortcuts. RWEC considers all accidents and injuries to be preventable and takes every reasonable step to reduce the possibility of injury, illness, or accident.

This Site Specific Health and Safety Plan (SSHSP) prescribes the procedures that must be followed during soil removal site activities. Operational changes that could affect the health and safety of personnel or the community will not be made without the prior approval of the Project Manager (PM) and the Health and Safety Manager (HSM).

The provisions of this plan are mandatory for all personnel and subcontractors assigned to the project. All visitors to the work site must abide by the requirements of the plan.

1.3 References

This SSHSP complies with applicable Occupational Safety and Health Administration (OSHA), U.S. Environmental Protection Agency (EPA), and RWEC Health & Safety policies and procedures. This plan follows the guidelines established in the following:

- Standard Operating Safety Guides, EPA (Publication 9285.1-03, June 1992).
- Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities, National Institute for Occupational Safety and Health (NIOSH), OSHA, U.S. Coast Guard (USCG), EPA (86-116, November 1985).
- Title 29 of the Code of Federal Regulations (CFR), Part 1910.
- Title 29 of the Code of Federal Regulations (CFR), Part 1926.
- United States Army Corps of Engineers (USACE) Safety and Heath Requirements Manual EM 385-1-1.

1.4 Disclaimer

The enclosed SSHSP has been designed for the methods presently contemplated by RWEC for execution of the proposed work. Therefore, the SSHSP may not be appropriate if the work is not performed by or using the methods presently contemplated by RWEC, or if the scope of work is modified. Each company or contractor is responsible for the safety and health of their personnel, for their actions, and for the work they perform. It is highly recommended that each company or contractor working at the Naval Activity Puerto Rico (NAPR) site perform their work under the supervision of their internal health and safety professionals.

2.0 SITE HISTORY/SCOPE OF WORK

2.1 Background

The existing airport facility at NAPR was in operation for 60 years until the base was closed in March 2004. During the lifetime of the facility, different areas were used for fire training and aircraft maintenance, leaving these areas with contaminants of concern that serve as the basis for this current removal action.

SWMU 68 (also known as Environmental Condition of Property [ECP] Site 14) is located at the southwest end of the Offsite Airfield within a flat lying open area surrounded by secondary growth vegetation. It is suspected that this area was used in the 1950s and 1960s for fire training exercises. A physical site inspection conducted during the ECP assessment observed a disturbed circular area consistent with that of a fire training area.

The former southern fire training area is currently not used. The site consists of a circular area containing limited vegetation. Evidence indicates that a road, extending east to west, was present on the property.

Results of soil samples collected during the Phase I/II ECP investigation performed in 2004 (NAVFAC, 2004) indicated that SWMU 68 has locations with elevated levels of background metals and low levels of diesel range organics (DRO).

A subsequent Phase I Resource Conservation and Recovery Act (RCRA) Facility Investigation conducted at SWMU 68 in 2006 concluded that there was very little impact on the environment from the past site activities. However, because concentrations of lead, copper and zinc from the ECP investigation indicated the presence of contamination in the surface soil above their ecological screening values and respective background levels, and nearby surface soil samples from the Phase I RCRA Facility Investigation (RFI) had relatively low concentrations with no exceedances for these metals, the Phase I RFI recommended a very limited remedial action for surface soil (excavation and disposal) to address potential ecological risks at this site. The extent of contamination associated with lead, copper and zinc has been adequately defined to support a removal action for surface soil covering an area of 5,000 square feet (100 feet by 50 feet rectangle) around ECP sample location 14E-01 and an area of 2,500 square feet (50 feet by 50 feet square) around ECP sample location 14E-03.

2.2 Scope of Work

This SSHSP focuses on work requirement of the removal action to attain the goals at this particular site at NAPR.

The principal tasks to be conducted are listed below:

- Site preparation;
- Install erosion and sediment controls;
- Removal and staging of contaminated soils;
- Maintain excavation to prevent run-off water from entering same and contamination to migrate;
- Contaminated soil removal, dewatering and load out onto trucks for transportation and disposal (T & D) at a permitted landfill;
- Place backfill at excavation and fill in 8" lifts compacting to specification requirements.

All site activities have been analyzed for potential hazards by reviewing available Material Safety and Data Sheets (MSDS), included in this plan as Appendix A, and the Activity Hazard Analysis (AHA) included in this plan as Appendix B.

3.0 KEY PERSONNEL AND MANAGEMENT

The PM, Site Superintendent (SS, and the HSM are responsible for formulating and enforcing health and safety requirements and implementing this SSHSP. The following summarizes the health and safety responsibilities of the site management.

3.1 Project Safety Responsibilities

The PM has the overall responsibility for the project and to assure that the requirements of the contract are attained in a manner consistent with the SSHSP requirements. The PM will coordinate with the SS to assure that the work is completed in a manner consistent with the SSHSP. The SS is responsible for field implementation of the SSHSP. The SS will be the main contact in any on-site emergency situation and will insure off-site emergency agencies have been contacted prior to the start of work. The PM, HSM, and SS are authorized to administer this SSHSP. All site personnel are authorized to stop work when an imminent health or safety risk exists. The PM is responsible for reviewing the SSHSP and ensuring that the SSHSP is complete and accurate. The HSM will also provide technical and administrative support for the Health and Safety Program and will be available for consultation when required. Each employee is responsible for personal safety as well as the safety of others in the work area.

3.2 Key Safety Personnel

The following individuals share responsibility for health and safety at the site:

Project Manager	Pedro Tejada (787) 857-8832 (office) (787) 630-9881 (cellular)
Site Superintendent	Luis A. Rios (787) 607-1536 (cellular)
Quality Control Officer	Alejandro Rodriquez (787) 857 8832 (office)
Health & Safety Manager	Felix Gonzalez (787) 751-5499(office)

4.0 ACTIVITY HAZARDS

Excavations will be completed as indicated on the project plans generated by Michael Baker Jr., Inc. (Baker).

Operation of heavy equipment will be performed to minimize the impact to areas outside of the limits of disturbance. Communications between equipment operators and field technicians working in the area will be maintained at all times. Trucks entering the base will have been inspected and drivers will be instructed as to route and procedures.

4.1 Chemical Hazards

Site personnel will be in direct contact with underlying materials and contaminated soils. The contaminants of concern in the soil at SWMU 68 are copper, lead and zinc.

In addition, materials will be used during construction activities that may be hazardous. The MSDS for these chemicals are included in this report as Appendix A.

The following general symptoms may indicate exposure to a hazardous chemical. Personnel will be removed from the work site and provided immediate medical attention if the following symptoms occur:

- Loss of appetite;
- Weakness in wrists or ankles;
- Dizziness or stupor;
- Nausea, headaches, or cramps;
- Irritation of the eyes, nose, or throat;
- Chest pains and coughing; and
- Rashes or burns.

4.2 Hazard Communication

The purpose of hazard communication (Employee Right-to-Know) is to ensure that the hazards of all chemicals located at this field project site are transmitted (communicated) according to 29 CFR 1926.59 to all personnel and subcontractors.

4.2.1 Container Labeling

RWEC personnel will ensure that all containers are labeled according to contents. These drums and containers will include those from manufacturers and those produced on site by operations, such as gasoline and diesel safety cans. All incoming and outgoing labels shall be checked for identity, hazard warning, and name and address of responsible party.

4.2.2 Material Safety Data Sheets

There will be an MSDS located on site for all site contaminants and each hazardous chemical known to be used on site. MSDS are located in Appendix A of the SSHP.

4.2.3 Employee Information and Training

Training employees on chemical hazards is accomplished through an ongoing corporate training program. All site employees shall maintain their Hazardous Waste Operations and Emergency Response Standard (HAZWOPER) training in accordance with 29 CFR 1910.120. Additionally, chemical hazards are communicated to employees through daily safety meetings held at RWEC field projects and by an initial site orientation program.

At a minimum, RWEC and related subcontractor employees will be instructed on the following:

- An in-depth review of the soil and surface contaminants of concern identified;
- OSHA regulated chemicals and their hazards in the work area;
- How to prevent exposure to these hazardous chemicals;
- What the company has done to prevent workers' exposure to these chemicals;
- Procedures to follow if they are exposed to these chemicals;
- How to read and interpret labels and MSDS's for hazardous substances found on RWEC sites;
- Emergency spill procedures;
- Proper storage and labeling.

Before any new hazardous chemical is introduced on site, each RWEC and related subcontractor employee will be given information in the same manner as during the safety class. The site supervisor will be responsible for seeing that the MSDS on the new chemical is available for review by on site personnel. The information pertinent to the chemical hazards will be communicated to project personnel.

Morning safety meetings will be held and the hazardous materials used on site will be discussed. Attendance is mandatory for all on site employees.

4.3 <u>Physical Hazards</u>

To minimize physical hazards, RWEC has developed standard safety protocols that will be followed at all times. AHA, located in Appendix B, has been developed for each principal activity and identifies the major hazards to which employees may be exposed.

The SS will observe the general work practices of each crew member and equipment operator and will enforce safe procedures. The crew leaders and SS will inspect the work areas. All hazards will be corrected in a timely manner. A variety of physical hazards may be encountered during work activities at this site. Hard hats, safety glasses and steel-toe safety boots are required in all areas of the site. Site-specific hazards and all necessary precautions will be discussed at the daily safety meetings. Failure to follow safety protocols will result in removal of an employee from the site and appropriate disciplinary actions.

4.4 Environmental Hazards

Environmental factors such as weather, wild animals, insects, and irritant plants may pose a hazard when performing outdoor tasks. The SS will take necessary actions to alleviate these hazards should they arise.

4.4.1 Heat Stress

The combination of warm ambient temperature and protective clothing increases the potential for heat stress. Heat stress disorders include:

- Heat rash;
- Heat cramps;
- Heat exhaustion; and
- Heat stroke.

This information will be reviewed during safety meetings. Workers are encouraged to increase consumption of water and electrolyte-containing beverages; e.g., Gatorade. Heat stress can be prevented by assuring an adequate work/rest schedule.

In addition, workers are encouraged to take rests and report symptoms whenever they feel any adverse effects that may be heat-related. The frequency of breaks may need to be increased based on worker recommendation to the SS. Heat stress can be prevented by assuring an adequate work/rest schedule and adequate fluid consumption. A guide for work/rest schedules for various protection levels are given below in Table 4.1. The number of hours before a work/rest period is based on experience with similar work. The time periods should be considered maximum. It must also be remembered that individual physical variability's and differences in physical work activities may require revisions to site plans. Table 4.1 should be used as a guide. Professional judgment of the SS is necessary to assure a fully protective plan to prevent heat stress disorders.

Table 4.1
Guidelines For Work-Rest Periods
Protection Level
Number of Hours Before Rest Period

Temperature	Level D	Level C	Level B	Level A
90+ F*	2.0	1.5	1.0	0.5
87.5 F	2.5	2.0	1.5	1.0
82.5 F	3.0	2.5	2.0	1.5
77.5 F	3.5	3.0	2.5	1.5
72.5	4.0	3.5	2.5	1.5

*Work above 100º F will be reviewed with the Project HSC to determine specific requirements.

Alternately the work/rest schedule can be calculated based on heat stress monitoring results. Each individual will count his/her radial (wrist) pulse as early as possible during each rest period. If the heart rate exceeds 75 percent of their calculated maximum heart rate (MHR) (MHR = 200 – age) at the beginning of the rest period, then the work cycle will be decreased by one-third. The rest period will remain the same. An individual is not permitted to return to work until his/her sustained heart rate is below 75 percent of their calculated maximum heart rate.

Body temperature, measured orally or through the ear canal may also be monitored to assess heat stress. Workers should not be permitted to continue work when their body temperature exceeds 100.4 degrees Fahrenheit (°F) or 38 degrees Celsius (°C). Monitoring should be conducted at the beginning of each break period as noted above.

Monitoring for heat stress will begin when the ambient temperature reaches or exceeds 70 °F when wearing chemical protective clothing (Level C, B, A), or 80 °F for site activities performed with no chemical protective clothing (Level D). Monitoring will include pulse rate, weight loss, oral/ or ear canal temperature, signs and symptoms of heat stress and fluid intake.

4.4.2 Noise

Hearing protection is required for workers operating or working near heavy equipment where the noise level is greater than 85 A-weighted decibel (dBA) Time Weighted Average (TWA) as well as personnel working around heavy equipment. The SS will determine the need and appropriate testing procedures (i.e., sound level meter and/or dosimeter).

Noise monitoring should be conducted during the beginning of each activity, as well as, any time modifications lead to increased noise levels (e.g., adding additional equipment). A sound level meter will be used to measure noise levels at selected locations in the work area and on the site perimeter when treatment equipment is operating normally. When used, noise-monitoring equipment must be calibrated before and after each shift.

If continuous noise levels are found to exceed 85 dBA at any location within the work area, warning signs will be posted. Workers and visitors will be notified that hearing protection is required. Appropriate hearing protection (e.g., ear plugs) will be worn whenever personnel are working or visitors are present in that location. A supply of earplugs will be maintained on site.

Action levels in the following table will trigger the use of appropriate hearing protection (plugs or muffs). Hearing protection must be able to attenuate noise below 90 dBA (8-hour TWA). Each hearing protection or device has a Noise Reduction Rating (NRR) assigned by the EPA. The calculation for a hearing protection device's effectiveness is: noise reading dBA – (NRR – 7dB) < 90 dBA. The results are presented in Table 4.2.

Table 4.2
Guidelines for Hearing Protection

Instrument	Measurement	Action
Type I or Type II Sound Level Meter or dosimeter	>80 dBA → 85 dBA	Hearing protection recommended. Limit work duration to 8-hour shifts.
	>85 dBA → 90 dBA	Hearing protection required. Limit work duration to 8-hour shifts.
	>90 dBA → 115 dBA	Hearing protection required. Investigate use of engineering controls. Limit work duration to 8 hour shifts.
	>115 dBA	Stop work. Consult Project HSM

4.4.3 Biological Hazards

4.4.3.1 Mosquito Borne Diseases

West Nile Virus, West Nile Encephalitis, and Dengue are human health concerns in the Caribbean and United States. West Nile Virus has spread rapidly throughout the Caribbean since its initial detection in humans in 2001 (PubMed, 2006). It is caused by the bite of a mosquito, infected with the West Nile virus.

West Nile Encephalitis is a viral infection of the brain transmitted through the bite of a mosquito, which has previously fed on birds and/or horses that were infected with West Nile Virus. "Encephalitis" means an inflammation of the brain, and it can be caused by viral and bacterial infections. West Nile Encephalitis can be a serious or even fatal illness although this is rare in humans. This illness develops in approximately one of every 150 infections and is generally confined to older and physically compromised individuals. Dead birds in an area may mean that West Nile Virus is circulating between the birds and the mosquitoes in that area. West Nile Virus is not transmitted from one person to another. Human illness from West Nile Virus is rare, even in areas where the virus has been reported.

Most people who become infected with West Nile Virus will have either no symptoms or only mild ones. Symptoms of West Nile Encephalitis include high fever, headache, confusion, muscle aches and weakness, seizures, or paralysis. At its most serious, the infection can result in coma, permanent neurological damage, and death. Symptoms usually occur 5 to 15 days following the bite of an infected mosquito. Because West Nile Encephalitis is a viral infection, antibiotics are not effective and there is no specific treatment available other than general support therapy.

Dengue is a dangerous mosquito-borne viral disease affecting humans; its global distribution is comparable to that of malaria, and an estimated 2.5 billion people live in areas at risk for epidemic transmission. Each year, tens of millions of cases of dengue fever (DF) occur and, depending on the year, up to hundreds of thousands of cases of dengue hemorrhagic fever (DHF). The case-fatality rate of DHF in most countries is about 5%, but this can be reduced to less than 1% with proper treatment. Most fatal cases are among children and young adults.

Classic dengue fever or "break bone fever" is characterized by acute onset of high fever 3-14 days after the bite of an infected mosquito. Patients develop frontal headache, retro-orbital pain, myalgias, arthralgias, nausea, vomiting, and often a maculopapular rash. Many patients notice a change in taste sensation. Acute symptoms, when present, usually last about 1 week, but weakness, malaise, and anorexia may persist for several weeks. A high proportion of infections produce no or minimal symptoms, especially in children. Treatment emphasizes relief of symptoms, avoiding aspirin and other non steroidal anti-inflammatory medications and encouraging oral fluid intake

Protective Measures at Projects

There is no vaccine to protect humans against West Nile Virus or Dengue. Individuals at project sites can reduce their risk from being infected with West Nile Virus by taking the following actions to protect against mosquito bites:

Review the hazards of West Nile Virus and Dengue periodically in morning safety meetings.

- Increase protective measures when working at dawn, dusk, and in the early evening.

- Reduce the area of exposed skin when working outdoors. Long-sleeved shirts with sleeves rolled down are recommended. Understand that mosquitoes may bite through thin clothing, so personnel should evaluate the actual Level D clothing worn, e.g., heavy long sleeve work shirts and heavy jeans may be indicated. Also, the risk or threat of mosquito bites is reduced for those activities that require the use of disposable coveralls.

- For activities where only Level D PPE is specified, consider using disposable coveralls when working in wooded, highly vegetated, or swampy areas.

- Use an insect repellent containing approximately 25% DEET (N, N-diethyl-meta-toluamide). DEET in concentrations greater than 25% provides no additional protection but repel insects longer. However, at some point there is no direct correlation between concentration and repellency. For example, 50% DEET provides about four hours of protection against mosquitoes, but increasing the concentration to 100% provides only one additional hour of protection. Use the repellent according to the manufacturer's directions provided on the container. Use just enough repellent to cover exposed skin and clothing. Do not treat unexposed skin. Frequent re-application is unnecessary for effectiveness. Avoid prolonged and excessive use of DEET.

- After returning from outdoor field activities, wash treated skin with soap and water.

- Personnel should report flu-like symptoms to the HSM.

Employees should avoid applying it to open wounds and irritated skin as it may further irritate the skin or cause discomfort.

Sweating, perspiration and getting wet may wash away the repellent and may require that DEET containing repellent be re-applied.

To remove the breeding places on a project, the following precautions will be followed as practical:

- Cut tall grass and weeds.

- Drain accumulated water in such items as drums, buckets, pools and plastic containers.

- Repair holes in door and window screens.

- Eliminate stagnate water puddles as practical.

- Limit outdoor activities at dawn, dusk and early evening, when mosquitoes are most active, as practical.

4.4.3.2 Blood Borne Pathogens

All human blood and human body fluids should be treated as if they are known to be infectious for human immunodeficiency virus (HIV), hepatitis B virus (HBV), hepatitis C virus (HCV), and/or other blood borne pathogens. All employees must observe universal precautions to prevent contact with blood or other potentially infectious materials (OPIM). When a body fluid is difficult or impossible to identify, all body fluids must be considered OPIM. Appendix C contains the RWEC Blood Borne Pathogens Exposure Control Plan.

4.4.4 Lightning

The procedures provided below will be used to protect site personnel from lightning related injuries.

Training. A tailgate safety meeting will be conducted to increase awareness to the hazards and prevention of lightning related incidents.

Detection of Lightning. The SS will be proactive in monitoring conditions that may produce thunderstorms and lightning. A daily and weekly weather forecast will be tracked and communicated to site personnel. When signs of impending storms, i.e., increasing wind, darkening skies, or lightning appear, local weather monitoring will be increased. The National Weather Service (www.nws.noaa.gov/) should be consulted frequently. Personnel will be notified when thunderstorms may impact the site.

The "flash/bang" (f/b) technique of measuring the distance to lightning will be reviewed with all personnel. The f/b technique is defined as: for each five seconds from the time of observing the lightning flash to hearing the associated thunder, the lightning is one mile away.

Suspension/Resumption of Activities. All outside activities will be suspended when a lightning flash is immediately in the area or an f/b of 20 seconds (4 miles away) is noted. Personnel may continue indoor work activities. Outdoor activities will resume when 30 minutes has passed since the last observable f/b is 20 seconds or greater.

Lightning Protection. When notification is given, all outside work activities will stop and personnel will gather in the support zone for a head count and further instructions. Indoor work will continue, except for the use of electrical equipment, telephones and computers. When a safe location is not present and personnel are caught by a sudden lightning event, employees should seek the lowest possible area, away from large objects which might attract lightning or fall over, e.g., trees, utility poles. The employee should assume a crouching position with their head lowered and hands over their ears. AVOID: WATER, HIGH GROUNDS, HEAVY EQUIPMENT AND TALL, ISOLATED OBJECTS.

First Aid. An employee that is struck by lightning needs immediate assistance (call 911). The body will not carry an electrical charge, but receives an electrical shock and may be burned. Personnel certified in first-aid/cardiopulmonary resuscitation (CPR) should inspect for shock and burns around fingers, toes, buckles and jewelry. Stay with the injured employee until medical help arrives.

4.5 Vehicle and Heavy Equipment Safety Management

4.5.1 Vehicle Safety

Motor vehicle incidents are the number one cause of occupational fatalities, accounting for one in three deaths. Fifty percent or more of vehicle safety incidents occur while backing up.

General Requirements:

RWEC requires employees to use seat belts at all times when traveling in RWEC's owned or leased/rented vehicles. The SS will develop a parking area plan, including backing vehicles into parking spaces, using spotters for backing vehicles and policy mandated vehicle inspections.

RWEC employees are expected to incorporate safe actions and preparations to avoid vehicle accidents and personal injury during work and off-hours. Breaks should be planned into lengthy job mobilizations and demobilizations, including rotation of drivers at regular intervals. If parking areas are busy or crowded and more than one worker is traveling in the same vehicle, one worker should remain outside the vehicle as it leaves the parking space to assist the driver with traffic observation

RWEC's employees arriving at work areas should park vehicles away from delivery, heavy equipment and vehicle loading/unloading locations to prevent parked vehicles from damage by various deliveries. Heavy equipment operators should inspect areas and request vehicles to be moved or spotters used if necessary, to maneuver equipment in tight areas. Employees who observe near misses or potential risks to parked or moving vehicles must report these to the SS immediately.

RWEC's employees are expected to use the vehicle inspection form and check/test the safety systems on the vehicle on a daily basis. Check the following: brakes, mirrors, seat belts, tires, leakage from the undercarriage, lights and turn signals. Vehicles with safety deficiencies must be reported immediately and not driven until properly repaired. Vehicles running errands from different project sites should have telephone numbers of the job site in the vehicle in case calls for assistance are required.

Because of the different ways alcohol can affect behavior, even in very small amounts, the best and safest course is not to drink before driving. At RWEC, a driver with blood alcohol concentration (BAC) over 0.04 percent is considered to be under the influence and subject to disciplinary action. Personnel involved in motor vehicle incidents are subject to drug and alcohol testing.

Weather conditions can have a profound effect on driving. On slippery roads, drive more slowly. Stop and turn with care. Keep several car lengths from other vehicles. At speeds in excess of 35 mph, the chances of hydroplaning increase with speed. In general, keep back 1 car length for every 10 miles per hour (mph) to prevent striking the car ahead.

Vehicles will be operated in accordance with the requirements listed below:

- Seatbelt use is mandatory for all passengers.
- Personnel may not ride in the back of cargo vehicles.
- Vehicle speed is limited to the posted speed limits for developed roadways, 25 mph maximum on dirt roads and 10 mph maximum off-road (based on conditions).

- Vehicle should be driven in four wheel low and low gear when on dirt roads or off road driving where steep grades dictate.

- All operators must possess a valid driver's license.

- Fuel or gasoline is not to be transported inside the passenger compartment.

- No vehicle is left running when unattended.

- Parking brakes are used when vehicles are parked.

In the event of a vehicle incident, notify your PM immediately and complete all required reports.

4.5.2 Heavy Equipment Safety

Forklifts, excavators, loaders, other material handling equipment present various physical hazards on remediation sites. The following critical safety practices shall be followed to prevent safety incidents during heavy equipment operation.

- All equipment will be inspected prior to each use.

- All operators will have training or equivalent experience to be permitted to operate heavy equipment.

- Spotters will be used to back-up equipment and direct traffic in all "blind" areas.

- Standard hand signals will be used to communicate between operators and ground crew.

- All heavy equipment will have operable back-up alarms.

- Heavy equipment will be parked in areas where operators will not be exposed to strains or slip/trip/fall hazards during mounting and dismounting of equipment.

- All heavy equipment will be equipped with operable seat belts; belts will be used by all operators.

- Written lifting plans will be developed and reviewed for all critical lifts.

4.6 Manual Material Lifting

Many different types of objects may be handled manually during site operations. Care should be taken when lifting and handling heavy or bulky items because they are the cause of many back injuries. The following fundamentals address the proper lifting techniques that are essential in preventing back injuries:

- The size, shape, and weight of the object to be lifted must first be considered. No individual employee is permitted to lift any object that weighs more than 60 pounds. Multiple employees or the use of mechanical lifting devices are required for objects over the 60-pound limit.

- The anticipated path to be taken by the lifter should be inspected for the presence of slip, trip, and fall hazards.

- The feet shall be placed far enough apart for good balance and stability (typically shoulder width). The footing shall be solid.

- The worker shall get as close to the load as possible. The legs shall be bent at the knees.

- The back shall be kept as straight as possible and abdominal muscles should be tightened.

- To lift the object, the legs are straightened from their bending position.

- A worker shall never carry a load that cannot be seen over or around.

- When placing an object down, the stance and position are identical to that for lifting. The legs are bent at the knees and the object lowered.

When two or more workers are required to handle the same object, coordination is essential to ensure that the load is lifted uniformly and that the weight is equally divided between the individuals carrying the load. When carrying the object, each worker, if possible, shall face the direction in which the object is being carried. In handling bulky or heavy items, the following guidelines shall be followed to avoid injury to the hands and fingers:

- A firm grip on the object is essential; leather gloves shall be used if necessary.

- The hands and object shall be free of oil, grease, and water that might prevent a firm grip and the fingers shall be kept away from any points that could cause them to be pinched or crushed, especially when setting the object down.

- The item shall be inspected for metal slivers, jagged edges, burrs, and rough or slippery surfaces prior to being lifted.

4.7 Activity Hazard Analysis

Appendix B contains AHA for primary site tasks. They contain detailed information on physical and chemical hazards, and provide control measures for these hazards. The AHA's will be field checked by the SS on an ongoing basis and revised as necessary. All revisions will be communicated to the work crew.

5.0 WORK AND SUPPORT AREAS

Work zones will be established according to wind direction, area to be excavated and exit routes. When necessary, each work area will be clearly identified using signs or physical barriers.

5.1 Support Zone

The uncontaminated support zone (SZ), or clean zone, will be located upwind, in an area outside the exclusion zone (EZ) and contamination reduction zone (CRZ) and within the geographic perimeters of the site. The area is used for material staging, vehicle parking, office facilities, sanitation facilities, and receipt of deliveries. Personnel entering this zone may include delivery personnel, visitors, security guards, etc., who will not necessarily be permitted in the EZ. All personnel arriving in the SZ will, upon arrival, report to the SS and sign the site visitor log.

5.2 Contamination Reduction Zone

Personnel and equipment decontamination will be performed in the CRZ that is adjacent to the EZ. All personnel entering or leaving the EZ will pass through this area to prevent any cross-contamination and for the purpose of accountability. Personal protective outer garments and respiratory protection will be removed in the CRZ and properly labeled. All water generated from equipment and personal decontamination will be contained on site and disposed of in an appropriate manner.

5.3 Exclusion Zone

The EZ will be the area around excavated areas and/or the areas with elevated air monitoring readings. This area has the highest potential for exposure to contamination by contact, ingestion, or inhalation. All employees will use proper PPE when working in these areas. The location of the EZ will be identified by fencing or other appropriate means primarily around the excavation areas and the stockpiles. A daily entry log records the time of entry and exit from the EZ for each person.

A log of all personnel visiting, entering or working on the site shall be maintained by the SS. Visitors will attend a site orientation given by the SS and sign the SSHSP.

The following are standard safe work practices that apply to all site personnel and will be discussed in the safety briefing prior to initiating work on the site:

- Eating, drinking, chewing gum or tobacco, smoking is prohibited in the EZ/CRZs.
- A buddy system will be used. Hand signals will be established to maintain communication.
- During site operations, each worker will consider himself as a safety backup to his partner. Off-site personnel provide emergency assistance.
- Visual contact will be maintained between buddies on site when performing hazardous duties.
- All personnel must comply with established safety procedures. Any staff member who does not comply with safety policy, as established by the SS, will be immediately dismissed from the site.
- Proper decontamination procedures must be followed before leaving the site.
- All employees and visitors must sign in and out of the site.

6.0 PROTECTIVE EQUIPMENT

This section specifies the levels of PPE, which is required for each principal activity performed at this site. All site personnel must be trained in the use of all PPE utilized.

6.1 Anticipated Protection Levels

The following protection levels have been established for the site work activities.

Table 6.1
Anticipated Protection Levels

Task	Initial PPE Level	Upgrade PPE Level	Skin Protection	Respiratory Protection	Other PPE
Areas outside of designated contaminated soil locations (SZ)	Level D	Modified Level D	Leather-work gloves. Tyvek® coverall as necessary to protect against biological hazards	None	Hard-hat, steel-toe work boots, safety glasses and hearing protection >85 dBA. Goggles/face shield when in contact with liquid contamination or flying debris.
Areas of contaminated soils (EZ and CRZ)-general work PPE level	Level C	Not Anticipated	Tyvek® coverall, inner latex sample gloves, outer nitrile gloves and latex boot covers	Full face respirator	Hard-hat, steel-toe work boots, safety glasses and hearing protection >85 dBA. Goggles/face shield when in there is a potential for splash hazards
General Support Zone Activities-(SZ)	Level D	Not Anticipated	None	None	Hard-hat, steel-toe boots, safety glasses and hearing protection >85dBA.

6.2 Protection Levels Descriptions

This section lists the minimum requirements for each protection level. Modification to these requirements may have been noted above.

6.2.1 Level D

Level D requires the following PPE equipment as necessary:

- Safety glasses with side shields;
- Hard hat;
- Steel-toed work boots;
- Work clothing as prescribed by weather;
- Leather work gloves;

- Cut resistant gloves when handling sharp objects;
- Reflective vests for ground personnel working around heavy equipment or roadways;
- Hearing protection in areas >85 dBA.

6.2.2 Modified Level D

Modified Level D requires the following PPE equipment as necessary:

- Safety glasses with side shields;
- Hard hat;
- Steel-toed work boots;
- Tyvek® coverall (when handling dry materials);
- Poly-coated Tyvek® coverall or polyvinyl chloride (PVC) rain suit (when handling wet materials);
- Latex over-boots;
- Inner latex sample gloves;
- Outer nitrile gloves;
- Hearing protection in areas >85 dBA
- Full-face shield when splash hazards are present;
- Metatarsal and shin guard for pressure sprayer operations.

6.2.3 Inspection and Cleaning

Respirators shall be checked periodically by a qualified individual and inspected before each use by the wearer. All respirators and associated equipment will be decontaminated and hygienically cleaned after each use.

6.2.4 Fit Testing

Annual respirator fit tests are required of all personnel wearing negative-pressure respirators. The test will use isoamyl acetate or irritant smoke. The fit test must be for the style and size of the respirator to be used. Quantitative fit-testing is required for use of respirators in chemical environments where the respirator effective use limit exceeds 10 (exposure of 1 part per million [(ppm)] inside the respirator for 10 ppm outside the respirator). Therefore, quantitative fit-testing is dependent on the permissible exposure level (PEL)/threshold limit value (TLV) of the chemical substance involved. Quantitative fit-testing is required for potential exposure to airborne particulate levels that exceed 10 times the established PEL/TLV.

6.2.5 Facial Hair

Personnel who have facial hair which interferes with the respirator's sealing surface will not be permitted to wear a respirator and will not be permitted to work in areas requiring respirator use.

6.2.6 Corrective Lenses

Normal eyeglasses cannot be worn under full-face respirators because the temple bars interfere with the respirator's sealing surfaces. For workers requiring corrective lenses, special spectacles designed for use with respirators will be provided. Contact lenses are permitted to be used with full-face respirators based on guidance issued by OSHA.

6.2.7 Medical Certification

Only workers who have been certified by a physician, as being physically capable of respirator usage will be issued a respirator. Personnel unable to pass a respiratory fit test or without medical clearance for respirator use will not be permitted to enter or work in areas on site that require respiratory protection. Employees will receive a written physician's opinion that they are fit for general hazardous waste operations as per 29 CFR 1910.120(f) (7).

6.3 Site-Specific Personal Protective Equipment

The primary objective of the PPE program is to ensure employee protection and to prevent employee exposure to site contaminants during site operations. Engineering controls are not feasible for many tasks and, therefore, require the use of PPE.

The SS will be responsible for monitoring all aspects of the PPE program. This includes donning and doffing, temperature related stress monitoring, inspection, and decontamination. PPE selection is identified in Table 6.1 for each specified task. The SS, in consultation with the HSC, and the HSM will direct changes in PPE based on changing conditions. The site-specific SSHSP will serve as written certification that the workplace was evaluated concerning PPE requirements.

7.0 DECONTAMINATION PROCEDURES

This section describes the procedures necessary to ensure that both personnel and equipment are free from contamination when they leave the work site.

7.1 Personnel Decontamination

Decontamination procedures will ensure that material which workers may have contacted in the EZ do not result in personal exposure and is not spread to clean areas of the site. This sequence describes the general decontamination procedure. The specific stages will vary depending on the site, the task, the protection level, etc.

7.1.1 Modified Level D Decontamination

- Go to the end of the EZ.
- Remove and discard latex booties.
- Remove outer gloves and discard.
- Remove protective suit.
- Remove inner sample gloves and discard.
- Wash face and hands.

7.1.2 Level C Decontamination

- Go to the end of the EZ.
- Remove and discard latex booties.
- Remove outer gloves and discard.
- Remove outer suit (Poly-coated Tyvek®, Tyvek® or PVC rain suit).
- Cross into CRZ (dirty side of respirator wash area).
- Remove and wash respirator (4 stages):
  Soap and water solution
  First rinse
  Disinfect respirator (1 cap full of bleach to 1 gallon of water)
  Final rinse
  Hang respirator to dry
- Remove inner sample gloves and discard.
- Wash face and hands.

7.1.3 Suspected Contamination

Any employee suspected of sustaining skin contact with chemical materials will first use the emergency shower. Following a thorough drenching, the worker will proceed to the decontamination facility and the worker will remove clothing, shower, don clean clothing, and immediately be taken to the first aid station. Medical attention will be provided based on the degree of injury.

7.1.4 Personal Hygiene

Before any eating, smoking, or drinking, personnel will wash hands, arms, neck and face.

7.2 Equipment Decontamination

All contaminated equipment will be decontaminated before leaving the site. Decontamination procedures will vary depending upon the contaminant involved, but may include sweeping, wiping, scraping, hosing, or steaming the exterior of the equipment. Personnel performing this task will wear the proper PPE as prescribed by the SS.

7.3 Disposal

All decontamination liquids and disposable clothing will be treated as contaminated waste unless determined otherwise by accepted testing methods. Wastes will be disposed of according to state and federal regulations.

8.0 AIR MONITORING

Air monitoring will be conducted in order to characterize personnel exposures and fugitive emissions from site contaminants. The principle contaminants of concern are hydrocarbons.

8.1 Work Area Air Monitoring

Work area air monitoring at SWMU 68 will be by direct reading methods. Photoionization Detector (PID) meter will be used to monitor personal exposures while the removal action is implemented. Air monitoring results will be used to determine the effectiveness and/or need for control methods.

Table 8.1
Direct Reading Air Monitoring Requirements

Monitoring Device	Monitoring Location/ Personnel	Monitoring Frequency	Action Level	Action
PID	Breathing Zone Monitoring	Continuous during all activities involving disturbance of soils.	1 ppm above background sustained for 1 minute	If PID reads greater than 1 mu (meter unit) above background for up to 5 minutes, PPE=Level C

8.2 Instrumentation

The following is a description of the air monitoring equipment (MiniRAE 2000 PID) to be used at this site.

8.2.1 Principle of Operation

MiniRAE 2000 portable PID is a broadband volatile organic compound (VOC) gas monitor and data logger for work in hazardous environments. It monitors VOCs using a PID with a 9.8eV, 10.6eV or 11.7eV gas discharge lamp.

8.2.2 Calibration Methods/Frequencies

MiniRAE 2000 should be calibrated each day before it is used.

There are two calibrations methods used:

1. Fresh air calibration - Fresh air calibration should be performed in an area known to be free of contaminants and/or using a charcoal filter.

2. Known concentration gas cylinder - This procedure determines the second point of the sensor calibration curve for the sensor. A cylinder of standard reference gas (span gas) fitted with a 500 cc/min. flow Limiting regulator or a flow-matching regulator.

8.2.3 Preventative Maintenance

Maintenance of the MiniRAE 2000 consists of maintaining the instrument clean, recharging of battery. Prior to entering a confined-space area or hot work involving welding, cutting, or other high heat-producing operations where flammable or combustible vapors may be present, lower explosive limit (LEL)/O2 measurements will be taken.

8.3 Air Monitoring Log

The SS will ensure that all air-monitoring data is logged into a notebook. Data will include instrument used, wind direction, work process, etc. The Site SS and PM will periodically review this data.

8.4 Calibration Requirements

The air monitoring equipment will be calibrated daily. A separate log will be kept by the SS detailing date, time, span gas, or other standard, and name of person performing the calibration.

8.5 Air Monitoring Results

Air monitoring results will be available for personnel inspection, and they will be discussed during morning safety meetings.

9.0 EMERGENCY RESPONSE

9.1 Pre-Emergency Planning

Prior to engaging in remediation activities at the site, RWEC will plan for possible emergency situations and have available adequate supplies and manpower to respond. In addition, site personnel will receive training during the site orientation concerning proper emergency response procedures.

The following situations would warrant implementation of the Emergency Response and Contingency Plan (ERCP):

Fire/Explosion	The potential for human injury exists. Toxic fumes or vapors are released. The fire could spread on-site or off-site and possibly ignite other flammable materials or cause heat-induced explosions. The use of water and/or chemical fire suppressants could result in contaminated run-off.
Spill or Release of Hazardous Materials	The spill could result in the release of flammable liquids or vapors, thus causing a fire or gas explosion hazard. The spill could cause the release of toxic liquids or fumes in sufficient quantities or in a manner that is hazardous to or could endanger human health.
Natural Disaster	A rainstorm exceeds the flash flood level. The facility is in a projected tornado path or a tornado has damaged facility property. Severe wind gusts are forecasted or have occurred and have caused damage to the facility. Hurricanes.
Medical Emergency	Overexposure to hazardous materials. Trauma injuries (broken bones, severe lacerations/bleeding, burns). Eye/skin contact with hazardous materials. Loss of consciousness. Heat stress (Heat stroke). Heart attack. Respiratory failure. Allergic reaction.

The following measures will be taken to assure the availability of adequate equipment and manpower resources:

- Sufficient equipment and materials will be kept on site and dedicated for emergencies only. The inventory will be replenished after each use.

- On-site emergency responders will be current in regards to training and medical surveillance programs. Copies of all applicable certificates will be kept on file for on-site personnel required to respond.

- It will be the responsibility of the Site Supervisor to brief the on-site response team on anticipated hazards at the site. The Emergency Coordinator shall also be responsible for anticipating and requesting equipment that will be needed for response activities.

- Emergency response activities will be coordinated with the Local Emergency Management Agency (EMA) in compliance with the Superfund Amendments and Reauthorization Act (SARA) Title III requirements.

Communications will be established prior to commencement of any activities at the remediation site. Communication will be established so that all responders on site have availability to all pertinent information to allow them to conduct their activities in a safe and healthful manner. The primary communication device will be air horns.

9.2 Emergency Recognition and Prevention

Because unrecognized hazards may result in emergency incidents, it will be the responsibility of the Site Supervisor and the SSO, through daily site inspections and employee feedback (Safety Observation Program, daily safety meetings, and AHA) to recognize and identify all hazards that are found at the site. These may include:

Chemical Hazards	Materials at the site Materials brought to the site
Physical Hazards	Fire/explosion Slip/trip/fall Excessive noise
Mechanical Hazards	Pinch points Vehicle traffic
Environmental Hazards	Electrical Storms High winds Heavy Rain/Snow Temperature Extremes (Heat Stress) Poisonous Plants/Animals

Once a hazard has been recognized, the SS will take immediate action to prevent the hazard from becoming an emergency.

- Daily safety meeting
- Task-specific training prior to commencement of activity
- Proper PPE selection/use
- Adhering to all RWEC standard operating procedures

Table 9.1
Emergency Telephone Numbers

Local Agencies: Ambulance Fire Police	 911 911 911
Hospital : Hospital San Pablo del este. HIMA 404 Avenida General Valero, Fajardo, PR 00738 The SSO must verify location and develop directions to the hospital before beginning any site activities.	 (787)-863-0505
Regional Poison Control Center	800-552-6337
Federal Agencies: Agency for Toxic Substances and Disease Registry National Response Center	 (404) 639-0615 (24 hr.) 800-424-8802
Michael Baker Jr., Inc.	To be Determined
RWEC Personnel: Project Manager – Pedro Tejada Site Superintendent – Luiz Rios Health and Safety Manager – Felix Gonzalez	 (787) 857-8832 (office) (787) 630-9881 (cellular) (787) 607-1536 (cellular) (787) 674-1562 (cellular)

9.3 Personnel Roles, Lines of Authority and Communications

This section describes the roles, responsibilities, and communication procedures that will be followed by personnel involved in emergency responses.

The primary Emergency Coordinator for this site is the Site Supervisor. In the event an emergency occurs and the Emergency Coordinator is not on site, the SS or the highest-ranking employee on site will serve as the Emergency Coordinator until he arrives. The Emergency Coordinator will determine the nature of the emergency and take appropriate action as defined by this ERCP.

The Emergency Coordinator will implement the ERCP immediately as required. The decision to implement the plan will depend upon whether the actual incident threatens human health or the environment. Immediately after being notified of an emergency incident, the Emergency Coordinator or his designee will evaluate the situation to determine the appropriate action.

9.3.1 Responsibilities and Duties

This section describes the responsibilities and duties assigned to the Emergency Coordinator.

It is recognized that the structure of the "Incident Command System" will change as additional response organizations are added. RWEC will follow procedures as directed by the Fire Department, Local Emergency Planning Commission (LEPC), State and Federal agencies as required. RWEC will defer to the local Fire Department Chief to assume the role of Incident Commander upon arriving on site. Additional on-site personnel may be added to the Site Emergency Response Team as required to respond effectively.

9.3.2 On-Site Emergency Coordinator Duties

The On-Site Emergency Coordinator is responsible for implementing and directing the emergency procedures. All emergency personnel and their communications will be coordinated through the Emergency Coordinator. Specific duties are as follows:

- Identify the source and character of the incident, type and quantity of any release. Assess possible hazards to human health or the environment that may result directly from the problem or its control.

- Discontinue operations in the vicinity of the incident if necessary to ensure that fires, explosions, or spills do not recur or spread to other parts of the site.

- Notify the NAPR personnel. NAPR will contact the local Emergency Response Teams if their help is necessary to control the incident. Table 9.1 provides telephone numbers for emergency assistance.

- Direct on-site personnel to control the incident until, if necessary, outside help arrives.

- Ensure that the building or area where the incident occurred and the surrounding area are evacuated, and shut off possible ignition sources, if appropriate. The Emergency Response Team is responsible for directing site personnel such that they avoid the area of the incident and leave emergency control procedures unobstructed.

- If fire or explosion is involved, notify facility Fire Department.

- Notify RWEC and Baker Project Manager

- Notify NAPR

- Have protected personnel, in appropriate PPE, on standby for rescue.

- If the incident may threaten human health or the environment outside of the site, the Emergency Coordinator should immediately determine whether evacuation of area outside of the site may be necessary and, if so, notify the Naval Activity Puerto Rico. The NAPR will contact the local Police Department and the Office of Emergency Management.

If hazardous waste has been released or produced through control of the incident, ensure that:

- Waste is collected and contained.
- Containers of waste are removed or isolated from the immediate site of the emergency.
- Treatment or storage of the recovered waste, contaminated soil or surface water, or any other material that results from the incident or its control is provided.
- Ensure that no waste that is incompatible with released material is treated or stored in the facility until cleanup procedures are completed.
- Ensure that all emergency equipment used is decontaminated, recharged, and fit for its intended use before operations are resumed.

9.3.3 Safe Distances and Places of Refuge

The Emergency Coordinator for all activities will be the SS. No single recommendation can be made for evacuation or safe distances because of the wide variety of emergencies that could occur. Safe distances can only be determined at the time of an emergency based on a combination of site and incident-specific criteria. However, the following measures are established to serve as general guidelines.

In the event of minor hazardous materials releases (small spills of low toxicity), workers in the affected area will report initially to the contamination reduction zone. Small spills or leaks (generally less than 55 gallons) will require initial evacuation of at least 50 feet in all directions to allow for cleanup and to prevent exposure. After initial assessment of the extent of the release and potential hazards, the Emergency Coordinator or his designee will determine the specific boundaries for evacuation. Appropriate steps such as caution tape, rope, traffic cones, barricades, or personal monitors will be used to secure the boundaries.

If an incident may threaten the health or safety of the surrounding community, the public will be informed and, if necessary, evacuated from the area. The Emergency Coordinator, or his designee, will inform the proper agencies in the event that this is necessary. Telephone numbers are listed in Table 9.1.

Places of refuge will be established prior to the commencement of activities. These areas must be identified for the following incidents:

- Chemical release;
- Fire/explosion;
- Medical emergency;
- Hazardous weather.

In general, evacuation will be made to the main entrance to the RWEC staging area, unless the Emergency Coordinator determines otherwise. It is the responsibility of the Emergency Coordinator to determine when it is necessary to evacuate personnel to off-site locations.

In the event of an emergency evacuation, all the employees will gather at the entrance to the site until a head count establishes that all are present and accounted for. No one is to leave the site without notifying the Emergency Coordinator.

9.3.4 Evacuation Routes and Procedures

All emergencies require prompt and deliberate action. In the event of an emergency, it will be necessary to follow an established set of procedures. Such established procedures will be followed as closely as possible. However, in specific emergency situations, the Emergency Coordinator may deviate from the procedures to provide a more effective plan for bringing the situation under control. The Emergency Coordinator is responsible for determining which situations require site evacuation.

9.3.5 Evacuation Signals and Routes

Two-way radio communication and an air horn will be used to notify employees of the necessity to evacuate an area or building involved in a release/spill of a hazardous material. The crew supervisor will have a two-way radio. Only the Emergency Coordinator will initiate total site evacuation, however, in his absence, decision to preserve the health and safety of employees will take precedence.

9.3.6 Evacuation Procedures

In the event that an evacuation is necessary, the following actions will be taken:
The emergency signal will be activated.

- No further entry of visitors, contractors, or trucks will be permitted. Vehicle traffic within the site will cease in order to allow safe exit of personnel and movement of emergency equipment.

- Shut off all machinery if safe to do so.

- ALL on-site personnel, visitors, and contractors in the support zone will assemble at the entrance to the site for a head count and await further instruction from the Emergency Coordinator.

- ALL persons in the exclusion zone and contamination reduction zone will be accounted for by their immediate crew leaders (e.g., foreman). Leaders will determine the safest exits for employees and will also choose an alternate exit if the first choice is inaccessible.

- During exit, the crew leader should try to keep the group together. Immediately upon exit, the crew leader will account for all employees in his crew.

- Upon completion of the head count, the crew leader will provide the information to the Emergency Coordinator.

- Contract personnel and visitors will also be accounted for.

- The names of emergency response team members involved will be reported to the emergency spill control coordinator.

- The Emergency Coordinator, or designee, will make a final tally of persons. No attempt to find persons not accounted for will involve endangering lives of RWEC or other employees by re-entry into emergency areas.

In all questions of accountability, immediate crew leaders will be held responsible for those persons reporting to them. Visitors will be the responsibility of those employees they are seeing. Contractors and truck drivers are the responsibility of the Site Supervisor.

- Personnel will be assigned by the Emergency Coordinator to be available to direct and brief emergency responders.

- Re-entry into the site will be made only after the Emergency Coordinator gives clearance. At his direction, a signal or other notification will be given for re-entry into the facility.

9.4 Emergency Spill Response Procedures and Equipment

In the event of an emergency involving a hazardous material spill or release, the following general procedures will be used for rapid and safe response and control of the situation. Emergency contacts found in Table 9.1 provide a quick reference guide to follow in the event of a major spill.

9.4.1 Notification Procedures

If an employee discovers a chemical spill or process upset resulting in a vapor or material release, he or she will immediately notify the on-site Emergency Coordinator.
On-site Emergency Coordinator will obtain information pertaining to the following:

- The material spilled or released;
- Location of the release or spillage of hazardous material;
- An estimate of quantity released and the rate at which it is being released;
- The direction in which the spill, vapor or smoke release is heading;
- Any injuries involved;
- Fire and/or explosion or possibility of these events;
- The area and materials involved and the intensity of the fire or explosion.

This information will help the on-site Emergency Coordinator to assess the magnitude and potential seriousness of the spill or release.

9.4.2 Procedure for Containing/Collecting Spills

The initial response to any spill or discharge will be to protect human health and safety, and then the environment. Identification, containment, treatment and disposal assessment will be the secondary response.

- Construction of a temporary containment berm utilizing on-site clay absorbent earth;

- Digging a sump, installing a polyethylene liner;

- Diverting the spill material into the sump placing drums under the leak to collect the spilling material before it flows over the ground;

- Transferring the material from its original container to another container.

- The Emergency Coordinator will notify NAPR of the spill and steps taken to institute clean up. Emergency response personnel will clean up all spills following the spill clean-up plan developed by the Emergency Coordinator.

Supplies necessary to clean up a spill will be immediately available on-site. Such items may include, but are not limited to:

- Shovel, rake;
- Sorbent materials;
- Personal safety equipment;
- Steel drums;
- Miscellaneous hand tools.

After a hazardous spill or release, clean up personnel will take the following measures:

- Make sure all unnecessary persons are removed from the hazard area.

- Put on protective clothing and equipment.

- If a flammable material is involved, remove all ignition sources, and use spark and explosion proof equipment for recovery of material.

- Remove all surrounding materials that could be especially reactive with materials in the waste. Determine the major components in the waste at the time of the spill.

- If wastes reach a storm sewer, try to dam the outfall by using sand, earth, sandbags, etc. If this is done, pump this material out into a temporary holding tank or drums as soon as possible.

- Place all small quantities of recovered liquid wastes (55 gallons or less) and contaminated soil into drums for incineration or removal to an approved disposal site.

- Spray the spill area with foam, if available, if volatile emissions may occur.

- Apply appropriate spill control media (e.g., clay, sand, lime, etc.) to absorb discharged liquids.

- For large spills, establish diking around leading edge of spill using booms, sand, clay or other appropriate material. If possible, use diaphragm pump to transfer discharged liquid to drums or holding tank.

9.4.3 Emergency Response Equipment

To provide for safety and first aid during emergency responses the following equipment will be staged in the support zone and throughout the site, as needed:

- ABC-type fire extinguisher
- First aid kit, industrial size
- Eyewash
- Emergency signal horn.

9.4.4 Emergency Spill Response Clean-Up Materials and Equipment

A sufficient supply of appropriate emergency response clean-up and personal protective equipment will be inventoried and inspected, visually, on a weekly basis.

The materials listed below may be kept on site for spill control, depending on the types of hazardous materials present on site. The majority of this material will be located in the support zone. Small amounts will be placed on pallets and located in the active work areas.

- Appropriate solvents (e.g., CITRIKLEEN, for decontamination of structures or equipment).
- Sand or clay to solidify/absorb liquid spills.

9.4.5 Medical Emergency Contingency Measures

The procedures listed below will be used to respond to medical emergencies. The SS will contact the local hospital and inform them of the site hazards and potential emergency situations. A minimum of two first-aid/CPR trained personnel will be available on site. Directions to the local hospital are included in this plan as Appendix D.

9.4.6 Response

The nearest workers will immediately assist a person who shows signs of medical distress or who is involved in an accident. The work crew supervisor will be summoned.

The work crew supervisor will immediately make radio contact with the on-site Emergency Coordinator to alert him of a medical emergency situation. The supervisor will advise the following information:

- Location of the victim at the work site
- Nature of the emergency
- Whether the victim is conscious
- Specific conditions contributing to the emergency, if known.

The Emergency Coordinator will notify the Site Safety Officer. The following actions will then be taken depending on the severity of the incident:

Life-Threatening Incident. If an apparent life-threatening condition exists, the crew supervisor will inform the Emergency Coordinator by radio, and the local Emergency Response Services (EMS) will be immediately called. An on-site person will be appointed who will meet the EMS and have him/her quickly taken to the victim. Any injury within the EZ will be evacuated by RWEC personnel to a clean area for treatment by EMS personnel. No one will be able to enter the EZ without showing proof of training, medical surveillance and site orientation.

An accident/injury/illness report will be completely and properly filled out and submitted to the Project Manager in accordance with RWEC's reporting procedures.

Non Life-Threatening Incident. All injuries, no matter how small, will be reported to the SS. If it is determined that no threat to life is present, the SS will direct the injured person through decontamination procedures appropriate to the nature of the illness or accident. Appropriate first-aid or medical attention will then be administered.

The area surrounding an accident site must not be disturbed until the scene has been cleared by the Site Supervisor.

9.4.7 Notification

The following personnel/agencies will be notified in the event of a medical emergency:

- Local Fire Department or EMS
- On-site Emergency Coordinator
- Workers in the affected areas
- Notify RWEC PM
- Notify Naval Activity Puerto Rico representative.

In the event of a work related injury or illness, OSHA 300 Log must be filled out. A copy has been included with this plan as Appendix E.

9.4.8 Fire Contingency Measures

RWEC's personnel and subcontractors are not trained professional firefighters. Therefore, if there is any doubt that a fire can be quickly contained and extinguished, personnel will notify the Emergency Coordinator by radio and vacate the structure or area. The Emergency Coordinator will immediately notify the local Fire Department.

The following procedures will be used to prevent the possibility of fires and resulting injuries:

- Sources of ignition will be kept away from where flammable materials are handled or stored.

- "No smoking" signs will be conspicuously posted in areas where flammable materials are present and throughout the exclusion and contamination reduction zones.

- Fire extinguishers will be located in all RWEC site dedicated vehicles and placed in all areas where a fire hazard may exist.

- Before workers begin operations in an area the foreman will give instruction on egress procedures and assembly points. Egress routes will be posted in work areas and exit points clearly marked.

The following procedures will be used in the event of a fire:

- Anyone who sees a fire will notify his or her supervisor who will then contact the Emergency Coordinator by radio. The Emergency Coordinator will activate the emergency air horns and contact the local Fire Department.

- When the emergency siren sounds, workers will disconnect electrical equipment in use (if possible) and proceed to the nearest fire exit.

- Work crews will be comprised of pairs of workers (buddy system) who join each other immediately after hearing the fire alarm and remain together throughout the emergency. Workers will assemble at a predetermined rally point for a head count.

- When a worker has extinguished a small fire, the Emergency Coordinator will be notified.

9.5 Hazardous Weather Contingency Measures

Operations will not be started or continued when the following hazardous weather conditions are present:

- Lightning
- Heavy Rains
- High Winds

9.5.1 Response

All equipment will be shut down and secured to prevent damage.

Personnel will be moved to safe refuge. The Emergency Coordinator will determine when it is necessary to evacuate personnel to off-site locations and will coordinate efforts with fire, police, and other agencies. The adverse weather condition plan is included as Appendix F.

9.5.2 Notification

The Emergency Coordinator will be responsible for assessing hazardous weather conditions and notifying personnel of specific contingency measures. At a minimum, RWEC's employees and subcontractors and NAPR will be notified.

10.0 TRAINING REQUIREMENTS

As a requirement for work at this site, in any hazardous waste work area, all field personnel will be required to take a 40-hour training class covering the requirements of 29 CFR 1910.120, which includes the following topics: personal protective equipment, toxicological effects of various chemicals, hazard communication, blood borne pathogens, handling of unknown tanks and drums, confined-space entry procedures, electrical safety, etc. In addition, all personnel must receive annual 8-hour refresher training and three-day on-site training under a trained, experienced Superintendent. Supervisory personnel shall have received additional 8-hour training in handling hazardous waste operations.

All personnel entering the work areas will be trained in the provisions of this site safety plan and the Accident Prevention Plan (Appendix G) and be required to sign the Site Safety Plan Acknowledgment in Appendix H.

Outlines of the orientation for RWEC's personnel and subcontract personnel and visitors are presented below. Any changes to the Health and Safety Plan will be documented in the Health and Safety Plan Amendment documentation form, Appendix I.

RWEC/SUBCONTRACTORS	VISITOR ORIENTATION
SSHSP sign off	SSHSP signoff
Sign in/out procedures	Review of Site map
Site background	Work Zones in progress
Chain of command	Hazard Communication
Rules and regulations	Emergency plan/signals
Hours of work	Training/medical requirements
Absences	Zones/areas open to visitors
Equipment	
Emergency Information	
Emergency signal	
Gathering point	
Responsibilities/roles	
Emergency phone numbers	
Work Zones	
Contaminants, MSDS's [Hazard Communication Program]	
AHAs	
Forms, site-specific Incident Reporting	

11.0 MEDICAL SURVEILLANCE PROGRAM

All RWEC personnel participate in a medical and health monitoring program. This program is initiated when the employee starts work with a complete physical and medical history and is continued on a regular basis. A listing of RWEC's worker medical profile requirements is shown below.

All field personnel performing activities in a designated EZ or CRZ shall within the past 12 months have completed a comprehensive medical examination. The annual medical includes the following elements:

- Medical and occupational history questionnaire;
- Physical examination;
- Complete blood count, with differential;
- Chest x-ray, once every 1 year;
- Pulmonary function test;
- Electrocardiogram;
- Visual acuity; and
- Follow-up examinations, at the discretion of the examining physician or the corporate medical director.

The medical surveillance program meets the requirements of the OSHA Standard 29 CFR 1910.120/1926.65 (f).

FIGURES

LEGEND

▭ – SWMU 68

SOURCE: GEO-MARINE, INC., SEPTEMBER 6, 2000.

500 0 250 500
1 inch = 500 ft.

FIGURE 2-1
LOCATION MAP
HEALTH AND SAFETY PLAN
SWMU 68-FORMER SOUTHERN FIRE TRAINING AREA

NAVAL ACTIVITY PUERTO RICO

APPENDIX A
MATERIAL SAFETY DATA SHEETS

MATERIAL SAFETY DATA SHEET

SECTION 1 PRODUCT AND COMPANY IDENTIFICATION

PRODUCT

Product Name: **GASOLINE, UNLEADED AUTOMOTIVE**
Product Description: Hydrocarbons and Additives
Product Code: 123455-20, 9700, 977032, 977217, 977306, 977360, 977371, 977381, 977445, 977562, 977767, 977920, 979533, 97A039, 97A065, 97A078, 97A087, 97A102, 97A108, 97A146, 97A147, 97A152, 97A193, 97A200, 97A240, 97A266, 97A273, 97A290, 97A305, 97A316, 97A317, 97A328, 97A347, 97A380, 97A404, 97A424, 97A431, 97A441, 97A514, 97A556, 97A557, 97A613, 97A634, 97A653, 97A655, 97A659, 97A686, 97A696, 97A703, 97A712, 97A726, 97A736, 97A746, 97A767, 97A794, 97A798, 97A827, 97A848, 97A851, 97A876, 97A883, 97A907, 97A934, 97A948, 97A949, 97A960, 97A983, 97A989, 97AV99, 97AW00, 97AW01, 97AW38, 97AZ87, 97AZ88, 97AZ89, 97AZ90, 97AZ91, 97AZ92, 97AZ93, 97AZ94, 97AZ95, 97AZ96, 97AZ97, 97AZ98, 97AZ99, 97BA11, 97BA12, 97BA13, 97BA14, 97BA15, 97BA16, 97BA67, 97BA68, 97BA69, 97BA70, 97BE24, 97BE25, 97BE26, 97BE27, 97BE28, 97BE29, 97BE30, 97BE31, 97BE32, 97BE33, 97BE34, 97BE35, 97BE36, 97BE37, 97BE38, 97BE39, 97BN13, 97BN50, 97C070, 97C072, 97C075, 97C110, 97C112, 97C113, 97C118, 97C127, 97C140, 97C148, 97C166, 97C417, 97C558, 97C576, 97C632, 97C702, 97C731, 97C759, 97C770, 97C782, 97C794, 97C870, 97C917, 97D130, 97D228, 97E002, 97E010, 97E041, 97E065, 97E087, 97E103, 97E104, 97E11, 97E112, 97E113, 97E170, 97E171, 97E196, 97E197, 97E259, 97E260, 97E304, 97E305, 97E347, 97E42, 97E532, 97E564, 97E581, 97E595, 97E606, 97E611, 97E619, 97E649, 97E655, 97E66, 97E682, 97E749, 97E860, 97E88, 97E999, 97F005, 97F020, 97F030, 97F054, 97F312, 97F344, 97F952, 97M190, 97M191, 97M192, 97M193, 97M194, 97M195, 97M229, 97M230, 97M232, 97N832, 97N844, 97N848, 97N861, 97N873, 97N877, 97N879, 97N891, 97N895, 97N913, 97N917, 97N921, 97N941, 97N942, 97N954, 97Q303, 97Q763, 97Q781, 97Q782, 97R368, 97S760, 97U927, 97V321, 97V323, 97V325, 97V326, 97X861, EMGF20
Intended Use: Fuel, Gasoline

COMPANY IDENTIFICATION

Supplier: **EXXON MOBIL CORPORATION**
3225 GALLOWS RD.
FAIRFAX, VA. 22037 USA

24 Hour Health Emergency	609-737-4411
Transportation Emergency Phone	800-424-9300
ExxonMobil Transportation No.	281-834-3296
Product Technical Information	800-662-4525, 800-947-9147
MSDS Internet Address	http://www.exxon.com, http://www.mobil.com

SECTION 2 COMPOSITION / INFORMATION ON INGREDIENTS

Reportable Hazardous Substance(s) or Complex Substance(s)

Name	CAS#	Concentration*
ETHYL ALCOHOL	64-17-5	< 11%
Gasoline	86290-81-5	89 - 100%

Hazardous Constituent(s) Contained in Complex Substance(s)

Name	CAS#	Concentration*
BENZENE	71-43-2	0.1 - 5%
ETHYL BENZENE	100-41-4	1 - 5%
N-HEXANE	110-54-3	1 - 5%
NAPHTHALENE	91-20-3	<1%
PSEUDOCUMENE (1,2,4-TRIMETHYLBENZENE)	95-63-6	1 - 5%
Toluene	108-88-3	5 - 10%
TRIMETHYL BENZENE	25551-13-7	1 - 5%
XYLENES	1330-20-7	5 - 10%

* All concentrations are percent by weight unless material is a gas. Gas concentrations are in percent by volume.

NOTE: The concentration of the components shown above may vary substantially. In certain countries, benzene content may be limited to lower levels. Oxygenates such as tertiary-amyl-methyl ether, ethanol, di-isopropyl ether, and ethyl-tertiary-butyl ether may be present. Because of volatility considerations, gasoline vapor may have concentrations of components very different from those of liquid gasoline. The major components of gasoline vapor are: butane, isobutane, pentane, and isopentane. The reportable component percentages, shown in the composition/information on ingredients section, are based on API's evaluation of a typical gasoline mixture.

SECTION 3 HAZARDS IDENTIFICATION

This material is considered to be hazardous according to regulatory guidelines (see (M)SDS Section 15).

POTENTIAL PHYSICAL / CHEMICAL EFFECTS

Extremely flammable. Material can release vapors that readily form flammable mixtures. Vapor accumulation could flash and/or explode if ignited. Material can accumulate static charges which may cause an incendiary electrical discharge.

POTENTIAL HEALTH EFFECTS

Irritating to skin. If swallowed, may be aspirated and cause lung damage. May be irritating to the eyes, nose, throat, and lungs. May cause central nervous system depression. High-pressure injection under skin may cause serious damage. Prolonged and repeated exposure to benzene may cause serious injury to blood forming organs and is associated with anemia and to the later development of acute myelogenous leukemia (AML).

Target Organs: Lung | Skin |

ENVIRONMENTAL HAZARDS

Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

NFPA Hazard ID:	Health:	1	Flammability:	3	Reactivity:	0
HMIS Hazard ID:	Health:	1*	Flammability:	3	Reactivity:	0

NOTE: This material should not be used for any other purpose than the intended use in Section 1 without expert advice. Health studies have shown that chemical exposure may cause potential human health risks which may vary from person to person.

SECTION 4 FIRST AID MEASURES

Inhalation

Remove from further exposure. For those providing assistance, avoid exposure to yourself or others. Use adequate respiratory protection. If respiratory irritation, dizziness, nausea, or unconsciousness occurs, seek

immediate medical assistance. If breathing has stopped, assist ventilation with a mechanical device or use mouth-to-mouth resuscitation.

SKIN CONTACT

Wash contact areas with soap and water. Remove contaminated clothing. Launder contaminated clothing before reuse. If product is injected into or under the skin, or into any part of the body, regardless of the appearance of the wound or its size, the individual should be evaluated immediately by a physician as a surgical emergency. Even though initial symptoms from high pressure injection may be minimal or absent, early surgical treatment within the first few hours may significantly reduce the ultimate extent of injury.

EYE CONTACT

Flush thoroughly with water. If irritation occurs, get medical assistance.

Ingestion

Seek immediate medical attention. Do not induce vomiting.

NOTE TO PHYSICIAN

If ingested, material may be aspirated into the lungs and cause chemical pneumonitis. Treat appropriately.

PRE-EXISTING MEDICAL CONDITIONS WHICH MAY BE AGGRAVATED BY EXPOSURE

Benzene- Individuals with liver disease may be more susceptible to toxic effects.

SECTION 5 FIRE FIGHTING MEASURES

EXTINGUISHING MEDIA

Appropriate Extinguishing Media: Use water fog, foam, dry chemical or carbon dioxide (CO_2) to extinguish flames.

Inappropriate Extinguishing Media: Straight Streams of Water

FIRE FIGHTING

Fire Fighting Instructions: Evacuate area. If a leak or spill has not ignited, use water spray to disperse the vapors and to protect personnel attempting to stop a leak. Prevent runoff from fire control or dilution from entering streams, sewers, or drinking water supply. Firefighters should use standard protective equipment and in enclosed spaces, self-contained breathing apparatus (SCBA). Use water spray to cool fire exposed surfaces and to protect personnel.

Unusual Fire Hazards: Extremely Flammable. Vapors are flammable and heavier than air. Vapors may travel across the ground and reach remote ignition sources causing a flashback fire danger. Hazardous material. Firefighters should consider protective equipment indicated in Section 8.

Hazardous Combustion Products: Smoke, Fume, Aldehydes, Sulfur Oxides, Incomplete combustion products, Oxides of carbon

FLAMMABILITY PROPERTIES

Flash Point [Method]: <-40C (-40F) [ASTM D-56]
Flammable Limits (Approximate volume % in air): LEL: 1.4 UEL: 7.6
Autoignition Temperature: >250°C (482°F)

SECTION 6 ACCIDENTAL RELEASE MEASURES

Notification Procedures

In the event of a spill or accidental release, notify relevant authorities in accordance with all applicable regulations. US regulations require reporting releases of this material to the environment which exceed the applicable reportable quantity or oil spills which could reach any waterway including intermittent dry creeks. The National Response Center can be reached at (800)424-8802.

PROTECTIVE MEASURES

Avoid contact with spilled material. Warn or evacuate occupants in surrounding and downwind areas if required due to toxicity or flammability of the material. See Section 5 for fire fighting information. See the Hazard Identification Section for Significant Hazards. See Section 4 for First Aid Advice. See Section 8 for Personal Protective Equipment.

SPILL MANAGEMENT

Land Spill: Eliminate all ignition sources (no smoking, flares, sparks or flames in immediate area). Stop leak if you can do it without risk. All equipment used when handling the product must be grounded. Do not touch or walk through spilled material. Prevent entry into waterways, sewer, basements or confined areas. A vapor suppressing foam may be used to reduce vapors. Use clean non-sparking tools to collect absorbed material. Absorb or cover with dry earth, sand or other non-combustible material and transfer to containers. Large Spills: Water spray may reduce vapor; but may not prevent ignition in closed spaces. Recover by pumping or with suitable absorbent.

Water Spill: Eliminate all ignition sources (no smoking, flares, sparks or flames in immediate area). Stop leak if you can do it without risk. Do not confine in area of spill. Advise occupants and shipping in downwind areas of fire and explosion hazard and warn them to stay clear. Allow liquid to evaporate from the surface. Seek the advice of a specialist before using dispersants.

Water spill and land spill recommendations are based on the most likely spill scenario for this material; however, geographic conditions, wind, temperature, (and in the case of a water spill) wave and current direction and speed may greatly influence the appropriate action to be taken. For this reason, local experts should be consulted. Note: Local regulations may prescribe or limit action to be taken.

ENVIRONMENTAL PRECAUTIONS

Large Spills: Dike far ahead of liquid spill for later recovery and disposal. Prevent entry into waterways, sewers, basements or confined areas.

SECTION 7 HANDLING AND STORAGE

HANDLING

Avoid breathing mists or vapors. Avoid contact with skin. Use non-sparking tools and explosion-proof equipment. Potentially toxic/irritating fumes/vapors may be evolved from heated or agitated material. Do not siphon by mouth. Use only with adequate ventilation. Use proper bonding and/or grounding procedures. Do not use as a cleaning solvent or other non-motor fuel uses. For use as a motor fuel only. It is dangerous and/or unlawful to put fuel into unapproved containers. Do not fill container while it is in or on a vehicle. Static electricity may ignite vapors and cause fire. Place container on ground when filling and keep nozzle in contact with container. Do not use electronic devices (including but not limited to cellular phones, computers, calculators, pagers or other electronic devices, etc.) in or around any fueling operation or storage area unless the devices are certified intrinsically safe by an approved national testing agency and to the safety standards required by national and/or local laws and regulations. Prevent small spills and leakage to avoid slip hazard. Material can accumulate static charges which may cause an electrical spark (ignition source).

Static Accumulator: This material is a static accumulator.

STORAGE

Ample fire water supply should be available. A fixed sprinkler/deluge system is recommended. Keep container closed. Handle containers with care. Open slowly in order to control possible pressure release. Store in a cool, well-ventilated area. Outside or detached storage preferred. Storage containers should be grounded and bonded. Drums must be grounded and bonded and equipped with self-closing valves, pressure vacuum bungs and flame arresters.

SECTION 8 EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE LIMIT VALUES

Exposure limits/standards (Note: Exposure limits are not additive)

Source	Form	Limit / Standard			NOTE	Source
BENZENE		OSHA Action level	0.5 ppm		N/A	OSHA Sp.Reg.
BENZENE		STEL	5 ppm		N/A	OSHA Sp.Reg.
BENZENE		TWA	1 ppm		N/A	OSHA Sp.Reg.
BENZENE		STEL	2.5 ppm		Skin	ACGIH
BENZENE		TWA	0.5 ppm		Skin	ACGIH
ETHYL ALCOHOL		TWA	1900 mg/m3	1000 ppm	N/A	OSHA Z1
ETHYL ALCOHOL		STEL	1000 ppm		N/A	ACGIH
ETHYL BENZENE		TWA	435 mg/m3	100 ppm	N/A	OSHA Z1
ETHYL BENZENE		STEL	125 ppm		N/A	ACGIH
ETHYL BENZENE		TWA	100 ppm		N/A	ACGIH
Gasoline		STEL	200 ppm		N/A	ExxonMobil
Gasoline		TWA	100 ppm		N/A	ExxonMobil
Gasoline		STEL	500 ppm		N/A	ACGIH
Gasoline		TWA	300 ppm		N/A	ACGIH
N-HEXANE		TWA	1800 mg/m3	500 ppm	N/A	OSHA Z1
N-HEXANE		TWA	50 ppm		Skin	ACGIH
NAPHTHALENE		TWA	50 mg/m3	10 ppm	N/A	OSHA Z1
NAPHTHALENE		STEL	15 ppm		Skin	ACGIH
NAPHTHALENE		TWA	10 ppm		Skin	ACGIH
PSEUDOCUMENE (1,2,4-TRIMETHYLBENZENE)		TWA	25 ppm		N/A	ACGIH
Toluene		Ceiling	300 ppm		N/A	OSHA Z2
Toluene		Maximum concentration	500 ppm		N/A	OSHA Z2
Toluene		TWA	200 ppm		N/A	OSHA Z2
Toluene		TWA	20 ppm		N/A	ACGIH
TRIMETHYL BENZENE		TWA	25 ppm		N/A	ACGIH
XYLENES		TWA	435 mg/m3	100 ppm	N/A	OSHA Z1
XYLENES		STEL	150 ppm		N/A	ACGIH
XYLENES		TWA	100 ppm		N/A	ACGIH

NOTE: Limits/standards shown for guidance only. Follow applicable regulations.

ENGINEERING CONTROLS

The level of protection and types of controls necessary will vary depending upon potential exposure conditions. Control measures to consider:
Use explosion-proof ventilation equipment to stay below exposure limits.

Personal Protection

Personal protective equipment selections vary based on potential exposure conditions such as applications, handling practices, concentration and ventilation. Information on the selection of protective equipment for use with this material, as provided below, is based upon intended, normal usage.

Respiratory Protection: If engineering controls do not maintain airborne contaminant concentrations at a level which is adequate to protect worker health, an approved respirator may be appropriate. Respirator selection, use, and maintenance must be in accordance with regulatory requirements, if applicable. Types of respirators to be considered for this material include:
No special requirements under ordinary conditions of use and with adequate ventilation.

For high airborne concentrations, use an approved supplied-air respirator, operated in positive pressure mode. Supplied air respirators with an escape bottle may be appropriate when oxygen levels are inadequate, gas/vapor warning properties are poor, or if air purifying filter capacity/rating may be exceeded.

Hand Protection: Any specific glove information provided is based on published literature and glove manufacturer data. Glove suitability and breakthrough time will differ depending on the specific use conditions. Contact the glove manufacturer for specific advice on glove selection and breakthrough times for your use conditions. Inspect and replace worn or damaged gloves. The types of gloves to be considered for this material include:
If prolonged or repeated contact is likely, chemical resistant gloves are recommended. If contact with forearms is likely, wear gauntlet style gloves.

Eye Protection: If contact is likely, safety glasses with side shields are recommended.

Skin and Body Protection: Any specific clothing information provided is based on published literature or manufacturer data. The types of clothing to be considered for this material include:
If prolonged or repeated contact is likely, chemical, and oil resistant clothing is recommended.

Specific Hygiene Measures: Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants. Discard contaminated clothing and footwear that cannot be cleaned. Practice good housekeeping.

ENVIRONMENTAL CONTROLS
See Sections 6, 7, 12, 13.

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

Typical physical and chemical properties are given below. Consult the Supplier in Section 1 for additional

data.

GENERAL INFORMATION

Physical State: Liquid
Color: Clear (May Be Dyed)
Odor: Petroleum/Solvent
Odor Threshold: N/D

IMPORTANT HEALTH, SAFETY, AND ENVIRONMENTAL INFORMATION

Relative Density (at 15 C): 0.74
Flash Point [Method]: <-40C (-40F) [ASTM D-56]
Flammable Limits (Approximate volume % in air): LEL: 1.4 UEL: 7.6
Autoignition Temperature: >250°C (482°F)
Boiling Point / Range: > 20C (68F)
Vapor Density (Air = 1): 3 at 101 kPa
Vapor Pressure: > 26.6 kPa (200 mm Hg) at 20 C
Evaporation Rate (N-Butyl Acetate = 1): > 10
pH: N/A
Log Pow (n-Octanol/Water Partition Coefficient): > 3
Solubility in Water: Negligible
Viscosity: <1 cSt (1 mm²/sec) at 40 C
Oxidizing Properties: See Sections 3, 15, 16.

OTHER INFORMATION

Freezing Point: N/D
Melting Point: N/A

SECTION 10 STABILITY AND REACTIVITY

STABILITY: Material is stable under normal conditions.

CONDITIONS TO AVOID: Avoid heat, sparks, open flames and other ignition sources.

MATERIALS TO AVOID: Halogens, Strong Acids, Alkalies, Strong oxidizers

HAZARDOUS DECOMPOSITION PRODUCTS: Material does not decompose at ambient temperatures.

HAZARDOUS POLYMERIZATION: Will not occur.

SECTION 11 TOXICOLOGICAL INFORMATION

ACUTE TOXICITY

Route of Exposure	Conclusion / Remarks
Inhalation	
Toxicity (Rat): LC50 > 5000 mg/m³	Minimally Toxic. Based on test data for structurally similar materials.
Irritation: No end point data.	Elevated temperatures or mechanical action may form vapors, mist, or fumes which may be irritating to the eyes, nose, throat, or lungs. Based on assessment of the components.
Ingestion	
Toxicity (Rat): LD50 > 2000 mg/kg	Minimally Toxic. Based on test data for structurally similar

	materials.
Skin	
Toxicity (Rabbit): LD50 > 2000 mg/kg	Minimally Toxic. Based on test data for structurally similar materials.
Irritation: No end point data.	Moderately irritating to skin with prolonged exposure. Based on test data for structurally similar materials.
Eye	
Irritation: Data available.	May cause mild, short-lasting discomfort to eyes. Based on test data for structurally similar materials.

CHRONIC/OTHER EFFECTS

For the product itself:

Laboratory animal studies have shown that prolonged and repeated inhalation exposure to light hydrocarbon vapors in the same boiling range as this product can produce adverse kidney effects in male rats. However, these effects were not observed in similar studies with female rats, male and female mice, or in limited studies with other animal species. Additionally, in a number of human studies, there was no clinical evidence of such effects at normal occupational levels. In 1991, The U.S. EPA determined that the male rat kidney is not useful for assessing human risk.
Vapor concentrations above recommended exposure levels are irritating to the eyes and the respiratory tract, may cause headaches and dizziness, are anesthetic and may have other central nervous system effects. Small amounts of liquid aspirated into the lungs during ingestion or from vomiting may cause chemical pneumonitis or pulmonary edema.
Gasoline unleaded: Caused cancer in animal tests. Chronic inhalation studies resulted in liver tumors in female mice and kidney tumors in male rats. Neither result considered significant for human health risk assessment by the United States EPA and others. Did not cause mutations In Vitro or In Vivo. Negative in inhalation developmental studies and reproductive tox studies.Inhalation of high concentrations in animals resulted in reversible central nervous system depression, but no persistent toxic effect on the nervous system. Non-sensitizing in test animals. Caused nerve damage in humans from abusive use (sniffing).

Contains:

BENZENE: Caused cancer (leukemia), damage to the blood-producing system, and serious blood disorders from prolonged, high exposure based on human epidemiology studies. Caused genetic effects and effects on the immune system in laboratory animal and some human studies. Caused toxicity to the fetus in laboratory animal studies.
ETHANOL: Prolonged or repeated exposure to high concentrations of ethanol vapor or overexposure by ingestion may produce adverse effects to brain, kidney, liver, and reproductive organs, birth defects in offspring, and developmental toxicity in offspring.
NAPHTHALENE: Exposure to high concentrations of naphthalene may cause destruction of red blood cells, anemia, and cataracts. Naphthalene caused cancer in laboratory animal studies, but the relevance of these findings to humans is uncertain.
N-HEXANE: Prolonged and/or repeated exposures to n-Hexane can cause progressive and potentially irreversible damage to the peripheral nervous system (e.g. fingers, feet, arms, legs, etc.). Simultaneous exposure to Methyl Ethyl Ketone (MEK) or Methyl Isobutyl Ketone (MIBK) and n-Hexane can potentiate the risk of adverse effects from n-Hexane on the peripheral nervous system. n-Hexane has been shown to cause testicular damage at high doses in male rats. The relevance of this effect for humans is unknown.
TOLUENE : Concentrated, prolonged or deliberate inhalation may cause brain and nervous system damage. Prolonged and repeated exposure of pregnant animals (> 1500 ppm) have been reported to cause adverse fetal developmental effects.
TRIMETHYLBENZENE: Long-term inhalation exposure of trimethylbenzene caused effects to the blood in laboratory animals.
ETHYLBENZENE: Caused cancer in laboratory animal studies. The relevance of these findings to humans is

uncertain.

Additional information is available by request.

The following ingredients are cited on the lists below:

Chemical Name	CAS Number	List Citations
BENZENE	71-43-2	1, 3, 6
ETHYL BENZENE	100-41-4	5
Gasoline	86290-81-5	5
NAPHTHALENE	91-20-3	2, 5

--REGULATORY LISTS SEARCHED--

1 = NTP CARC
2 = NTP SUS
3 = IARC 1
4 = IARC 2A
5 = IARC 2B
6 = OSHA CARC

SECTION 12 ECOLOGICAL INFORMATION

The information given is based on data available for the material, the components of the material, and similar materials.

ECOTOXICITY

Material -- Expected to be toxic to aquatic organisms. May cause long-term adverse effects in the aquatic environment.

MOBILITY

More volatile component -- Highly volatile, will partition rapidly to air. Not expected to partition to sediment and wastewater solids.

Less volatile component -- Low solubility and floats and is expected to migrate from water to the land. Expected to partition to sediment and wastewater solids.

PERSISTENCE AND DEGRADABILITY

Biodegradation:

Majority of components -- Expected to be inherently biodegradable

Atmospheric Oxidation:

More volatile component -- Expected to degrade rapidly in air

BIOACCUMULATION POTENTIAL

Majority of components -- Has the potential to bioaccumulate, however metabolism or physical properties may reduce the bioconcentration or limit bioavailability.

SECTION 13 DISPOSAL CONSIDERATIONS

Disposal recommendations based on material as supplied. Disposal must be in accordance with current applicable laws and regulations, and material characteristics at time of disposal.

DISPOSAL RECOMMENDATIONS

Product is suitable for burning in an enclosed controlled burner for fuel value or disposal by supervised incineration at very high temperatures to prevent formation of undesirable combustion products.

REGULATORY DISPOSAL INFORMATION

RCRA Information: Disposal of unused product may be subject to RCRA regulations (40 CFR 261). Disposal of the used product may also be regulated due to ignitability, corrosivity, reactivity or toxicity as determined by the Toxicity Characteristic Leaching Procedure (TCLP). Potential RCRA characteristics: IGNITABILITY. TCLP (BENZENE)

Empty Container Warning Empty Container Warning (where applicable): Empty containers may contain residue and can be dangerous. Do not attempt to refill or clean containers without proper instructions. Empty drums should be completely drained and safely stored until appropriately reconditioned or disposed. Empty containers should be taken for recycling, recovery, or disposal through suitably qualified or licensed contractor and in accordance with governmental regulations. DO NOT PRESSURISE, CUT, WELD, BRAZE, SOLDER, DRILL, GRIND, OR EXPOSE SUCH CONTAINERS TO HEAT, FLAME, SPARKS, STATIC ELECTRICITY, OR OTHER SOURCES OF IGNITION. THEY MAY EXPLODE AND CAUSE INJURY OR DEATH.

SECTION 14 TRANSPORT INFORMATION

LAND (DOT)

Proper Shipping Name: Gasoline
Hazard Class & Division: 3
ID Number: 1203
Packing Group: II
Marine Pollutant: MP: 100 %weight PP: 0 %weight
ERG Number: 128
Label(s): 3
Transport Document Name: UN1203, GASOLINE, 3, PG II, MARINE POLLUTANT

LAND (TDG)

Proper Shipping Name: Gasoline
Hazard Class & Division: 3
UN Number: 1203
Packing Group: II
Special Provisions: 17

SEA (IMDG)

Proper Shipping Name: MOTOR SPIRIT or GASOLINE or PETROL
Hazard Class & Division: 3
EMS Number: F-E, S-E
UN Number: 1203
Packing Group: II
Marine Pollutant: Yes
Label(s): 3
Transport Document Name: UN1203, MOTOR SPIRIT or GASOLINE or PETROL, 3, PG II, (-40°C c.c.), MARINE POLLUTANT

AIR (IATA)

Proper Shipping Name: Gasoline
Hazard Class & Division: 3
UN Number: 1203
Packing Group: II

Label(s) / Mark(s): 3
Transport Document Name: UN1203, GASOLINE, 3, PG II

SECTION 15 REGULATORY INFORMATION

OSHA HAZARD COMMUNICATION STANDARD: When used for its intended purpose, this material is classified as hazardous in accordance with OSHA 29CFR 1910.1200.

NATIONAL CHEMICAL INVENTORY LISTING: AICS, DSL, EINECS, ENCS, KECI, PICCS, TSCA

EPCRA: This material contains no extremely hazardous substances.

CERCLA: This material is not subject to any special reporting under the requirements of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA). Contact local authorities to determine if other reporting requirements apply.

SARA (311/312) REPORTABLE HAZARD CATEGORIES: Fire. Immediate Health. Delayed Health.

SARA (313) TOXIC RELEASE INVENTORY:

Chemical Name	CAS Number	Typical Value
ETHYL BENZENE	100-41-4	1 - 5%
N-HEXANE	110-54-3	1 - 5%
NAPHTHALENE	91-20-3	<1%
Toluene	108-88-3	5 - 10%
XYLENES	1330-20-7	5 - 10%
PSEUDOCUMENE (1,2,4-TRIMETHYLBENZENE)	95-63-6	1 - 5%
BENZENE	71-43-2	0.1 - 5%

The following ingredients are cited on the lists below:

Chemical Name	CAS Number	List Citations
BENZENE	71-43-2	1, 2, 4, 10, 11, 13, 15, 16, 17, 18, 19
ETHYL ALCOHOL	64-17-5	1, 4, 13, 17, 18, 19
ETHYL BENZENE	100-41-4	1, 4, 10, 13, 16, 17, 18, 19
Gasoline	86290-81-5	1, 17, 18
N-HEXANE	110-54-3	1, 4, 13, 16, 17, 18, 19
NAPHTHALENE	91-20-3	1, 4, 5, 9, 10
PSEUDOCUMENE (1,2,4-TRIMETHYLBENZENE)	95-63-6	1, 13, 16, 17, 18, 19
Toluene	108-88-3	1, 4, 11, 13, 15, 16, 17, 18, 19
TRIMETHYL BENZENE	25551-13-7	1, 13, 16, 17, 18, 19
XYLENES	1330-20-7	1, 4, 5, 9, 13, 15, 17, 18, 19

--REGULATORY LISTS SEARCHED--

1 = ACGIH ALL 6 = TSCA 5a2 11 = CA P65 REPRO 16 = MN RTK

2 = ACGIH A1	7 = TSCA 5e	12 = CA RTK	17 = NJ RTK
3 = ACGIH A2	8 = TSCA 6	13 = IL RTK	18 = PA RTK
4 = OSHA Z	9 = TSCA 12b	14 = LA RTK	19 = RI RTK
5 = TSCA 4	10 = CA P65 CARC	15 = MI 293	

Code key: CARC=Carcinogen; REPRO=Reproductive

SECTION 16 OTHER INFORMATION

N/D = Not determined, N/A = Not applicable

THIS SAFETY DATA SHEET CONTAINS THE FOLLOWING REVISIONS:
Revision Changes:
Section 04: First Aid Inhalation - Header was modified.
Section 04: First Aid Ingestion - Header was modified.
Section 06: Notification Procedures - Header was modified.
Section 01: Product Code was modified.
Section 10 Stability and Reactivity - Header was modified.
Section 13: Disposal Recommendations - Note was modified.
Section 09: Evaporation Rate - Header was modified.
Section 08: Personal Protection - Header was modified.
Section 08: Personal Protection was modified.
Section 11: Inhalation Lethality Test Data was modified.
Section 05: Hazardous Combustion Products was modified.
Section 09: Relative Density - Header was modified.
Section 09: Viscosity was modified.
Section 14: Transport Document Name was modified.
Section 14: Proper Shipping Name was modified.
Section 14: Label(s) - Header was modified.
Section 14: Proper Shipping Name was modified.
Section 14: Proper Shipping Name was modified.
Section 14: Transport Document Name was modified.
Composition: Component Table was modified.
Section 15: List Citations Table was modified.
Section 11: Tox List Cited Table was modified.
Section 15: List Citation Table - Header was modified.
Section 15: SARA (313) TOXIC RELEASE INVENTORY - Table was modified.
Section 16: Materials Covered was modified.
Composition: Component Table was modified.
Section 16: Precautions - Header was modified.
Section 16: NA Contains was modified.
Section 08: Exposure Limits Table was modified.
Section 08: OEL Table - Notation Column - Header was modified.
Section 08: Exposure Limit Values - Header was modified.
Section 14: Marine Pollutant - Header was added.
Section 14: Marine Pollutant was added.
Section 14: Marine Pollutant - Header was added.
Section 14: Marine Pollutant was added.
Section 08: Exposure limits/standards was deleted.
THIS MSDS COVERS THE FOLLOWING MATERIALS: ESSO EXTRA MIDGRADE UNLEADED | ESSO MIDGRADE UNLEADED | ESSO PREMIUM UNLEADED | ESSO REGULAR UNLEADED | ESSO SUPER PREMIUM UNLEADED | EXXON MIDGRADE UNLEADED | EXXON PREMIUM UNLEADED | EXXON

REGULAR UNLEADED | Gasoline | INDOLENE GASOLINE | MIDGRADE UNLEADED | MOBIL EXTRA UNLEADED | MOBIL REGULAR UNLEADED | MOBIL SPECIAL UNLEADED | MOBIL SUPER UNLEADED | PREMIUM UNLEADED | REGULAR UNLEADED | UNLEADED GASOLINE

PRECAUTIONARY LABEL TEXT:
Contains: BENZENE, Gasoline
DANGER!
HEALTH HAZARDS
Irritating to skin. If swallowed, may be aspirated and cause lung damage. Prolonged and repeated exposure to benzene may cause serious injury to blood forming organs and is associated with anemia and to the later development of acute myelogenous leukemia (AML).
Target Organs: Lung | Skin |

PHYSICAL HAZARDS
Extremely flammable. Material can accumulate static charges which may cause an incendiary electrical discharge. Material can release vapors that readily form flammable mixtures. Vapor accumulation could flash and/or explode if ignited.

Precautions
Avoid breathing mists or vapors. Avoid contact with skin. Use non-sparking tools and explosion-proof equipment. Potentially toxic/irritating fumes/vapors may be evolved from heated or agitated material. Do not siphon by mouth. Use only with adequate ventilation. Use proper bonding and/or grounding procedures.

FIRST AID
Inhalation: Remove from further exposure. For those providing assistance, avoid exposure to yourself or others. Use adequate respiratory protection. If respiratory irritation, dizziness, nausea, or unconsciousness occurs, seek immediate medical assistance. If breathing has stopped, assist ventilation with a mechanical device or use mouth-to-mouth resuscitation.

Eye: Flush thoroughly with water. If irritation occurs, get medical assistance.

Oral: Seek immediate medical attention. Do not induce vomiting.

Skin: Wash contact areas with soap and water. Remove contaminated clothing. Launder contaminated clothing before reuse. If product is injected into or under the skin, or into any part of the body, regardless of the appearance of the wound or its size, the individual should be evaluated immediately by a physician as a surgical emergency. Even though initial symptoms from high pressure injection may be minimal or absent, early surgical treatment within the first few hours may significantly reduce the ultimate extent of injury.

FIRE FIGHTING MEDIA
Use water fog, foam, dry chemical or carbon dioxide (CO_2) to extinguish flames.

SPILL/LEAK
Land Spill: Eliminate all ignition sources (no smoking, flares, sparks or flames in immediate area). Stop leak if you can do it without risk. Prevent entry into waterways, sewer, basements or confined areas. A vapor suppressing foam may be used to reduce vapors. Absorb or cover with dry earth, sand or other non-combustible material and transfer to containers. Recover by pumping or with suitable absorbent.

Water Spill: Eliminate all ignition sources (no smoking, flares, sparks or flames in immediate area). Stop leak if you can do it without risk. Do not confine in area of spill. Advise occupants and shipping in downwind areas of fire and explosion hazard and warn them to stay clear. Allow liquid to evaporate from the surface. Seek the advice of a specialist before using dispersants.

This warning is given to comply with California Health and Safety Code 25249.6 and does not constitute an admission or a waiver of rights. This product contains a chemical known to the State of California to cause cancer, birth defects, or other reproductive harm. Chemicals known to the State of California to cause cancer, birth defects, or other reproductive harm are created by the combustion of this product.

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MHC: 1A, 0, 0, 0, 3, 1 PPEC: CF

DGN: 2000316XUS (1011203)

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7419760-00 BEACON 325
MATERIAL SAFETY DATA BULLETIN

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1. PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: BEACON 325
SUPPLIER: EXXON MOBIL CORPORATION
3225 GALLOWS RD.
FAIRFAX, VA 22037

24 - Hour Health and Safety Emergency (call collect): 609-737-4411
24 - Hour Transportation Emergency (Primary) CHEMTREC: 800-424-9300
(Secondary) 281-834-3296
Product and Technical Information: 800-443-9966
MSDS Fax on Demand: 613-228-1467, other MSDS information: 856-224-4644

2. COMPOSITION/INFORMATION ON INGREDIENTS

CHEMICAL NAMES AND SYNONYMS: BASE OIL AND ADDITIVES

GLOBALLY REPORTABLE MSDS INGREDIENTS:

None.

See Section 8 for exposure limits (if applicable).

3. HAZARDS IDENTIFICATION

Under normal conditions of use, this product is not considered hazardous according to regulatory guidelines (See section 15).

EMERGENCY OVERVIEW: Smooth, Tan Grease. DOT ERG No. : NA

POTENTIAL HEALTH EFFECTS: Under normal conditions of intended use, this product does not pose a risk to health. Excessive exposure may result in eye, skin or respiratory irritation.

For further health effects/toxicological data, see Section 11.

4. FIRST AID MEASURES

EYE CONTACT: Flush thoroughly with water. If irritation occurs, call a physician.

SKIN CONTACT: Wash contact areas with soap and water. Remove and clean oil soaked clothing daily and wash affected area.
INJECTION INJURY WARNING: If product is injected into or under the skin, or into any part of the body, regardless of the appearance of the wound or its size, the individual should be evaluated immediately by a physician as a surgical emergency. Even though initial symptoms from high pressure injection may be minimal or absent, early surgical treatment within the first few hours may significantly reduce the ultimate extent of injury.

INHALATION: Remove from further exposure. If respiratory irritation, dizziness, nausea, or unconsciousness occurs, seek immediate medical assistance. If breathing has stopped, assist ventilation with mechanical device or use mouth-to-mouth resuscitation.

INGESTION: Not expected to be a problem. Seek medical attention if discomfort occurs. Do not induce vomiting.

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5. FIRE-FIGHTING MEASURES

EXTINGUISHING MEDIA: Carbon dioxide, foam, dry chemical and water fog.

SPECIAL FIRE FIGHTING PROCEDURES: Water or foam may cause frothing. Use water to keep fire exposed containers cool. Water spray may be used to flush spills away from exposure. Prevent runoff from fire control or dilution from entering streams, sewers, or drinking water supply.

SPECIAL PROTECTIVE EQUIPMENT: For fires in enclosed areas, fire fighters must use self-contained breathing apparatus.

UNUSUAL FIRE AND EXPLOSION HAZARDS: None.

COMBUSTION PRODUCTS: Fumes, smoke, carbon monoxide, sulfur oxides, aldehydes and other decomposition products, in the case of incomplete combustion.

Flash Point C(F): 213(415) (ESTIMATED FOR OIL, ASTM D-92 (COC)).

Flammable Limits (approx.% vol.in air) - LEL: NE, UEL: NE

NFPA HAZARD ID: Health: 0, Flammability: 1, Reactivity: 0

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6. ACCIDENTAL RELEASE MEASURES

NOTIFICATION PROCEDURES: Report spills/releases as required to appropriate authorities. U.S. Coast Guard and EPA regulations require immediate reporting of spills/releases that could reach any waterway including intermittent dry creeks. Report spill/release to Coast Guard National Response Center toll free number (800)424-8802. In case of accident or road spill notify CHEMTREC (800) 424-9300.

PROCEDURES IF MATERIAL IS RELEASED OR SPILLED:
LAND SPILL: Shut off source taking normal safety precautions. Take measures to minimize the effects on ground water. Recover by pumping or contain spilled material with sand or other suitable absorbent and remove mechanically into containers. If necessary, dispose of adsorbed residues as directed in Section 13.
WATER SPILL: Confine the spill immediately with booms. Warn other ships in the vicinity. Notify port and other relevant authorities. Remove from the surface by skimming or with suitable absorbents. If permitted by regulatory authorities the use of suitable dispersants should be considered where recommended in local oil spill procedures.

ENVIRONMENTAL PRECAUTIONS: Prevent material from entering sewers,

water sources or low lying areas; advise the relevant authorities if it has, or if it contaminates soil/vegetation.

PERSONAL PRECAUTIONS: See Section 8

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7. HANDLING AND STORAGE

HANDLING: High pressure injection under the skin may occur due to the rupture of pressurized lines. Always seek medical attention. No special precautions are necessary beyond normal good hygiene practices. See Section 8 for additional personal protection advice when handling this product.

STORAGE: Keep containers closed when not in use. Do not store in open or unlabelled containers. Store away from strong oxidizing agents and combustible materials. Do not store near heat, sparks, flame or strong oxidants.

SPECIAL PRECAUTIONS: Prevent small spills and leakages to avoid slip hazard.

EMPTY CONTAINER WARNING: Empty containers retain residue (liquid and/or vapor) and can be dangerous. DO NOT PRESSURIZE, CUT, WELD, BRAZE, SOLDER, DRILL, GRIND OR EXPOSE SUCH CONTAINERS TO HEAT, FLAME, SPARKS, STATIC ELECTRICITY, OR OTHER SOURCES OF IGNITION; THEY MAY EXPLODE AND CAUSE INJURY OR DEATH. Do not attempt to refill or clean container since residue is difficult to remove. Empty drums should be completely drained, properly bunged and promptly returned to a drum reconditioner. All containers should be disposed of in an environmentally safe manner and in accordance with governmental regulations.

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8. EXPOSURE CONTROLS/PERSONAL PROTECTION

OCCUPATIONAL EXPOSURE LIMITS:

This product does not contain any components which have recognized exposure limits.

VENTILATION: Use adequate ventilation.

RESPIRATORY PROTECTION: No special requirements under ordinary conditions of use and with adequate ventilation.

EYE PROTECTION: Generally eye contact is unlikely with this type material. If eye contact is likely, safety glasses with side shields or chemical type goggles should be worn.

SKIN PROTECTION: If prolonged or repeated skin contact is likely, oil impervious gloves should be worn. Good personal hygiene practices should always be followed.

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9. PHYSICAL AND CHEMICAL PROPERTIES

Typical physical properties are given below. Consult Product Data Sheet for specific details.

APPEARANCE: Grease
COLOR: Smooth, Tan
ODOR: Mild
ODOR THRESHOLD-ppm: NE
pH: NA
BOILING POINT C(F): > 260(500)

DROP POINT C(F): NE
FLASH POINT C(F): 213(415) (ESTIMATED FOR OIL, ASTM D-92 (COC))
FLAMMABILITY (solids): NE
AUTO FLAMMABILITY C(F): NA
EXPLOSIVE PROPERTIES: NA
OXIDIZING PROPERTIES: NA
VAPOR PRESSURE-mmHg 20 C: < 0.1
VAPOR DENSITY: NE
EVAPORATION RATE: NE
RELATIVE DENSITY, 15/4 C: 0.94
SOLUBILITY IN WATER: Negligible
PARTITION COEFFICIENT: > 3.5
VISCOSITY AT 40 C, cSt: > 3200.0
VISCOSITY AT 100 C, cSt: NE
POUR POINT C(F): NA
FREEZING POINT C(F): NE
VOLATILE ORGANIC COMPOUND: NE
NOTE: MOST PHYSICAL PROPERTIES FOR OIL COMPONENT.
DMSO EXTRACT, IP-346 (WT.%): <3, for mineral oil only
NA=NOT APPLICABLE NE=NOT ESTABLISHED D=DECOMPOSES

FOR FURTHER TECHNICAL INFORMATION, CONTACT YOUR MARKETING REPRESENTATIVE

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10. STABILITY AND REACTIVITY

STABILITY (THERMAL, LIGHT, ETC.): Stable.
CONDITIONS TO AVOID: Extreme heat and high energy sources of ignition.
INCOMPATIBILITY (MATERIALS TO AVOID): Strong oxidizers.
HAZARDOUS DECOMPOSITION PRODUCTS: Product does not decompose at ambient temperatures.
HAZARDOUS POLYMERIZATION: Will not occur.

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11. TOXICOLOGICAL DATA

---ACUTE TOXICOLOGY---

ORAL TOXICITY (RATS): Practically non-toxic (LD50: greater than 2000 mg/kg). ---Based on testing of similar products and/or the components.
DERMAL TOXICITY (RABBITS): Practically non-toxic (LD50: greater than 2000 mg/kg). ---Based on testing of similar products and/or the components.
INHALATION TOXICITY (RATS): Practically non-toxic (LC50: greater than 5 mg/l). ---Based on testing of similar products and/or the components.
EYE IRRITATION (RABBITS): Practically non-irritating. (Draize score: greater than 6 but 15 or less). ---Based on testing of similar products and/or the components.
SKIN IRRITATION (RABBITS): Practically non-irritating. (Primary Irritation Index: greater than 0.5 but less than 3). ---Based on testing of similar products and/or the components.
OTHER ACUTE TOXICITY DATA: Although an acute inhalation study was not performed with this product, a variety of mineral oils and synthetic base oils, such as those in this product have been tested. These samples had virtually no effect other than a nonspecific inflammatory response in the lung to the aerosolized mineral oil. The presence of additives in other tested formulations (in approximately the same amounts as in the present formulation) did not alter the observed effects.

---SUBCHRONIC TOXICOLOGY (SUMMARY)---

No significant adverse effects were found in studies using repeated dermal applications of similar formulations to the skin of laboratory animals for 13 weeks at doses significantly higher than those expected during normal industrial exposure. The animals were evaluated extensively for effects of exposure (hematology, serum chemistry, urinalysis, organ weights, microscopic examination of tissues etc.).

---REPRODUCTIVE TOXICOLOGY (SUMMARY)---

No teratogenic effects would be expected from dermal exposure, based on laboratory developmental toxicity studies of major components in this formulation and/or materials of similar composition.

---CHRONIC TOXICOLOGY (SUMMARY)---

Repeated and/or prolonged exposure may cause irritation to the skin, eyes or respiratory tract. For mineral base oils: Base oils in this product are severely solvent refined and/or severely hydrotreated. Chronic mouse skin painting studies of severely treated oils showed no evidence of carcinogenic effects. These results are confirmed on a continuing basis using various screening methods such as Modified Ames Test, IP-346, and/or other analytical methods. For synthetic base oils: The base oils in this product have been tested in the Ames assay and other tests of mutagenicity with negative results. These base oils are not expected to be carcinogenic with chronic dermal exposures.

---SENSITIZATION (SUMMARY)---

Not expected to be sensitizing based on tests of this product, components, or similar products.

12. ECOLOGICAL INFORMATION

ENVIRONMENTAL FATE AND EFFECTS: This product is expected to be inherently biodegradable, as the principal components have been shown to degrade at slow to moderate rates. The major components in the formulation show no aquatic toxicity at 1000 mg/L loading, therefore long-term adverse effects in the aquatic environment are not expected.

13. DISPOSAL CONSIDERATIONS

WASTE DISPOSAL: Product is suitable for burning in an enclosed, controlled burner for fuel value. Such burning may be limited pursuant to the Resource Conservation and Recovery Act. In addition, the product is suitable for processing by an approved recycling facility or can be disposed of at an appropriate government waste disposal facility. Use of these methods is subject to user compliance with applicable laws and regulations and consideration of product characteristics at time of disposal.

RCRA INFORMATION: The unused product, in our opinion, is not specifically listed by the EPA as a hazardous waste (40 CFR, Part 261D), nor is it formulated to contain materials which are listed hazardous wastes. It does not exhibit the hazardous

characteristics of ignitability, corrosivity, or reactivity. The unused product is not formulated with substances covered by the Toxicity Characteristic Leaching Procedure (TCLP). However, used product may be regulated.

14. TRANSPORT INFORMATION

USA DOT: NOT REGULATED BY USA DOT.

RID/ADR: NOT REGULATED BY RID/ADR.

IMO: NOT REGULATED BY IMO.

IATA: NOT REGULATED BY IATA.

15. REGULATORY INFORMATION

US OSHA HAZARD COMMUNICATION STANDARD: When used for its intended purposes, this product is not classified as hazardous in accordance with OSHA 29 CFR 1910.1200.

EU Labeling: Product is not dangerous as defined by the European Union Dangerous Substances/Preparations Directives. EU labeling not required.

Governmental Inventory Status: All components comply with TSCA.

U.S. Superfund Amendments and Reauthorization Act (SARA) Title III:
This product contains no "EXTREMELY HAZARDOUS SUBSTANCES".

SARA (311/312) REPORTABLE HAZARD CATEGORIES: None.

This product contains no chemicals subject to the supplier notification requirements of SARA (313) toxic release program.

The following product ingredients are cited on the lists below:

CHEMICAL NAME	CAS NUMBER	LIST CITATIONS *
NAPHTHENIC ACIDS, ZINC SALTS (0.02%)	12001-85-3	22

--- REGULATORY LISTS SEARCHED ---

1=ACGIH ALL	6=IARC 1	11=TSCA 4	16=CA P65 CARC	21=LA RTK
2=ACGIH A1	7=IARC 2A	12=TSCA 5a2	17=CA P65 REPRO	22=MI 293
3=ACGIH A2	8=IARC 2B	13=TSCA 5e	18=CA RTK	23=MN RTK

4=NTP CARC	9=OSHA CARC	14=TSCA 6	19=FL RTK	24=NJ RTK
5=NTP SUS	10=OSHA Z	15=TSCA 12b	20=IL RTK	25=PA RTK
				26=RI RTK

* EPA recently added new chemical substances to its TSCA Section 4 test rules. Please contact the supplier to confirm whether the ingredients in this product currently appear on a TSCA 4 or TSCA 12b list.
Code key:CARC=Carcinogen; SUS=Suspected Carcinogen; REPRO=Reproductive

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16. OTHER INFORMATION

USE: GREASE

NOTE: PRODUCTS OF EXXON MOBIL CORPORATION AND ITS AFFILIATED COMPANIES ARE NOT FORMULATED TO CONTAIN PCBS.

Health studies have shown that many hydrocarbons pose potential human health risks which may vary from person to person. Information provided on this MSDS reflects intended use. This product should not be used for other applications. In any case, the following advice should be considered:

INDUSTRIAL LABEL

Under normal conditions of intended use, this product does not pose a risk to health. Excessive exposure may result in eye, skin or respiratory irritation. Always observe good hygiene measures. First Aid: Wash skin with soap and water. Flush eyes with water. If overcome by fumes or vapor, remove to fresh air. If ingested do not induce vomiting. If symptoms persist seek medical assistance. Read and understand the MSDS before using this product.

****
For Internal Use Only: MHC: 1* 1* 1* 1* 1*, MPPEC: A, TRN: 7419760-00, CMCS97: 97R014, REQ: PS+C, SAFE USE: L
EHS Approval Date: 07OCT2001
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SAFETY DATA SHEET

SECTION 1 PRODUCT AND COMPANY IDENTIFICATION

As of the revision date above, this (M)SDS meets the regulations in the United Kingdom & Ireland.

PRODUCT

Product Name: **ESSO DIESEL**
Product Description: Hydrocarbons and Additives
Product Code: 708110-60
Intended Use: Diesel engine fuel

COMPANY IDENTIFICATION

Supplier: **Esso Petroleum Company, Limited**
ExxonMobil House
Ermyn Way
KT22 8UX Leatherhead, Surrey
United Kingdom

24 Hour Environmental / Health Emergency Telephone 01372 222 000 (UK) / +44 1372 222 000 (Ireland)
e-mail SDS-UK@EXXONMOBIL.COM

SECTION 2 HAZARDS IDENTIFICATION

This material is dangerous according to regulatory guidelines (see (M)SDS Section 15).

CLASSIFICATION: | Carc. Cat. 3; R40 | Xn; R65 | R66 | N; R51/53 |

PHYSICAL / CHEMICAL HAZARDS

Material can release vapours that readily form flammable mixtures. Vapour accumulation could flash and/or explode if ignited. Material can accumulate static charges which may cause an incendiary electrical discharge.

HEALTH HAZARDS

Limited evidence of a carcinogenic effect. Harmful: may cause lung damage if swallowed. Repeated exposure may cause skin dryness or cracking. Under conditions of poor personal hygiene and prolonged repeated contact, some polycyclic aromatic compounds (PACs) have been suspected as a cause of skin cancer in humans. May be irritating to the eyes, nose, throat, and lungs. May cause central nervous system depression. High-pressure injection under skin may cause serious damage.

ENVIRONMENTAL HAZARDS

Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Note: This material should not be used for any other purpose than the intended use in Section 1 without expert advice. Health studies have shown that chemical exposure may cause potential human health risks which may vary from person to person.

SECTION 3 COMPOSITION / INFORMATION ON INGREDIENTS

This material is regulated as a preparation.

Reportable Hazardous Substance(s) or Complex Substance(s)

Name	CAS#	EINECS / ELINCS	Concentration *	Symbols/Risk Phrases
Fuels, diesel, no. 2	68476-34-6	270-676-1	> 94%	Xn;Carc. Cat. 3;R40, Xn;R65, R66, N;R51/53

* All concentrations are percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.

Note: Composition may contain up to 0.5% performance additives and / or dyes. FAME (fatty acid methyl ester) may be present up to 5% - the maximum permitted by European Standard EN 590

SECTION 4 FIRST AID MEASURES

INHALATION

Remove from further exposure. For those providing assistance, avoid exposure to yourself or others. Use adequate respiratory protection. If respiratory irritation, dizziness, nausea, or unconsciousness occurs, seek immediate medical assistance. If breathing has stopped, assist ventilation with a mechanical device or use mouth-to-mouth resuscitation.

SKIN CONTACT

Remove contaminated clothing. Dry wipe exposed skin and cleanse with waterless hand cleaner and follow by washing thoroughly with soap and water. For those providing assistance, avoid further skin contact to yourself or others. Wear impervious gloves. Launder contaminated clothing separately before reuse. Discard contaminated articles that cannot be laundered. If product is injected into or under the skin, or into any part of the body, regardless of the appearance of the wound or its size, the individual should be evaluated immediately by a physician as a surgical emergency. Even though initial symptoms from high pressure injection may be minimal or absent, early surgical treatment within the first few hours may significantly reduce the ultimate extent of injury.

EYE CONTACT

Flush thoroughly with water. If irritation occurs, get medical assistance.

INGESTION

Seek immediate medical attention. Do not induce vomiting.

NOTE TO PHYSICIAN

If ingested, material may be aspirated into the lungs and cause chemical pneumonitis. Treat appropriately.

PRE-EXISTING MEDICAL CONDITIONS WHICH MAY BE AGGRAVATED BY EXPOSURE

Hydrocarbon Solvents/Petroleum Hydrocarbons- Skin contact may aggravate an existing dermatitis.

SECTION 5 FIRE FIGHTING MEASURES

EXTINGUISHING MEDIA

Appropriate Extinguishing Media: Use water fog, foam, dry chemical or carbon dioxide (CO_2) to extinguish flames.

Inappropriate Extinguishing Media: Straight streams of water

FIRE FIGHTING

Fire Fighting Instructions: Evacuate area. Prevent run-off from fire control or dilution from entering streams, sewers or drinking water supply. Fire-fighters should use standard protective equipment and in enclosed spaces, self-contained breathing apparatus (SCBA). Use water spray to cool fire exposed surfaces and to protect personnel.

Hazardous Combustion Products: Aldehydes, Sulphur Oxides, Smoke, Fume, Incomplete combustion products, Oxides of carbon

FLAMMABILITY PROPERTIES

Flash Point [Method]: >56C (133F) [ASTM D-93]
Flammable Limits (Approximate volume % in air): LEL: 0.6 UEL: 7.0
Autoignition Temperature: >250℃ (482℉)

SECTION 6 ACCIDENTAL RELEASE MEASURES

NOTIFICATION PROCEDURES

In the event of a spill or accidental release, notify relevant authorities in accordance with all applicable regulations.

PROTECTIVE MEASURES

Avoid contact with spilled material. Warn or evacuate occupants in surrounding and downwind areas if required, due to toxicity or flammability of the material. See Section 5 for fire fighting information. See the Hazard Identification Section for Significant Hazards. See Section 4 for First Aid Advice. See Section 8 for Personal Protective Equipment.

SPILL MANAGEMENT

Land Spill: Eliminate all ignition sources (no smoking, flares, sparks or flames in immediate area). Stop leak if you can do so without risk. All equipment used when handling the product must be grounded. Do not touch or walk through spilled material. Prevent entry into waterways, sewer, basements or confined areas. A vapour-suppressing foam may be used to reduce vapour. Use clean non-sparking tools to collect absorbed material. Absorb or cover with dry earth, sand or other non-combustible material and transfer to containers. Large Spills: Water spray may reduce vapour, but may not prevent ignition in enclosed spaces.

Water Spill: Stop leak if you can do so without risk. Eliminate sources of ignition. If the Flash Point exceeds the Ambient Temperature by 10 deg C or more, use containment booms and remove from the surface by skimming or with suitable absorbents when conditions permit. If the Flash Point does not exceed the Ambient Air Temperature by at least 10C, use booms as a barrier to protect shorelines and allow material to evaporate. Seek the advice of a specialist before using dispersants.

Water spill and land spill recommendations are based on the most likely spill scenario for this material; however, geographic conditions, wind, temperature, (and in the case of a water spill) wave and current direction and speed may greatly influence the appropriate action to be taken. For this reason, local experts should be consulted. Note: Local regulations may prescribe or limit action to be taken.

ENVIRONMENTAL PRECAUTIONS

Large Spills: Dyke far ahead of liquid spill for later recovery and disposal. Prevent entry into waterways, sewers, basements or confined areas.

SECTION 7 HANDLING AND STORAGE

HANDLING

Avoid all personal contact. Use proper bonding and/or earthing procedures. Do not use as a cleaning solvent or other non-motor fuel uses. For use as a motor fuel only. Do not use electronic devices (including but not limited to cellular phones, computers, calculators, pagers or other electronic devices etc) in or around any fuelling operation or storage area unless the devices are certified intrinsically safe by an approved national testing agency and to the safety standards required by national and/or local laws and regulations. Prevent small spills and leakage to avoid slip hazard. Do not siphon by mouth. Material can accumulate static charges which may cause an electrical spark (ignition source).

Static Accumulator: This material is a static accumulator.

STORAGE

Keep container closed. Handle containers with care. Open slowly in order to control possible pressure release. Store in a cool, well-ventilated area. Storage containers should be earthed and bonded. Drums must be earthed and bonded and equipped with self-closing valves, pressure vacuum bungs and flame arresters.

SECTION 8 EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE LIMIT VALUES

Exposure limits/standards (Note: Exposure limits are not additive)

Substance Name	Form	Limit/Standard			Note	Source	Year
Fuels, diesel, no. 2	Stable Aerosol.	TWA	5 mg/m3			ExxonMobil	2007
Fuels, diesel, no. 2	Vapour.	TWA	200 mg/m3			ExxonMobil	2007

Note: Information about recommended monitoring procedures can be obtained from the relevant agency(ies)/institute(s):

ENGINEERING CONTROLS

The level of protection and types of controls necessary will vary depending upon potential exposure conditions. Control measures to consider:

Use explosion-proof ventilation equipment to stay below exposure limits.

PERSONAL PROTECTION

Personal protective equipment selections vary based on potential exposure conditions such as applications, handling practices, concentration and ventilation. Information on the selection of protective equipment for use with this material, as provided below, is based upon intended, normal usage.

Respiratory Protection: If engineering controls do not maintain airborne contaminant concentrations at a level which is adequate to protect worker health, an approved respirator may be appropriate. Respirator selection, use, and maintenance must be in accordance with regulatory requirements, if applicable. Types of respirators to be considered for this material include:

No special requirements under ordinary conditions of use and with adequate ventilation.

For high airborne concentrations, use an approved supplied-air respirator, operated in positive pressure mode.

Supplied air respirators with an escape bottle may be appropriate when oxygen levels are inadequate, gas/vapour warning properties are poor, or if air purifying filter capacity/rating may be exceeded.

Hand Protection: Any specific glove information provided is based on published literature and glove manufacturer data. Work conditions can greatly affect glove durability; inspect and replace worn or damaged gloves. The types of gloves to be considered for this material include:
Chemical resistant gloves are recommended. If contact with forearms is likely wear gauntlet style gloves. CEN standards EN 420 and EN 374 provide general requirements and lists of glove types.

Eye Protection: If contact with material is likely, chemical goggles are recommended.

Skin and Body Protection: Any specific clothing information provided is based on published literature or manufacturer data. The types of clothing to be considered for this material include:
Chemical/oil resistant clothing is recommended.

Specific Hygiene Measures: Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants. Discard contaminated clothing and footwear that cannot be cleaned. Practice good housekeeping.

ENVIRONMENTAL CONTROLS
See Sections 6, 7, 12, 13.

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

Typical physical and chemical properties are given below. Consult the Supplier in Section 1 for additional data.

GENERAL INFORMATION
Physical State: Liquid
Colour: Light Colored
Odour: Petroleum/solvent
Odour Threshold: N/D

IMPORTANT HEALTH, SAFETY, AND ENVIRONMENTAL INFORMATION
Relative Density (at 15 C): 0.85
Flash Point [Method]: >56C (133F) [ASTM D-93]
Flammable Limits (Approximate volume % in air): LEL: 0.6 UEL: 7.0
Autoignition Temperature: >250℃ (482℉)
Boiling Point / Range: > 180C (356F)
Vapour Density (Air = 1): > 2 at 101 kPa
Vapour Pressure: < 0.04 kPa (0.3 mm Hg) at 20℃
Evaporation Rate (N-Butyl Acetate = 1): N/D
pH: N/D
Log Pow (n-Octanol/Water Partition Coefficient): > 3.5
Solubility in Water: Negligible
Viscosity: 2 cSt (2 mm²/sec) at 40℃ - 4 cSt (4 mm²/sec) at 40℃
Oxidising properties: See Sections 3, 15, 16.

OTHER INFORMATION
Freezing Point: N/D

Melting Point: N/A

SECTION 10 STABILITY AND REACTIVITY

STABILITY: Material is stable under normal conditions.

CONDITIONS TO AVOID: Open flames and high energy ignition sources.

MATERIALS TO AVOID: Halogens, Strong Acids, Strong Bases, Strong oxidisers

HAZARDOUS DECOMPOSITION PRODUCTS: Material does not decompose at ambient temperatures.

HAZARDOUS POLYMERIZATION: Will not occur.

SECTION 11 TOXICOLOGICAL INFORMATION

Acute Toxicity

Route of Exposure	Conclusion / Remarks
INHALATION	
Toxicity: LC50 > 5000 mg/m3	Minimally Toxic. Based on test data for structurally similar materials.
Irritation: Data available.	Elevated temperatures or mechanical action may form vapours, mist, or fumes which may be irritating to the eyes, nose, throat, or lungs. Based on test data for structurally similar materials.
INGESTION	
Toxicity: LD50 > 2000 mg/kg	Minimally Toxic. Based on test data for structurally similar materials.
Skin	
Toxicity: LD50 > 2000 mg/kg	Minimally Toxic. Based on test data for structurally similar materials.
Irritation: Data available.	May dry the skin leading to discomfort and dermatitis. Based on test data for structurally similar materials.
Eye	
Irritation: Data available.	May cause mild, short-lasting discomfort to eyes. Based on test data for structurally similar materials.

CHRONIC/OTHER EFFECTS

For the product itself:

Vapour concentrations above recommended exposure levels are irritating to the eyes and the respiratory tract, may cause headaches and dizziness, are anaesthetic and may have other central nervous system effects. Small amounts of liquid aspirated into the lungs during ingestion or from vomiting may cause chemical pneumonitis or pulmonary edema.

Diesel fuel: Carcinogenic in animal tests. Caused mutations in-vitro. Repeated dermal exposures to high concentrations in test animals resulted in reduced litter size and litter weight, and increased fetal resorptions at maternally toxic doses. Dermal exposure to high concentrations resulted in severe skin irritation with weight loss and some mortality. Inhalation exposure to high concentrations resulted in respiratory tract irritation, lung changes/infiltration/accumulation, and reduction in lung function. Diesel exhaust fumes: Carcinogenic in animal tests. Inhalation exposures to exhaust for 2 years in test animals resulted in lung tumours and lymphoma. Extract of particulate produced skin tumours in test animals. Caused mutations in-vitro.

Additional information is available by request.

SECTION 12 ECOLOGICAL INFORMATION

The information given is based on data available for the material, the components of the material, and similar materials.

ECOTOXICITY

Material -- Expected to be toxic to aquatic organisms. May cause long-term adverse effects in the aquatic environment.

MOBILITY

More volatile component -- Highly volatile, will partition rapidly to air. Not expected to partition to sediment and wastewater solids.
High molecular wt. component -- Low solubility and floats and is expected to migrate from water to the land. Expected to partition to sediment and wastewater solids.

PERSISTENCE AND DEGRADABILITY
Biodegradation:

Material -- Expected to be inherently biodegradable

Atmospheric Oxidation:

More volatile component -- Expected to degrade rapidly in air

SECTION 13 DISPOSAL CONSIDERATIONS

Disposal recommendations based on material as supplied. Disposal must be in accordance with current applicable laws and regulations, and material characteristics at time of disposal.

DISPOSAL RECOMMENDATIONS

Product is suitable for burning in an enclosed controlled burner for fuel value or disposal by supervised incineration at very high temperatures to prevent formation of undesirable combustion products.

REGULATORY DISPOSAL INFORMATION

European Waste Code: 13 07 01

NOTE: These codes are assigned based upon the most common uses for this material and may not reflect contaminants resulting from actual use. Waste producers need to assess the actual process used when generating the waste and its contaminants in order to assign the proper waste disposal code(s).

This material is considered as hazardous waste pursuant to Directive 91/689/EEC on hazardous waste, and subject to the provisions of that Directive unless Article 1(5) of that Directive applies.

Empty Container Warning Empty Container Warning (where applicable): Empty containers may contain residue and can be dangerous. Do not attempt to refill or clean containers without proper instructions. Empty drums should be completely drained and safely stored until appropriately reconditioned or disposed. Empty containers should be taken

for recycling, recovery, or disposal through suitably qualified or licensed contractor and in accordance with governmental regulations. DO NOT PRESSURISE, CUT, WELD, BRAZE, SOLDER, DRILL, GRIND, OR EXPOSE SUCH CONTAINERS TO HEAT, FLAME, SPARKS, STATIC ELECTRICITY, OR OTHER SOURCES OF IGNITION. THEY MAY EXPLODE AND CAUSE INJURY OR DEATH.

SECTION 14 TRANSPORT INFORMATION

LAND (ADR/RID)

Proper Shipping Name: GAS OIL
Proper Shipping Name Suffix: Special Provision 640L
Hazard Class: 3
Classification Code: F1
UN Number: 1202
Packing Group: III
Label(s) / Mark(s): 3
Hazard ID Number: 30
CEFIC Tremcard: 30S1202
Hazchem EAC: 3Y
Transport Document Name: UN1202, GAS OIL, 3, PG III

INLAND WATERWAYS (ADNR)

Proper Shipping Name: GAS OIL
Hazard Class: 3
Hazard ID Number: 30
UN or ID Number: 1202
Packing Group: III
Label(s) / Mark(s): 3
Transport Document Name: UN1202, GAS OIL, 3, PG III

SEA (IMDG)

Proper Shipping Name: GAS OIL
Hazard Class & Division: 3
UN Number: 1202
Packing Group: III
Label(s): 3
EMS Number: F-E, S-E
Transport Document Name: UN1202, GAS OIL, 3, PG III, (56℃ c.c.)

AIR (IATA)

Proper Shipping Name: GAS OIL
Hazard Class & Division: 3
UN Number: 1202
Packing Group: III
Label(s): 3
Transport Document Name: UN1202, GAS OIL, 3, PG III

SECTION 15 REGULATORY INFORMATION

Material is dangerous as defined by the EU Dangerous Substances/Preparations Directives.

CLASSIFICATION: Category 3 Carcinogen. Harmful. Dangerous for the environment.

EU LABELING:

Symbol: Xn, N

Harmful.

Dangerous for the environment.

Nature of Special Risk: R40; Limited evidence of a carcinogenic effect. R65; Harmful: may cause lung damage if swallowed. R66; Repeated exposure may cause skin dryness or cracking. R51/53; Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Safety Advice: S2; Keep out of the reach of children. S36/37; Wear suitable protective clothing and gloves. S61; Avoid release to the environment. Refer to special instructions/safety data sheets. S62; If swallowed, do not induce vomiting: seek medical advice immediately and show this container or label.

Contains: Fuels, diesel, no. 2

REGULATORY STATUS AND APPLICABLE LAWS AND REGULATIONS

Complies with the following national/regional chemical inventory requirements: EINECS, TSCA, ENCS

Applicable EU Directives and Regulations:
EU Directive:

92/85/EEC [...pregnant workers...recently given birth or...breastfeeding directive]
94/33/EC [...on the protection of young people at work]

SECTION 16 OTHER INFORMATION

N/D = Not determined, N/A = Not applicable
KEY TO THE RISK CODES CONTAINED IN SECTION 2 AND 3 OF THIS DOCUMENT (for information only):
R40; Limited evidence of a carcinogenic effect.
R51/53; Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
R65; Harmful: may cause lung damage if swallowed.
R66; Repeated exposure may cause skin dryness or cracking.

THIS SAFETY DATA SHEET CONTAINS THE FOLLOWING REVISIONS:
No revision information is available.

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Internal Use Only

MHC: 1A, 0, 0, 0, 1, 1 PPEC: C

DGN: 7081439XGB (1012120)

7212211-00 2211 DIESEL LUBRICATING OIL
MATERIAL SAFETY DATA BULLETIN

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1. PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: 2211 DIESEL LUBRICATING OIL
SUPPLIER: EXXON MOBIL CORPORATION
3225 GALLOWS RD.
FAIRFAX, VA 22037

24 - Hour Health and Safety Emergency (call collect): 609-737-4411
24 - Hour Transportation Emergency (Primary) CHEMTREC: 800-424-9300
(Secondary) 281-834-3296
Product and Technical Information:
Lubricants and Specialties: 800-662-4525 800-443-9966
Fuels Products: 800-947-9147
MSDS Fax on Demand: 713-613-3661
MSDS Internet Website: http://www.exxon.com, http://www.mobil.com

2. COMPOSITION/INFORMATION ON INGREDIENTS

CHEMICAL NAMES AND SYNONYMS: BASE OIL AND ADDITIVES

GLOBALLY REPORTABLE MSDS INGREDIENTS:

None.

See Section 8 for exposure limits (if applicable).

3. HAZARDS IDENTIFICATION

Under normal conditions of use, this product is not considered hazardous according to regulatory guidelines (See section 15).

EMERGENCY OVERVIEW: Clear Orange Liquid. DOT ERG No. : NA

POTENTIAL HEALTH EFFECTS: Under normal conditions of intended use, this product does not pose a risk to health. Excessive exposure may result in eye, skin or respiratory irritation.

For further health effects/toxicological data, see Section 11.

4. FIRST AID MEASURES

EYE CONTACT: Flush thoroughly with water. If irritation occurs, call a physician.

SKIN CONTACT: Wash contact areas with soap and water. Remove and clean oil soaked clothing daily and wash affected area. (See Section 16 - Injection Injury)

INHALATION: Not expected to be a problem. However, if respiratory irritation, dizziness, nausea, or unconsciousness occurs due to excessive vapor or mist exposure, seek immediate medical assistance. If breathing has stopped, assist ventilation with a mechanical device or mouth-to-mouth resuscitation.

INGESTION: Not expected to be a problem. Seek medical attention if discomfort occurs. Do not induce vomiting.

5. FIRE-FIGHTING MEASURES

EXTINGUISHING MEDIA: Carbon dioxide, foam, dry chemical and water fog.

SPECIAL FIRE FIGHTING PROCEDURES: Water or foam may cause frothing. Use water to keep fire exposed containers cool. Water spray may be used to flush spills away from exposure. Prevent runoff from fire control or dilution from entering streams, sewers, or drinking water supply.

SPECIAL PROTECTIVE EQUIPMENT: For fires in enclosed areas, fire fighters must use self-contained breathing apparatus.

UNUSUAL FIRE AND EXPLOSION HAZARDS: None.

COMBUSTION PRODUCTS: Fumes, smoke, carbon monoxide, sulfur oxides, aldehydes and other decomposition products, in the case of incomplete combustion.

Flash Point C(F): 227(440) (ASTM D-92).

Flammable Limits (approx.% vol.in air) - LEL: 0.9%, UEL: 7.0%

NFPA HAZARD ID: Health: 0, Flammability: 1, Reactivity: 0

6. ACCIDENTAL RELEASE MEASURES

NOTIFICATION PROCEDURES: Report spills/releases as required to appropriate authorities. U.S. Coast Guard and EPA regulations require immediate reporting of spills/releases that could reach any waterway including intermittent dry creeks. Report spill/release to Coast Guard National Response Center toll free number (800)424-8802. In case of accident or road spill notify CHEMTREC (800) 424-9300.

PROCEDURES IF MATERIAL IS RELEASED OR SPILLED:

LAND SPILL: Shut off source taking normal safety precautions. Take measures to minimize the effects on ground water. Recover by pumping or contain spilled material with sand or other suitable absorbent and remove mechanically into containers. If necessary, dispose of adsorbed residues as directed in Section 13.

WATER SPILL: Confine the spill immediately with booms. Warn other ships in the vicinity. Notify port and other relevant authorities. Remove from the surface by skimming or with suitable absorbents. If permitted by regulatory authorities the use of suitable dispersants should be considered where recommended in local oil spill procedures.

ENVIRONMENTAL PRECAUTIONS: Prevent material from entering sewers, water sources or low lying areas; advise the relevant authorities if it has, or if it contaminates soil/vegetation.
PERSONAL PRECAUTIONS: See Section 8

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7. HANDLING AND STORAGE

HANDLING: No special precautions are necessary beyond normal good hygiene practices. See Section 8 for additional personal protection advice when handling this product.
STORAGE: Keep containers closed when not in use. Do not store in open or unlabelled containers. Store away from strong oxidizing agents and combustible materials. Do not store near heat, sparks, flame or strong oxidants.
SPECIAL PRECAUTIONS: Prevent small spills and leakages to avoid slip hazard.
EMPTY CONTAINER WARNING: Empty containers retain residue (liquid and/or vapor) and can be dangerous. DO NOT PRESSURIZE, CUT, WELD, BRAZE, SOLDER, DRILL, GRIND OR EXPOSE SUCH CONTAINERS TO HEAT, FLAME, SPARKS, STATIC ELECTRICITY, OR OTHER SOURCES OF IGNITION; THEY MAY EXPLODE AND CAUSE INJURY OR DEATH. Do not attempt to refill or clean container since residue is difficult to remove. Empty drums should be completely drained, properly bunged and promptly returned to a drum reconditioner. All containers should be disposed of in an environmentally safe manner and in accordance with governmental regulations.

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8. EXPOSURE CONTROLS/PERSONAL PROTECTION

OCCUPATIONAL EXPOSURE LIMITS:

When mists/aerosols can occur, the following are recommended: 5 mg/m3 (as oil mist)- ACGIH Threshold Limit Value (TLV), 10 mg/m3 (as oil mist) - ACGIH Short Term Exposure Limit (STEL), 5 mg/m3 (as oil mist) - OSHA Permissible Exposure Limit (PEL)

VENTILATION: If mists are generated, use adequate ventilation, local exhaust or enclosures to control below exposure limits.
RESPIRATORY PROTECTION: If mists are generated, and/or when ventilation is not adequate, wear approved respirator.
EYE PROTECTION: If eye contact is likely, safety glasses with side shields or chemical type goggles should be worn.
SKIN PROTECTION: Not normally required. When splashing or liquid contact can occur frequently, wear oil resistant gloves and/or other protective clothing. Good personal hygiene practices should always be followed.

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9. PHYSICAL AND CHEMICAL PROPERTIES

Typical physical properties are given below. Consult Product Data Sheet for specific details.

APPEARANCE: Liquid

COLOR: Clear Orange
ODOR: Mild
ODOR THRESHOLD-ppm: NE
pH: NA
BOILING POINT C(F): > 329(625)
MELTING POINT C(F): NA
FLASH POINT C(F): 227(440) (ASTM D-92)
FLAMMABILITY (solids): NE
AUTO FLAMMABILITY C(F): NA
EXPLOSIVE PROPERTIES: NA
OXIDIZING PROPERTIES: NA
VAPOR PRESSURE-mmHg 20 C: NE
VAPOR DENSITY: NE
EVAPORATION RATE: NE
RELATIVE DENSITY, 15/4 C: 0.92
SOLUBILITY IN WATER: Negligible
PARTITION COEFFICIENT: > 3.5
VISCOSITY AT 40 C, cSt: 205.0
VISCOSITY AT 100 C, cSt: 14.7
POUR POINT C(F): < -12(10)
FREEZING POINT C(F): NE
VOLATILE ORGANIC COMPOUND: NE
DMSO EXTRACT, IP-346 (WT.%): <3, for mineral oil only
NA=NOT APPLICABLE NE=NOT ESTABLISHED D=DECOMPOSES

FOR FURTHER TECHNICAL INFORMATION, CONTACT YOUR MARKETING REPRESENTATIVE

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10. STABILITY AND REACTIVITY

STABILITY (THERMAL, LIGHT, ETC.): Stable.
CONDITIONS TO AVOID: Extreme heat and high energy sources of ignition.
INCOMPATIBILITY (MATERIALS TO AVOID): Strong oxidizers.
HAZARDOUS DECOMPOSITION PRODUCTS: Product does not decompose at ambient temperatures.
HAZARDOUS POLYMERIZATION: Will not occur.

---

11. TOXICOLOGICAL DATA

---ACUTE TOXICOLOGY---

ORAL TOXICITY (RATS): Practically non-toxic (LD50: greater than 2000 mg/kg). ---Based on testing of similar products and/or the components.
DERMAL TOXICITY (RABBITS): Practically non-toxic (LD50: greater than 2000 mg/kg). ---Based on testing of similar products and/or the components.
INHALATION TOXICITY (RATS): Practically non-toxic (LC50: greater than 5 mg/l). ---Based on testing of similar products and/or the components.
EYE IRRITATION (RABBITS): Practically non-irritating. (Draize score: greater than 6 but 15 or less). ---Based on testing of similar products and/or the components.
SKIN IRRITATION (RABBITS): Practically non-irritating. (Primary Irritation Index: greater than 0.5 but less than 3). ---Based on testing of similar products and/or the components.
OTHER ACUTE TOXICITY DATA: Although an acute inhalation study was not

performed with this product, a variety of mineral and synthetic oils, such as those in this product, have been tested. These samples had virtually no effect other than a nonspecific inflammatory response in the lung to the aerosolized mineral oil. The presence of additives in other tested formulations (in approximately the same amounts as in the present formulation) did not alter the observed effects.

---SUBCHRONIC TOXICOLOGY (SUMMARY)---

No significant adverse effects were found in studies using repeated dermal applications of similar formulations to the skin of laboratory animals for 13 weeks at doses significantly higher than those expected during normal industrial exposure. The animals were evaluated extensively for effects of exposure (hematology, serum chemistry, urinalysis, organ weights, microscopic examination of tissues etc.).

---REPRODUCTIVE TOXICOLOGY (SUMMARY)---

No teratogenic effects would be expected from dermal exposure, based on laboratory developmental toxicity studies of major components in this formulation and/or materials of similar composition.

---CHRONIC TOXICOLOGY (SUMMARY)---

Repeated and/or prolonged exposure may cause irritation to the skin, eyes or respiratory tract. Overexposure to oil mist may result in oil droplet deposition and/or granuloma formation. For mineral base oils: Base oils in this product are severely solvent refined and/or severely hydrotreated. Chronic mouse skin painting studies of severely treated oils showed no evidence of carcinogenic effects. These results are confirmed on a continuing basis using various screening methods such as Modified Ames Test, IP-346, and/or other analytical methods. For synthetic base oils: The base oils in this product have been tested in the Ames assay and other tests of mutagenicity with negative results. These base oils are not expected to be carcinogenic with chronic dermal exposures.

---SENSITIZATION (SUMMARY)---

Not expected to be sensitizing based on tests of this product, components, or similar products.

---OTHER TOXICOLOGY DATA---

Used gasoline engine oils have shown evidence of skin carcinogenic activity in laboratory tests when no effort was made to wash the oil off between applications. Used oil from diesel engines did not produce this effect.

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12. ECOLOGICAL INFORMATION

ENVIRONMENTAL FATE AND EFFECTS:

In the absence of specific environmental data for this product, this assessment is based on information for representative products.

ECOTOXICITY: Available ectoxicity data (LL50 >1000 mg/L) indicates

that adverse effects to aquatic organisms are not expected from this product.

MOBILITY: When released into the environment, adsorption to sediment and soil will be the predominant behavior.

PERSISTENCE AND DEGRADABILITY: This product is expected to be inherently biodegradable.

BIOACCUMULATIVE POTENTIAL: Bioaccumulation is unlikely due to the very low water solubility of this product, therefore bioavailability to aquatic organisms is minimal.

---

13. DISPOSAL CONSIDERATIONS

WASTE DISPOSAL: Product is suitable for burning in an enclosed, controlled burner for fuel value. Such burning may be limited pursuant to the Resource Conservation and Recovery Act. In addition, the product is suitable for processing by an approved recycling facility or can be disposed of at an appropriate government waste disposal facility. Use of these methods is subject to user compliance with applicable laws and regulations and consideration of product characteristics at time of disposal.

RCRA INFORMATION: The unused product, in our opinion, is not specifically listed by the EPA as a hazardous waste (40 CFR, Part 261D), nor is it formulated to contain materials which are listed hazardous wastes. It does not exhibit the hazardous characteristics of ignitability, corrosivity, or reactivity. The unused product is not formulated with substances covered by the Toxicity Characteristic Leaching Procedure (TCLP). However, used product may be regulated.

---

14. TRANSPORT INFORMATION

USA DOT: NOT REGULATED BY USA DOT.

RID/ADR: NOT REGULATED BY RID/ADR.

IMO: NOT REGULATED BY IMO.

IATA: NOT REGULATED BY IATA.

STATIC ACCUMULATOR (50 picosiemens or less): YES

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15. REGULATORY INFORMATION

US OSHA HAZARD COMMUNICATION STANDARD: When used for its intended purposes, this product is not classified as hazardous in accordance with OSHA 29 CFR 1910.1200.

EU Labeling: Product is not dangerous as defined by the European Union Dangerous Substances/Preparations Directives. EU labeling not required.

Governmental Inventory Status: All components comply with TSCA.

U.S. Superfund Amendments and Reauthorization Act (SARA) Title III:
This product contains no "EXTREMELY HAZARDOUS SUBSTANCES".

SARA (311/312) REPORTABLE HAZARD CATEGORIES: None.

This product contains no chemicals subject to the supplier notification requirements of SARA (313) toxic release program.

The following product ingredients are cited on the lists below:

CHEMICAL NAME	CAS NUMBER	LIST CITATIONS *
CHLORINE (ELEMENTAL ANALYSIS) (0.24%)	7782-50-5	22
CHLORO ALKANES (0.61%)	61788-76-9	22

--- REGULATORY LISTS SEARCHED ---

1=ACGIH ALL	6=IARC 1	11=TSCA 4	16=CA P65 CARC	21=LA RTK
2=ACGIH A1	7=IARC 2A	12=TSCA 5a2	17=CA P65 REPRO	22=MI 293
3=ACGIH A2	8=IARC 2B	13=TSCA 5e	18=CA RTK	23=MN RTK
4=NTP CARC	9=OSHA CARC	14=TSCA 6	19=FL RTK	24=NJ RTK
5=NTP SUS	10=OSHA Z	15=TSCA 12b	20=IL RTK	25=PA RTK
				26=RI RTK

* EPA recently added new chemical substances to its TSCA Section 4 test rules. Please contact the supplier to confirm whether the ingredients in this product currently appear on a TSCA 4 or TSCA 12b list.
Code key:CARC=Carcinogen; SUS=Suspected Carcinogen; REPRO=Reproductive

16. OTHER INFORMATION

USE: COMMERCIAL ENGINE OIL

NOTE: PRODUCTS OF EXXON MOBIL CORPORATION AND ITS AFFILIATED COMPANIES ARE NOT FORMULATED TO CONTAIN PCBS.

Health studies have shown that many hydrocarbons pose potential human health risks which may vary from person to person. Information provided on this MSDS reflects intended use. This product should not be used for other applications. In any case, the following advice should be considered:

INJECTION INJURY WARNING: If product is injected into or under the skin,

or into any part of the body, regardless of the appearance of the wound or its size, the individual should be evaluated immediately by a physician as a surgical emergency. Even though initial symptoms from high pressure injection may be minimal or absent, early surgical treatment within the first few hours may significantly reduce the ultimate extent of injury.

INDUSTRIAL LABEL

Under normal conditions of intended use, this product does not pose a risk to health. Excessive exposure may result in eye, skin or respiratory irritation. Always observe good hygiene measures. First Aid: Wash skin with soap and water. Flush eyes with water. If overcome by fumes or vapor, remove to fresh air. If ingested do not induce vomiting. If symptoms persist seek medical assistance. Read and understand the MSDS before using this product.

****
For Internal Use Only: MHC: 1* 1* 1* 1* 1*, MPPEC: A, TRN: 7212211-00, CMCS97: 97P275, REQ: PS+C, SAFE USE: L
EHS Approval Date: 25OCT2001
****

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Prepared by: ExxonMobil Oil Corporation
Environmental Health and Safety Department, Clinton, USA

APPENDIX B
ACTIVITY HAZARD ANALYSIS

1.0 ACTIVITY HAZARD ANALYSIS

Activity Hazard Analyses (AHA) identify potential safety, health, and environmental hazards associated with specific tasks and provide protective measures for personnel, the community, and the environment.

Activity Hazard Analyses have been developed for the major tasks to be performed for this project. The names of the competent/qualified person(s) required for a particular activity (i.e., excavations, fall protection, and other activities) as specified by OSHA, will be identified and included in the AHA. The AHA shall be reviewed and modified by the Construction Site Manager or SSHO (with input from subcontracted field employees). Activity Hazard Analyses shall be reviewed and modified, as necessary, to address changing site conditions, operations, or changes of competent/qualified person(s). Activity Hazard Analyses shall also be reviewed and modified during the daily tailgate safety meetings and Job Safety Analysis (JSA) meetings. Modifications will be handwritten in ink on the specific AHA. If more than one competent/qualified person will be used on the AHA, a list of names will be included as an attachment to the AHA. Those listed shall be competent and qualified for the type of work involved and familiar with current site safety issues. If a new competent/qualified person (not on the original list) is added, the list shall be updated (this is an administrative action not requiring an updated AHA). The new worker shall acknowledge, in writing that he/she has reviewed the AHA and is familiar with current site safety issues. Work will not proceed on a particular task or phase until the AHA has been discussed with the work crews. Additions or changes to this HASP must be attached as a HASP Amendment. Any amendment to this HASP must have written approval from the RWEC Program HSM.

Each day, the crews must complete a JSA for each task that will be accomplished, as required by RWEC Procedures, “Job Safety Analysis (JSA)” (Current Revision). The JSA shall be revised, as necessary, when unforeseen circumstances arise or work-site conditions change. Any revisions shall be immediately communicated with the affected site workers. If the need to complete an unplanned task becomes necessary at any point throughout the day, then a new JSA shall be prepared to cover that task.

2.0 PROJECT HAZARDS AND HAZARD CONTROL MEASURES

There are potential chemical, physical, and environmental hazards present at the project sites. The hazards, if not properly controlled, could cause harm to project personnel, visitors, and the public. The anticipated hazards at the project sites and the recommended control measures are presented in this section.

2.1 Chemical Hazards

There are no chemical hazards associated with this project not covered under the OSHA Hazard Communication standard.

2.1.1 Operational Chemicals/Hazard Communication Program

Hazardous chemicals will be brought to project sites for use in activities supporting the planned work. These chemicals are used as fuels, oxidizers, solvents, cements, cleaning solutions, paints, etc. The use of operational chemicals is regulated by OSHA under the Hazard Communication Standard (29 CFR 1910.1200). A written hazard communication program has been established and includes the following elements:

- ***Container Labeling***—Project personnel will ensure that all containers are labeled according to their contents. This requirement will apply to containers from manufacturers and those produced on site by operations. The labels on all incoming and outgoing containers will be checked for identity, hazard warning, and the name and address of the responsible party.

- ***Material Data Safety Sheets***—MSDSs will be provided on site for each hazardous chemical used or known to be present at the site.

- ***Employee Information and Training***—Employees will receive annual chemical hazard safety training, supplemented by informal daily safety meetings. Project specific chemical hazards will be communicated to employees through an initial site orientation meeting and daily safety meetings.

The written hazard communication program will be available at the project site for personnel review and provides requirements for the safe use of operational chemicals. Proper ventilation and personal protective equipment (PPE) shall be used when working with operational chemicals. Air monitoring may be performed as needed to assess and control exposures resulting from the use of operational chemicals. Both an inventory list of the operational chemicals (Hazardous Chemical Inventory List) used and a Material Safety Data Sheets (MSDS) for operational chemicals shall be made available at each project site.

2.2 Munitions and Explosives of Concern

There is very little potential for Munitions and Explosives of Concern (MEC) to be encountered during project activities.

2.3 Radiological Hazards

There is very little potential for radiological hazards to be encountered during project activities.

2.4 Physical Hazards

There will be numerous physical hazards associated with site operations that require consideration. Some of these physical hazards are as follows:

- Noise
- Slips, trips, and falls
- Fires, explosions, and hot work
- Use of ladders and scaffolding
- Use of small tools
- Use of mechanized equipment
- Operation of motor vehicles
- Material handling
- Hazardous energies (i.e., electrical, mechanical, and pressure)
- Intrusive Activities
- Excavation
- Confined space entry
- Dust
- Excessive Work Hours

2.4.1 Noise and Hearing Conservation

There will be many sources of noise at this project site. Noise may be generated from the use of equipment and tools. Hearing loss, resulting from occupational exposure to noise, can be prevented. RWEC, Inc. procedures, "Hearing Conservation Program" (Current Revision) shall be implemented at each project site whenever there is employee noise exposures equal to or exceeding an eight-hour TWA of 85 dBA (decibels, A-scale). As part of the criteria for a hearing conservation program, audiometric testing of personnel must be conducted annually. The SSHO shall conduct noise surveys as necessary to determine if engineering controls should be implemented and/or if hearing protection is adequate. Personnel shall wear hearing protection when working with or around equipment, power tools, as noise monitoring indicates, or in areas posted as such. Warning signs shall be posted in areas where noise (greater than 85 decibels) necessitates the use of hearing protection.

2.4.2 Slips, Trips, and Falls

The following details procedures to prevent slips, trips, and falls:

- Personnel shall keep working areas clean and orderly. Tools, equipment, and materials shall be used and stored in a fashion to minimize tripping hazards.

- Small objects, tools, and debris shall not be left lying around in any place, particularly in areas where personnel walk.

- Spills shall be cleaned up immediately.

- Personnel are prohibited from walking or working on surfaces or equipment that is not intended as walking or working surfaces.

- Personnel shall take extra precautions, such as establishing firm handholds, wearing suitable footwear, and walking slowly when walking on surfaces during wet weather.

- Personnel shall not jump from elevated places or equipment.

- Personnel using hand and mechanical tools shall position themselves properly and consider the events if a tool slips or suddenly moves.

- Electrical extension cords and electrical wiring shall be kept clear of walking and working areas and/or covered, buried, or otherwise secured.

- Walking and working surfaces shall be properly maintained during inclement weather.

- Running is prohibited on job sites unless under emergency conditions.

- Employees exposed to fall hazards shall be protected by standard guardrail, catch platforms, temporary floors, safety nets, personal fall protection devices, or the equivalent. No employee may be exposed to a fall of over 6 feet without being adequately protected.

2.4.3 Fires, Explosions, and Hot Work

Hot work (e.g., welding, burning, and cutting) conducted on site shall comply with the following requirements:

- RWEC, Inc. procedure, "Hot Work in Hazardous Locations" (Current Revision) shall be followed whenever there is spark/ignition producing activities in progress at the project site.

- The Construction Site Manager or SSHO shall establish areas approved for welding, cutting, and other hot work.

- The Construction Site Manager or SSHO is responsible for authorizing welding, cutting, and other hot work in areas not specifically designed or approved for such operations (Hot Work Permit).

- All personnel shall be protected from welding radiation, flashes, sparks, molten metal, and slag.

- All welding, burning, and cutting equipment shall be inspected daily by the operator. Defective equipment shall be tagged and removed from service, replaced or repaired, and re-inspected before again being placed in service.

- All welders, cutters, and their supervisors shall be properly trained in the safe operation of their equipment, safe welding/cutting practices, and welding/cutting respiratory and fire protection.

- The handling of compressed gas cylinders shall comply with all applicable regulations and requirements established by the Navy and the Contractor.

- Cutting, welding, or other hot work shall be permitted only in areas that are or have been made fire safe.

- Cutting, welding, or other hot work shall NOT be permitted in the following situations:

  - In areas not authorized by the Construction Site Manager or SSHO;

  - In the presence of explosive atmospheres (i.e., mixtures of flammable gases, vapors, liquids, or dusts with air), or explosive atmospheres that may develop inside un-cleaned or improperly prepared drums, tanks, or other containers, and equipment that has previously contained such materials;

  - In any area where combustible gas indicator readings are in excess of 10 percent of the lower explosive limit;

  - On storage, process vessels, or lines in service that contain flammable or combustible liquids, gases, vapors, or solids.

- Before any welding, cutting, or other hot work is permitted, the area shall be inspected by the Construction Site Manager or SSHO to verify that the following requirements have been met:

  - Cutting and welding equipment to be used shall be in safe operating condition and in good repair.

  - Where practical, all combustible material shall be relocated at least 50 feet away from the hot work site. Where relocation is impractical, combustibles shall be protected with flameproof covers or otherwise shielded.

  - At a minimum, two fully charged and operable fire extinguishers, appropriate for the type of possible fire (4-A:60-B:C), shall be available at each work area.

  - A fire watch shall be required whenever hot work is performed in hazardous locations.

  - Combustible gas indicator readings shall be taken to verify the work area is free of combustible gases and vapors.

  - The work area is free of toxic contaminants at concentrations in excess of established TLVs or all personnel who will work in the area have been provided respiratory protection and protective apparel appropriate for the degree of exposure.

  - When hot work is to be performed on tanks or other vessels that contain or have contained flammable or combustible liquids, the vessel shall be properly isolated, purged, cleaned, or inerted as appropriate, to reduce the concentrations of flammable/combustible vapors to safe levels.

  - As required, a Hot Work Permit shall be completed by the Construction Site Manager or SSHO, reviewed with personnel who will perform the hot work, and posted near the job site.

  - If at any time during the hot work operation a change in conditions at the work site is suspected, such as a release of flammable gases or vapors in the work area,

work shall be stopped immediately and the Construction Site Manager or SSHO shall be notified. Such work stoppage invalidates the Hot Work Permit, and a new permit shall be completed after inspections and tests have been performed by the Construction Site Manager or SSHO.

2.4.4 Use of Small Tools

Hand and power tools shall be used, inspected, and maintained in accordance with the manufacturer's instructions and recommendations and will be used only for the purpose for which designed. A copy of the manufacturer's instructions and recommendations shall be maintained at the project site. The following requirements shall be adhered to:

- Tools designed to accommodate guards will be equipped with such guards when in use.
- Tools shall be inspected to ascertain safe operating conditions and are to be kept clean and free of accumulated dirt.
- Electric power tools and extension cords shall be used with ground fault circuit interrupter.
- Portable power cords will be designated as hard usage or extra hard usage and shall not be used if damaged, patched, oil-soaked, worn, or frayed.
- Connections on pneumatic lines shall be secured with a safety lashing.
- Explosive-actuated tools will meet the design requirements of American National Standards Institute A10.3 and only be operated by a qualified operator.
- Explosive-actuated tools and charges shall be secured at all times to prevent unauthorized possession or use.
- Explosive-actuated tools shall not be loaded until just prior to the intended firing time; neither loaded nor empty tools are to be pointed at any employees; hands shall be kept clear of the open barrel end.
- Hand tools, such as hammers and chisels, shall be inspected and dressed if necessary.

2.4.5 Use of Mechanized Equipment

Powered industrial trucks, forklifts, backhoes, and other types of specialized equipment may be used to accomplish the work at the project. The use of mechanized equipment can be dangerous. Extra care shall be exercised in its use and while working in the vicinity of this equipment.

2.4.5.1 Forklifts

All operators of this equipment shall be familiar with the requirements for inspection and operation of the equipment that they will be using. Before equipment is placed into use and on a daily basis, the operator is to inspect and verify that it is in safe operating condition. The following shall be adhered to while operating forklifts:

- Equipment will not be operated in a manner that will endanger persons or property nor will the safe operating speeds or loads be exceeded.

- Getting on or off of equipment while it is in motion is prohibited.

- Equipment will be operated in accordance with the manufacturer's instructions and recommendations.

- Determinations of structures will be made in advance to verify that clearances and load capacities are safe for the passage of equipment.

- All machinery or equipment will be shut down and positive means taken to prevent its operation while repairs or manual lubrications are being done. Equipment designed to be serviced while running is exempt from this requirement.

- Forks will be either fully lowered or blocked when being repaired or when not in use. All controls shall be in a neutral position, with the engines stopped and brakes set, unless work being performed on the machine requires otherwise.

- No guard, safety appliance, or device will be removed from machinery or equipment, or made ineffective except for making immediate repairs, lubrications, or adjustments, and then only after the power has been shut off. All guards and devices will be replaced immediately after completion of repairs and adjustments and before power is turned on.

- Each forklift and other similar equipment will be equipped with at least one dry chemical or carbon dioxide fire extinguisher with a minimum rating of 10-B:C.

- Personnel will not work, pass under, or ride on the forks.

- All forklifts shall be equipped with a reverse signal alarm.

- Seat belt use is required while operating equipment.

Spotters for the operator will be the only personnel allowed in the vicinity operating forklifts. Personnel needing to approach forklifts while operating shall observe the following protocols:

- Make eye contact with the operator (and spotter).

- Signal the operator to cease forklift activity.

- Approach the equipment only after the operator has given signal to do so.

2.4.5.2 Heavy Construction Equipment

There are various types of heavy construction equipment that may be used during this project. All operators of this equipment shall be familiar with the requirements for inspection and operation of the equipment that they will be using. Before equipment is placed into use and on a daily basis, the operator is to inspect and verify that it is in safe operating condition. The following guidelines shall be adhered to while operating heavy construction equipment:

- Equipment will not be operated in a manner that will endanger persons or property nor will the safe operating speeds or loads be exceeded.

- Getting on or off any equipment while it is in motion is prohibited.

- Equipment will be operated in accordance with the manufacturer's instructions and recommendations.

- Determinations of road conditions and structures will be made in advance to verify that clearances and load capacities are safe for the passage of equipment.

- All machinery or equipment will be shut down and positive means taken to prevent its operation while repairs or manual lubrications are being done. Equipment designed to be serviced while running is exempt from this requirement.

- Buckets, blades, dump bodies, and similar equipment will be either fully lowered or blocked when being repaired or when not in use. All controls shall be in a neutral position, with the engines stopped and brakes set, unless work being performed on the machine requires otherwise.

- No guard, safety appliance, or device will be removed from machinery or equipment, or made ineffective except for making immediate repairs, lubrications, or adjustments, and then only after the power has been shut off. All guards and devices will be replaced immediately after completion of repairs and adjustments and before power is turned on.

- Mechanized equipment will be shut down prior to and during fueling operations. Closed systems, with automatic shut-off, which prevent spillage if connections are broken, may be used to fuel diesel powered equipment left running.

- Each piece of heavy equipment and other similar equipment will be equipped with at least one dry chemical or carbon dioxide fire extinguisher with a minimum rating of 10-B:C.

- Personnel will not work, pass under, or ride in the buckets or booms of loaders in operation.

- All self-propelled construction equipment, whether moving alone or in combination, shall be equipped with a reverse signal alarm.

- Seat belt use is required while operating equipment.

Spotters for the operator will be the only personnel allowed in the vicinity of the heavy equipment. Spotters shall stay out of the boom radius area. Personnel needing to approach heavy equipment while operating shall observe the following protocols:

- Make eye contact with the operator (and spotter)

- Signal the operator to cease heavy equipment activity

- Approach the equipment only after the operator has given signal to do so.

2.4.5.3 Mechanized Equipment – Use of Quick Connect/Disconnect Systems

The manufacturer's specifications and operating manuals for hydraulic equipment and attachments utilizing quick connect/disconnect systems shall be followed. After completing a switch in attachments, the equipment operator shall take the actions necessary to ensure the quick connect/disconnect system is positively engaged.

2.4.5.4 Hydraulic Excavators, Wheel Loaders, Track Loaders, and Backhoe/Loaders Used to Transport or Hoist Loads with Rigging

When hydraulic excavating equipment is to be used to transport or hoist loads utilizing hooks, eyes, slings, chains, or other rigging the following requirements shall apply:

- Operations involving the use of hydraulic excavating equipment and rigging to transport or hoist loads require different operator skills and considerations than the standard excavating operations routinely performed with hydraulic excavating equipment. An AHA specific to the transporting or hoisting operation shall be prepared. The AHA shall include, but not be limited to the following:

  - Written proof of qualifications of equipment operators, riggers, and others involved in the transporting and hoisting operations

  - Performance of the operational test described in the *EM 385-1-1, Safety and Health Requirements Manual* (USACE, 2003)

  - Proper operating procedures in accordance with the equipment manufacturers operating manual

  - Proper use and on site availability of manufacturer's load rating capacities or charts

  - Proper use of rigging, including positive latching devices to secure the load and rigging

  - Inspection of rigging

  - Use of tag lines to control the load

  - Communications

  - Establishment of a sufficient swing radius (equipment, rigging, and load)

  - Stability of surfaces beneath the hydraulic excavating equipment.

- An operational test with the selected hydraulic excavating equipment will be performed in the presence of the Government Designated Authority (if available). The operational test shall consist of a demonstration that the test load and selected rigging can be safely lifted, maneuvered, controlled, stopped, and landed. The operational test shall be representative of the complete cycle of the proposed transporting or hoisting operation, including configuration, orientation, and positioning of the excavating equipment and the use of identical rigging. The test load shall be equivalent to the maximum anticipated load, but shall not exceed 100

percent of the manufacturer's load rating capacity for the excavating equipment as configured. Written documentation of the performance of the operational test outlining test procedures and results shall be maintained at the on-site project office.

- All rigging and rigging operations shall comply with the requirements of Section 15 of the *EM 385-1-1, Safety and Health Requirements Manual* (USACE, 2003). Hooks, eyes, slings, chains, or other rigging shall not be attached to or hung from the teeth of a bucket during the transporting or hoisting of a load by hydraulic excavating equipment.

- After the completion and acceptance of an operational test described in 16.N.01 (b) (USACE, 2003), if repairs, major maintenance, or reconfiguration are required to be performed on the hydraulic excavating equipment or attachments, another operational test as described in 16.N.01 (b) shall be performed to demonstrate that the completed repairs are satisfactory and that the test load and selected rigging can be safely lifted, maneuvered, controlled, stopped, and landed.

- Loads shall be lifted the minimum height necessary to clear the ground or other obstacles and carried as low as possible when the equipment is traveling.

- Loads shall not be lifted over personnel.

- Adequate clearances shall be maintained from electrical sources.

- Hydraulic excavating equipment shall not be used to hoist personnel. The riding of personnel on loads, hooks, hammers, buckets, or any other hydraulic excavating equipment attachment is prohibited.

2.4.6 Operation of Motor Vehicles

All company owned, leased, or rented vehicle operations shall comply with the requirements of RWEC, Inc, "Motor Vehicle Operation: General Requirements" (Current Revision). RWEC, vehicles shall be inspected on a daily basis. Additionally, all RWEC vehicles shall be inspected prior to any trip, 50 miles or greater. Vehicle inspections shall be documented on the Vehicle Inspection form.

Subcontractors operating motor vehicles at projects shall comply with all federal, state, and local traffic regulations. Subcontractors shall only use vehicles that are in good condition and safe to operate. Subcontractors shall inspect their vehicles on a daily basis and submit the inspection documentation to the Construction Site Manager or SSHO. Vehicle drivers shall keep alert for children and pedestrians; children and pedestrians shall always be given the right-of-way. All personnel must observe the maximum-posted speed limits on the base roadways and parking lots. Vehicles must not be parked closer than 15 feet from fire hydrants. Vehicle must pull over to the right side of the road when approached by emergency vehicles – remain stopped until the emergency vehicles have safely passed. All personnel shall drive defensively and wear seat belts while vehicles are in motion. Operators of vehicles may only use cellular telephones with hands-free devices while the vehicle is in motion. Prior to using a hand-held cellular telephone, drivers shall find a safe place to bring their vehicle to a stop. This requirement does not preclude passenger(s) from using cellular telephones while the vehicle is in motion. The use of headphones and earphones for music or radio is prohibited while operating a motor vehicle.

Since backing accidents at these types of projects are frequent, the following guidelines shall be observed:

- Backing of vehicles shall be avoided when possible.
- Extra care shall be taken to back vehicles when unavoidable.
- Back-up slowly and back-up the shortest distance necessary to accomplish the maneuver.
- When parking vehicles, vehicles shall be backed into the space whenever possible.
- Before entering a vehicle which has been parked, the driver should first physically perform a 360° walk around the vehicle to observe all areas and especially the area behind the vehicle.
- Spotters shall be used to back vehicles whenever possible.

2.4.7 Material Handling

Various materials and equipment may be handled manually during project operations. Care should be taken when lifting and handling heavy or bulky items to avoid back injuries. The following fundamentals address the proper lifting techniques that are essential in preventing back injuries:

- Size, shape, and weight of the object to be lifted shall first be considered. No individual employee is permitted to lift any object that weighs over 60-pounds. Multiple employees or the use of mechanical lifting devices is required for objects over the 60-pound limit.
- Anticipated path to be taken by the lifter should be inspected for the presence of slip, trip, and fall hazards.
- Feet shall be placed far enough apart for good balance and stability (typically shoulder width).
- Workers shall get as close to the load as possible. Legs shall be bent at the knees.
- Back shall be kept as straight as possible and abdominal muscles should be tightened.
- Twisting motions should be avoided when performing manual lifts.
- To lift the object, the legs are straightened from their bending position.
- Take small turning steps without twisting the knees or the back if it is necessary to turn with the load.
- A worker shall never carry a load that cannot be seen over or around.
- When placing an object down, the stance and position are identical to that for lifting. The legs are bent at the knees and the object lowered.

When two or more workers are required to handle the same object, coordination is essential for sharing the weight between the individuals carrying the load and to make a uniform lift. When carrying the object, each worker, if possible, shall face the direction in which the object is being carried. In handling bulky or heavy items, the following guidelines shall be followed to avoid injury to the hands and fingers:

- A firm grip on the object is essential; leather gloves shall be used as necessary.
- Hands and the object shall be free of oil, grease, and water, which might prevent a firm grip. Fingers shall be kept away from any points that could cause them to be pinched or crushed, especially when setting the object down.
- Item shall be inspected for metal slivers, sharp or jagged edges, burrs, and rough or slippery surfaces prior to being lifted.

2.4.8 Hazardous Energies (Electrical, Mechanical, and Pressurized Systems)

All portable electrical equipment and extension cords shall be protected with a ground fault circuit interrupter (GFCI) as part of the circuit. Applicable OSHA standards for electrical power, 29 CFR 1926 Subpart K and Section 11 of the *Safety and Health Requirements Manual* (USACE, 2003) apply.

Only qualified electricians may work on electrical circuits. Qualified personnel shall be trained with the proper use of the special precautionary techniques, PPE, including arc-flash, insulating and shielding materials, and insulated tools and test equipment.

Live parts to which an employee might be exposed shall be put into an electrically safe work condition (de-energized) before an employee works on or near them, unless it can be demonstrated that de-energizing introduces additional or increased hazards or is infeasible due to equipment design or operational limitations. This rule applies to all electrical work, including changing a light bulb.

Where work is performed in locations containing un-insulated energized overhead lines that are not guarded or isolated, precautions shall be taken to prevent employees from contacting such lines directly with any unguarded parts of their body or indirectly through conductive materials, tools, or equipment. Where the work to be performed is such that contact with un-insulated energized overhead lines is possible, the lines shall be de-energized and visibly grounded at the point of work, or suitably guarded.

Employees working in areas where electrical hazards are present shall be provided with, and shall use PPE that is designed and constructed for the specific part of the body to be protected and for the work to be performed, as required by Section 130.7 of National Fire Protection Association (NFPA) 70 E (2004), *Standard for Electrical Safety in the Workplace*.

Employees shall use insulated tools and/or handling equipment when working inside the Limited Approach Boundary of exposed live parts where tools or handling equipment might make accidental contact. Insulated tools shall be protected from damage to the insulating material.
Before starting each electrical job, the qualified employee in charge shall conduct a job briefing with the employees involved. The briefing shall cover such subjects as hazards associated with the job, work procedures involved, special precautions, energy source controls, and PPE requirements.

Only hard or extra-hard usage extension cords shall be used. Extension cords, power tools, and lighting equipment shall be inspected before each use, protected from damage, and kept out of wet areas.

Lockout/tagout procedures are to be implemented during servicing or maintenance of machines and equipment to preclude the unexpected release of stored energy or inadvertent energization. These procedures are contained in RWEC, Inc. Procedure, "Control of Hazardous Energy Sources" (Current Revision) and comply with the requirements established in 29 CFR 1926.417.
The handling of compressed gas cylinders shall comply with the requirements established in RWEC, "Compressed Gas Cylinders". All pressure vessels shall be designed, inspected, and tested in accordance with ASTM International standards. All air compressors and hoses shall be inspected before use, operated, and maintained by designated, qualified personnel. All air compressors shall be equipped with a pressure gauge and relief-valve, and only be operated at design pressures. Chicago fittings shall be secured together with tie-wire or equivalent and secured with safety lashings.

2.4.8.1 Portable Generator Use

Refer to the generator manufacturer's instructions for safe operation. Never use a generator in enclosed or partially enclosed spaces due to the quick build-up of high levels of carbon monoxide. The concentration of carbon monoxide shall be monitored when using generators in areas of poor ventilation. The concentration of carbon monoxide in the work area shall not be allowed to exceed 25 ppm.

Keep the generator dry and do not use in rain or wet conditions. To protect from moisture, operate it on a dry surface under an open, canopy-like structure. Dry your hands, if wet, before touching the generator. Use a heavy duty, outdoor-rated extension cord that is rated (in watts or amps) at least equal to the sum of the connected appliance loads. Check that the entire cord is free of cuts or tears and that the plug has all three prongs, especially a grounding pin. Ground generators by using a hand-inserted ground-rod, if recommended by the manufacturer.

Before refueling the generator, turn it off and let it cool down. Gasoline spilled on hot engine parts could ignite. A 20-A:B:C fire extinguisher shall be readily available in locations where a generator is being used.

Use hearing protection when working near a generator.

2.4.9 Intrusive Activities

Intrusive activities are defined as any activity that produces a man-made cut, cavity, trench, or depression into the earth's surface formed by earth removal or any activity that results in an object placed into the earth below the surface. These activities include excavating, drilling, augering, boring, shoveling, fence post driving, driving stakes, etc. Intrusive activities can be dangerous and can result in severe personal injury or death. Intrusive activities can also cause significant property damage to utilities, structures, and operational equipment. Breaching underground utilities can result in electrocution from damaged electrical lines, fires from broken fuel/gas lines, and disruption of telephone service. Positive steps shall be taken to determine if the area contains underground utilities or overhead hazards prior to commencing intrusive activities. It is important to understand that underground utilities have been found in areas that have been properly investigated and thought not to have utilities present. Personnel shall always be alert for marking tape, wires, pipes, previously disturbed soils, crushed stone or sand bedding/backfill, containers, discolored soil, MEC, or anything else unusual.

2.4.10 Excavation

When performing excavation activities, RWEC, "Excavation and Trenching" (Current Revision) and RWEC, "Underground/Overhead Utility Contact Prevention" (Current Revision) shall be followed. Any excavation five (5) feet deep or greater, into which persons will enter and perform work, shall be shored, sloped, or otherwise made safe for entry. Excavations less than five (5) feet in depth in which a competent person, as defined in 29 CFR 1926.650, examines and determines there to be no potential for cave-in, do not require protective systems. Certain excavations and trenches are considered confined spaces that require a confined space entry permit.

RWEC does not anticipate any excavation activities to be associated with this scope of work, however should excavation activities become necessary, daily inspections of the excavation shall be made by a competent person as defined in 29 CFR 1926.650. All excavated materials shall be placed at least two (2) feet from the edge of the excavation. Perimeter protection shall be provided for unattended excavations as specified in Section 25.B of the *EM 385-1-1, Safety and Health Requirements Manual* (USACE, 2003). Open excavations shall be lighted at night. The Construction Site Manager or SSHO shall evaluate the exposure of the excavation to employees, the public, vehicles, and equipment. This evaluation shall be used in determining the class of perimeter protection.

All project personnel shall participate in the site-specific training session and be instructed on the following requirements:

- Before commencing intrusive activities such as excavating, drilling, etc., the existence and location of underground pipes, electrical equipment, communication lines, gas lines, etc. shall be determined and documented. Only hand digging is permitted within three (3) feet of underground high voltage, product, or gas lines. Once the line is exposed, heavy equipment can be used but must remain at least three (3) feet from the exposed line.

- Operations shall be suspended, ignition sources eliminated, and the area shall be ventilated if the concentration of flammable/combustible vapors reach or exceed 10 percent of the lower explosive limit. A combustible gas indicator shall be used to make this determination.

- Personnel entry into any excavation five (5) feet deep or greater is only permitted if the necessary protective systems are in place. Employees shall wear a harness with a lifeline securely attached to it when entering excavations classified as confined spaces or that otherwise present the potential for emergency rescue.

- Employees shall not work in excavations in which there is accumulated water, or in excavations in which water is accumulating, unless adequate precautions have been taken to protect employees against the hazards posed by water accumulation. If water is controlled or prevented from accumulating by the use of water removal equipment, the process shall be monitored by a competent person to ensure proper operation.

- Excavations greater than four (4) feet in depth, which require personnel to enter, shall have sufficient means of entry and egress (for example, stairs, ladders, and ramps). Ladders will be provided and secured as necessary. Ladders shall extend at least three (3) feet above grade. Means of entry/egress shall not require personnel to travel laterally more than 25 feet.

2.4.11 Confined Space Entry

Confined space entry is not expected in this project.

A confined space is defined as a space large enough and so configured that an employee can bodily enter and perform assigned work, has limited means for entry or exit, and is not designed for continuous employee occupancy. Confined space work may pose additional hazards such as chemical exposures, flammable/explosive atmospheres, electrocution, oxygen deficiency, etc. Only properly trained personnel shall supervise and participate in confined space entry procedures or serve as standby attendants.

Personnel shall never enter a confined space without a permit issued by the Construction Site Manager or SSHO. If personnel are uncertain about whether their activity involves a confined space entry, they shall stop work and notify their supervisor, the Construction Site Manager, or the SSHO. The fire department shall be requested to provide emergency rescue services prior to entering the confined spaces.

All confined spaces are initially considered permit required. Under certain conditions, a space may be re-classified as a non-permit, confined space provided the Construction Site Manager or SSHO approves the reclassification and the space meets the criteria.

2.4.12 Dust

The generation of dust shall be prevented when possible and controlled when necessary. Work practices shall be adjusted in a manner to minimize dust generation. Personnel shall avoid working in dust by positioning themselves upwind of dust generating activities. Excessive dust shall be controlled by suppression with water.

2.5 General Work Rules

While all the procedures outlined in this HASP are required, the following list presents general work rules that must be strictly enforced by the Construction Site Manager, SSHO, and Subcontractor Supervisors:

- Personnel are not allowed on site without the prior knowledge and consent of the Construction Site Manager.

- Loose jewelry, clothing, or long hair is not permitted on or near equipment with moving parts.

- Personnel shall not enter a restricted area unless authorized.

- All work zones, as established on the site, shall be observed. All required PPE shall be worn prior to entering these zones.

- Legible and understandable labels shall be affixed prominently to the containers of waste materials.

- All operations involving the potential for eye injury (fuel splash), etc. shall have eyewash units locally available and capable of delivering at least 0.4 gallons per minute for at least 15 minutes.

- If on-site activities continue later than dusk, adequate lighting shall be provided.

- Field activities shall be suspended during severe weather such as thunderstorms, lightning, and hurricane warnings.

- Damaged PPE shall be immediately repaired or replaced, as appropriate.

- Personnel shall thoroughly wash their hands and face before eating, smoking, or drinking.

- Unauthorized removal of materials from the project is prohibited.

- Possession of controlled substances and prohibited items, such as alcohol, illicit drugs, firearms, and weapons while working on site is strictly prohibited.

- Operations involving the potential for fire hazards shall be conducted in a manner as to minimize the risk of fire.

- Overhead and underground utility hazards shall be identified and/or located prior to conducting operations.

2.6 Workday Duration Limitations

This section describes the limitations of hours worked by site personnel and the general administrative qualifiers that guide the policy.

2.6.1 Workday Duration

The following workday duration limitations for hours worked on the projects are in effect:

- Personnel working on projects, including those who are operating hoisting equipment or mobile construction equipment, may work up to 12 hours at the site, which includes travel time to housing, but excludes non-compensated time. This workday duration is subject to reduction by the other requirements and factors described below. The 12-hour limit is primarily due to motor vehicle driving restrictions.

- Personnel shall not operate motor vehicles after being in a duty status (regardless of their role or function) for more than 12 hours during any 24-hour period without at least eight consecutive hours of rest. A minimum of eight consecutive hours shall be provided for rest in each 24-hour period.

- No employee may drive continuously for more than 10 hours in any single on-duty period. (Continuous period of more than 10 hours in any 24-hour period without at least eight consecutive hours of rest.)

2.6.2 General Administration

For each project effort, the Construction Site Manager is responsible for adjusting the workday duration within the limits set above.

The following factors will be considered by the Construction Site Manager for adjusting the workday duration:

- Time of year (e.g., reduce workday duration because there is less daylight in winter).
- Temperature/weather (e.g., reduce workday duration when the temperature is very hot, or very windy).
- Type of work (e.g., reduce workday duration for personnel involved in physically demanding phases of work).
- Individual personnel limitations (e.g., reduce workday duration for personnel with minor head colds or suffering from temporary effects of allergies).

For any questions regarding the implementation of this policy, contact the Program Health and Safety Manager (HSM).

2.7 <u>Buddy System</u>

The "buddy system" will be used at all times while working on-site – this requires that personnel maintain visual, voice, cellular telephone, or radio communication.

2.7.1 Lone Worker Procedure

Occasionally, only one worker may be present at the project to perform routine operations such as performing paperwork in the office. During these routine operations, there will be no "buddy" present on site. Even though there will be no buddy present on site at these times, communications must still be maintained. The lone field worker shall carry a cellular telephone or two-way radio on their person, at all times, while working at the project site (a landline telephone will suffice if the worker is in an office). Arrangements shall be made by the lone field workers, with at least one other person (monitor), to affect hourly communications. This hourly communication shall convey the following information:

- Present location
- Present status
- Anticipated activities and location of anticipated activities (include routes of expected travel)
- Estimated duration of anticipated activities
- Identify other anticipated activities, projected travel routes, and activity locations if the lone field worker will complete the initial task prior to making the next scheduled contact with the other employee

The lone field worker should initiate the hourly communication to the monitor at a pre-designated time (for example, the top of the hour). If the monitor does not receive the status call at the pre-designated time, then the monitor shall try to establish communications with the lone employee. If the lone field employee answers, then the update shall be made and the schedule of calls shall continue. If the lone field employee does not answer, the monitor shall try again in five minutes. If contact is not made on the second try, then the monitor shall notify the local emergency services, such as police or security force. All information provided from the last communication (see above) shall be provided to the emergency services. Additionally, the telephone number of the monitor (or other means of contact) shall be provided to the emergency services.

Upon mobilization to the project, the Construction Site Manager or SSHO shall verify that emergency communications are established for all activities.

Important: This procedure applies to routine tasks only. Non-routine tasks require the buddy system to be in effect.

2.8 Environmental Hazards

In addition to chemical and physical hazards, there are environmental hazards that may be present. For the purposes of this HASP, the environmental hazards are comprised of extreme ambient temperatures, insects, spiders, rodents, poisonous plants, and sunburn. This form is used to alert the Construction Site Manager or SSHO of these sensitivities so that additional precautions may be made.

2.8.1 Heat Stress

Heat stress is of concern for worker safety during the summer months or when working in areas containing steam lines or other heat generating equipment. Heat stress is caused by a number of interacting factors, including environmental conditions, clothing, PPE, workload, and individual characteristics. Heat stress can cause physical discomfort, loss of efficiency, or personal illness/injury.

Individuals vary in their susceptibility to heat stress. Factors that may predispose individuals to heat stress include the following:

- Lack of physical fitness and/or obesity
- Insufficient acclimation
- Age
- Dehydration
- Alcohol and/or drug use
- Infection
- Sunburn
- Diarrhea
- Chronic disease
- Medical conditions and/or the use of some medications, such as beta-blockers for high blood pressure

The amount and type of PPE worn, directly influences reduced work tolerance and the increased risk of heat stress. Personal protective equipment adds weight, bulk, reduces the body's capability for physiological thermoregulation (such as, evaporation, convection, and radiation), and increases energy expenditure.

2.8.1.1 Signs and Symptoms of Heat Stress

If the body's physiological processes fail to maintain a normal body temperature because of excessive heat, a number of physical reactions can occur – ranging from mild to fatal.
These physical reactions to excessive heat include the following:

- Heat rash is caused by continuous exposure to heat and humidity and aggravated by chafing clothes. Heat rash decreases the body's ability to tolerate heat in addition to being a nuisance.

- Heat cramps are caused by profuse perspiration with inadequate electrolytic fluid replacement. Heat cramps cause painful muscle spasms and pain in the extremities and abdomen.

- Heat exhaustion is caused by increased stress on various organs to meet increased demand to cool the body. Heat exhaustion causes shallow breathing; pale, cool, moist skin; profuse sweating; and dizziness.

- Heat stroke is the most severe form of heat stress. Heat stroke symptoms include hot, dry skin; no perspiration; nausea; dizziness; confusion; strong, rapid pulse; coma; and sometimes death. Heat stroke is a serious medical emergency. The affected person shall be cooled down rapidly and medical attention must be given immediately.

The American Conference of Governmental Industrial Hygienist (2007) states that excessive heat stress may be marked by one or more of the following symptoms, and an individual's exposure to heat stress should be discontinued when any of the following occur:

- Sustained (several minutes) heart rate is in excess of 180 beats per minute minus the individual's age in years (180 minus age), for individuals with assessed normal cardiac performance

- Body core temperature is greater than 101.3 degrees Fahrenheit (°F) for medically selected and acclimatized personnel; or greater than 100.4°F in unselected, unacclimatized workers

- Recovery heart rate at one (1) minute after a peak work effort is greater than 110 beats per minute

- There are symptoms of sudden and severe fatigue, nausea, dizziness, or lightheadedness

An individual may be at greater risk of heat stress if:

- Profuse sweating is sustained over hours

- Weight loss over a shift is greater than 1.5 percent of body weight (ACGIH, 2007)

2.8.1.2 Heat Stress Prevention

The following practices will help prevent heat stress:

- Acclimatize workers to hot working conditions.
- Provide plenty of liquids to replace the body fluids lost by perspiration. Fluid intake should be forced because, under conditions of heat stress, the normal thirst mechanism is not adequate to bring about a voluntary replacement of lost fluids.
- Provide personal cooling devices.
- Conduct strenuous field operations in the early morning and provide shade when possible.
- Train personnel to recognize the signs and symptoms of heat stress, its prevention, and treatment.
- Rotate personnel to various job duties and establish adequate work/rest cycles.
- Provide shade or shelter during rest periods.

2.8.1.3 Heat Stress Treatment

Workers expressing the symptoms of heat stress shall notify the Construction Site Manager or SSHO immediately. At the onset of heat related illness, activities must be halted and treatment initiated. Early detection and treatment of heat stress helps to prevent further serious illness or injury. Individuals that have experienced heat related illness could become more sensitive and predisposed to additional future heat stress related problems.

Heat exhaustion can be alleviated by having the affected person rest in a cool, shaded location and have them drink cool water. To cool down the affected person's body:

- Remove impermeable PPE
- Remove worker from direct sunshine
- Apply copious amounts of cool, not cold, water on them
- Have them drink cool water, not cold, if conscious

2.8.1.4 Heat Stroke Treatment

Heat stroke is a true medical emergency. In a heat stroke situation, the body must be cooled immediately to prevent severe injury or death – medical attention must be immediately obtained. The following shall be performed if heat stroke is suspected:

- Transportation of the victim to a medical facility must not be delayed – seek immediate medical attention.

- Apply cold packs, if available; place under the arms, around the neck, or any other place where they can cool large surface blood vessels.

- If transportation to a medical facility is delayed, reduce body temperature by immersing victim in a cool water bath (however, be careful not to over-chill the victim once body temperature is reduced below 102°F). If this is not possible, continuously douse victim with cool water and fan for evaporative cooling.

2.8.1.5 Acclimatization

Physiologically adjusting or acclimatizing personnel to hot conditions is extremely important. Supervisors shall provide the necessary time for adequate worker acclimatization, due to each individual's physical condition and his or her ability to work in hot and humid environments.

2.8.1.6 Physiological Monitoring

Adequate work/rest periods shall be implemented as necessary to prevent heat stress on personnel. However, since individuals vary in their susceptibility to heat stress, RWEC will also utilize physiological monitoring to aid in measuring each individual's response to heat stress. The initiation of physiological monitoring will be required when employees are working in environments exceeding 90°F ambient air temperatures. Physiological monitoring is also required when ambient temperatures exceed 70°F and impermeable garments are worn. Ambient air temperatures shall be recorded on the Ambient Air Temperature Log when ambient temperatures exceed 70°F. The two physiological parameters that each individual will monitor are as follows:

- Heart Rate—Each individual will count his/her radial (wrist) pulse as early as possible during each rest period. If the heart rate of any individual exceeds 75 percent of their calculated maximum heart rate (maximum heart rate equals 200 minus age) at the beginning of the rest period, then the work cycle will be decreased by one-third. The rest period will remain the same. An individual is not permitted to return to work until his/her sustained heart rate is below 75 percent of their calculated maximum heart rate.

- Body Temperature—Each individual will measure his/her body temperature with an intra-aural (ear) or oral thermometer, as directed by the thermometer manufacturer's instructions, as early as possible in the first rest period. If the temperature exceeds 99.6°F at the beginning of the rest period, then the work cycle shall be decreased by one third. The rest period will remain the same.

An individual is not permitted to return to work if his/her temperature exceeds 100.4°F.

Training personnel (including subcontractor employees) who may be exposed to hot working environments shall be trained on the following:

- Employees:

  - Sources of heat stress, influence of protective clothing, and importance of acclimatization

  - How the body handles heat

- Heat-related illnesses and their recognition (signs and symptoms)

- Preventive/corrective measures

  - Individual factors, such as age, weight, gender, level of acclimatization, etc. that may predispose some workers to heat stress

  - Medical conditions and use of prescription drugs, such as beta blockers, that may modify a worker's ability to adapt physiologically to heat stress

  - Physiological monitoring, record keeping of body temperature/pulse, and establishment of work-rest regimes and first aid procedures

- Supervisors:

  - Physiological monitoring, record keeping of body temperature/pulse, and establishment of work-rest regimes and first aid procedures

2.8.2 Poisonous Plants

Three or five leaves radiating from a stem identify poison ivy, poison oak, and poison sumac. Poison ivy is in the form of a vine (and sometimes low-lying) while oak and sumac are bush-like. All of these plants can produce a delayed allergic reaction. The plant tissues have an oleoresin, which is active in live, dead, and dried parts. The oleoresin may be carried through smoke, dust, contaminated articles, and the hair of animals. Additionally, when operating a chain saw to clear brush, saw dust may be contaminated with enough oleoresin to cause a severe rash. Symptoms usually occur 24 to 48 hours after exposure resulting in rashes that itch and blister. Should exposure to any of these plants occur, wash the affected area with a mild soap and water within one-half hour, but do not scrub the area. The best preventative measure for poisonous plants is recognition and avoidance. The use of disposable gloves and Tyvek® coveralls is recommended to help prevent skin contact with these plants.

2.8.3 Flying Insects

Flying insects such as mosquitoes, wasps, hornets, and bees may be encountered while working at project sites. Personnel who are allergic to bee stings should notify their supervisor and the Construction Site Manager or SSHO. An optional Allergy/Sensitivity Questionnaire may be completed by employees to help identify personnel who are allergic or sensitive to insect bites or stings. Mosquito bites can be effectively prevented by the use of insect repellants containing DEET. Insect repellant containing DEET shall be available to personnel while working on site. Additionally, special insecticide preparations, such as Repel Permanone, shall be available for treating worker's clothing. Commercially prepared ointments for treatment of insect bites and bee stings shall be available on site. All personnel shall immediately report any bee stings to their supervisor and the Construction Site Manager or SSHO.

2.8.4 Spiders

Personnel shall be alert to the potential for spider bites. Spiders sometimes establish residence in dark places, stored clothing, and PPE. It is advisable for personnel to inspect clothing and PPE for spiders prior to donning. If a spider bite is sustained, personnel shall report it to the Construction Site Manager or SSHO.

3.0 PERSONAL PROTECTIVE EQUIPMENT

When engineering and administrative controls are not feasible or adequate to protect personnel from the hazards associated with project activities, PPE use will be required.

3.1 Respiratory Protection

Respiratory protection use is not anticipated for this project. In the event that some unforeseen circumstance requires the use of respiratory protection, the specifications of this section shall apply. The Program HSM shall be contacted prior to implementing the use of any respiratory protection during this project.

Respiratory protection equipment shall be NIOSH-approved and respirator use will conform to American National Standards Institute Z88.2 and OSHA 29 CFR 1910.134 requirements. RWEC Procedures "Respiratory Protection Program" details the medical qualification and training requirements, as well as the selection, use, inspection, cleaning, maintenance, storage, and fit testing of respiratory protection equipment. This procedure complies with the requirements contained within 29 CFR 1910.134 and will be maintained in the project office along with other pertinent RWEC Safety and Health Procedures.

All personnel (including visitors) using respiratory protection, shall possess a written opinion by the medical examiner of the person's ability to use the necessary respiratory protective equipment and shall have successfully passed a respirator fit test in accordance with RWEC's, "Respiratory Protection Program" within the last 12 months.

Levels of Protection

The following is a description of the PPE that will be required during various phases of the project.

3.1.1 Level D – Modified Protection

Additional PPE may be required for specific tasks. Level D – modified protection generally consists of the following PPE:

- Safety glasses with side shields meeting ANSI Z87.1 specifications.
- Face shield (when grinding or chipping materials).
- Safety-toed work boots meeting ANSI Z41 specifications.
- Nitrile or vinyl surgical gloves (inner, when working with DWV piping and systems).
- Hearing protection (if necessary or required).
- Hard hat meeting ANSI Z89.1 specifications.
- High visibility vests (when working near heavy equipment or vehicular traffic).
- Additional eye and face protection, such as face-shield, welder's helmet, tinted cutting goggles (when welding/torching).

- Molten metal and slag protection (when welding/torching).
- Fire resistant Nomex coveralls (when welding/torching).
- Disposable coveralls (Poly coated Tyvek when contact with raw sewage is possible).
- Nitrile, PVC, or neoprene gloves (when contact with raw sewage is possible).
- Chemical protective boots (when contact with raw sewage is possible).

Employees working in areas where electrical hazards are present shall be provided with, and shall use, protective equipment as required by Section 130.7 of NFPA 70 E (2004) that is designed and constructed for the specific part of the body to be protected and for the work to be performed. Refer to Appendix F, "NFPA 70 E - Electrical Safety Tables": Hazard/Risk Category Classifications; Protective Clothing and Personal Protective Equipment (PPE) Matrix; and Protective Clothing Characteristics).

3.1.2 Level D Protection

Level D protection is the minimum level of protection that will be used for all other activities at the project. Level D PPE shall, at a minimum, consist of:

- Safety-toed work boots meeting ANSI Z41 specifications.
- Safety glasses with side shields meeting ANSI Z87.1 specifications.
- Hard hat meeting ANSI Z89.1 specifications.
- Hearing protection (if necessary or required).
- High visibility vests (when working near mechanized equipment or vehicular traffic).
- Work gloves, such as leather, cotton, or other material that provides cut/abrasion resistance (as necessary).

3.2 Activity-Specific Levels of Protection

The required level of personal protection is specific to the activity being conducted and shall be documented in the Job Safety Analysis. Levels of PPE are subject to change or to modification.

4.0 SITE CONTROL AND WORK AREAS

Work areas will be established based upon activities. Measures shall be taken to control access to these areas. The work areas will consist of the construction area and the support area.

4.1 Construction Area

The construction area will consist of areas where construction and demolition activities occur. The perimeter will be secured with physical barriers such as polyethylene fencing, barricades, caution boundary tape, danger pylons, and/or appropriate markers designed to restrict entry to the area. Permission to enter the construction area will be limited to those individuals with the proper training and PPE.

4.2 Support Area

The support area will consist of a marked area where the support equipment and sanitation facilities (i.e., toilets, drinking water, and washing water) are staged. Smoking, drinking, and eating will be allowed only in designated areas. An eye wash station will be located in this area.

4.3 Access Controls

The Construction Site Manager or SSHO will establish the physical boundaries of each area and instruct all workers and visitors on the limits of the restricted areas. No one shall be allowed to enter the restricted area without the required protective equipment for that area.

4.4 Visitor Access

Visitors will be required to check in immediately upon arrival at the site. Each visitor will be required to provide and wear the necessary PPE during the visits and shall be escorted by project personnel.

4.5 Project Site Security

Ft. Buchanan has security measures in place, which must be followed by all personnel. All equipment shall be locked when project personnel are not present.

4.6 Posting Site

Appropriate warning signs warning shall be posted adjacent to work areas providing warning and caution of hazards, instructions, and directions to workers and non-project personnel.

5.0 PERSONAL HYGIENE

Adequate washing facilities shall be available for employee use at provided toilet, eating, and break facilities. Each washing facility shall be maintained in a sanitary condition and provided with water (either hot and cold running water or tepid running water), soap, and individual means of drying (disposable towels).

6.0 TRAINING REQUIREMENTS

This section describes general training, safety meetings, site-specific training, hazard communication, first aid and CPR, and other additional training, certification, and licenses needed to work on the project.

6.1 General Training

The Site Manager or SSHO is responsible for informing all site personnel and all visitors of the contents of the HASP and verifying that each person signs the HASP Acknowledgment Form. Documentation of certification of training requirements will be reviewed by the Construction Site Manager or SSHO, filed on site.

6.2 Safety Meetings

Employees shall be provided continuing safety and health training to enable them to perform their work in a safe manner.

6.2.1 Morning Safety Meetings

Subcontractors shall conduct a safety meeting at the beginning of each shift. The topics discussed at this daily "tailgate" safety meeting shall include safety and health considerations for the day's activities, pertinent aspects of AHAs, necessary PPE, problems encountered, and new operations. The JSA(s) may be prepared as a component of the morning safety meeting. Attendance records and meeting notes shall be documented on the Safety Meeting Log and maintained with the project files.

6.2.2 Supervisor Safety Meetings

A supervisor safety meeting shall be held each month. This meeting will be held by the Construction Site Manager. The topics to be covered are as follows:

- Past activities
- Plans for new or changed operations
- Review of pertinent aspects of appropriate AHAs
- Establishment of safe working procedures for anticipated hazards
- Pertinent safety and health training and motivation
- Worker input and contributions

6.3 Site-Specific Training

All personnel working at the project shall attend a site-specific safety orientation covering the following topics:

- Purpose of the HASP and review of pertinent sections including emergency response procedures

- Review of applicable AHAs

- Names of personnel responsible for site safety (RWEC and subcontractors)

- The provisions for medical care and facilities and the names of CPR and first aid trained personnel assigned to the project
- Morning safety meeting procedures
- Safety and health hazards on site and the means to control/eliminate those hazards
- Responsibilities for accident prevention and maintaining safe and healthful work environments
- Procedures for reporting and correcting unsafe conditions or practices
- Employee "Stop Work Authority"
- Responsibilities for reporting all accidents and illnesses
- PPE (use and care)
- Location of safety equipment (i.e., fire extinguishers, first aid kits, etc.)
- Standard operating procedures, safety rules, and safe work practices for the project
- Work areas and site control measures
- Hazard Communication Program (includes discussion of MSDSs for hazardous chemicals used on site)
- Hot work procedures (when applicable)
- Lockout/tagout procedures
- Fall protection
- Housekeeping

The content of the training will be derived from information contained within the HASP.

6.4 Hazard Communication

All personnel performing field activities involving hazardous operational chemicals shall receive basic hazard communication training, which involves a review of the RWEC written hazard communication program, MSDSs, container labeling, chemical health hazards, and chemical hazard control procedures. Personnel shall be notified of the hazards of chemical contamination on site (if present) by a review of Section 4.1 of this HASP. Material Safety Data Sheets for additional materials brought on site shall be reviewed with personnel prior to the use.

6.5 First Aid and Cardiopulmonary Resuscitation

Each subcontractor shall provide at least one person trained and certified in both American Red Cross first aid techniques and CPR whenever their personnel are on-site. Additionally, the RWEC Construction Site Manager and SSHO shall be certified in both. These employees will meet both the training and vaccination requirements.

6.6 Additional Training, Certification, and Licenses

In addition to the training, certification, and licensing previously detailed, the following shall also be required if deemed necessary based on project activities:

- All personnel operating motor vehicles shall hold a valid operator's license.
- Personnel wearing respiratory protection shall receive training in the use, care, and maintenance of that equipment on an annual basis. Fit testing for that equipment shall be performed on an annual basis as specified in 29 CFR 1910.134.
- All crane operators shall be designated as qualified meeting the specifications in the *EM 385-1-1, Safety and Health Requirements Manual* (USACE, 2003). Qualification is to be renewed every three years.
- Personnel operating powered industrial trucks (forklifts) shall have a certificate designating them as a qualified operator.
- Any employee operating a powder-actuated tool shall be qualified as an operator of that tool as specified by the manufacturer. Recertification, if any, shall be obtained as specified by the manufacturer.
- Confined space entry, attendant, and supervisory personnel shall be trained and certified as specified in 29 CFR 1910.146. Confined space rescue personnel shall be trained and certified as specified in 29 CFR 1910.146 and shall practice rescues (from similar types of confined spaces) on an annual basis.
- The certification and recertification requirements for first aid (three years) and CPR (one year) are applicable. First aid and CPR training/certification must be made by a reputable provider.
- Personnel working from ladders shall be initially trained in Ladder Safety.
- Personnel inspecting cranes shall have a certificate designating them as a competent person.
- Personnel inspecting excavations shall have a certificate designating them as a competent person.
- Personnel supervising scaffold erection shall have a certificate designating them as a competent person.
- Personnel operating arc-welding equipment shall have a certificate designating them as a qualified operator.
- Personnel operating gas welding and cutting equipment shall have a certificate designating them as a qualified operator.
- Personnel may only use portable fire extinguishers to extinguish small fires, if the employee has been trained and the employee is confident that the small fire can be safely extinguished.

APPENDIX C
BLOOD BORNE PATHOGENS EXPOSURE CONTROL PLAN

1.0 BLOOD-BORNE PATHOGEN EXPOSURE CONTROL PLAN

Blood-borne pathogens are microorganisms (i.e., bacteria, virus) sometimes present in blood and certain body fluids, which are capable of causing human disease or death. These pathogens can also be present on objects and surfaces that have had contact with infected blood or certain body fluids. Blood-borne pathogens are also capable of causing human disease or death to unprotected people who are exposed to infected blood or body fluids. Diseases caused by blood-borne pathogens include, but are not limited to, hepatitis A, hepatitis B, hepatitis C, malaria, acquired immunodeficiency syndrome (AIDS), and other sexually transmitted diseases. The most significant of these and of greatest concern are hepatitis B and AIDS.

Hepatitis B is a serious disease caused by the hepatitis B virus (HBV), which attacks the liver. The virus can cause lifelong infection, cirrhosis (scarring) of the liver, liver cancer, liver failure, and death. Exposure symptoms include fever, fatigue, nausea, vomiting, muscle aches, loss of appetite, and jaundice (yellowing of the eyes or skin). Hepatitis diagnosis is difficult because some symptoms are similar to the flu and may remain mild for an extended period. The HBV can remain infectious for up to 10 days, even in dried blood. Hepatitis B vaccine is available for all age groups to prevent HBV infection.

Human immunodeficiency virus (HIV) is the virus that causes AIDS. People with HIV have what is called HIV infection. Some of these people will develop AIDS because of their HIV infection. Humans may be infected with HIV for many years without experiencing any symptoms. Upon development of AIDS, symptoms may include weight loss, skin lesions, dry cough, fever, fatigue, diarrhea, swelling of the lymph glands, and death. Presently, no cure exists for HIV or AIDS, and no vaccination is currently available.

A hazard exists for blood and other bodily fluids to be infected with dangerous, infectious pathogens. Employees could become infected if they are exposed to these blood-borne pathogens.

The purpose of this Blood-borne Pathogen Exposure Control Plan is to provide the information, procedures, and requirements necessary to prevent employee exposure to blood-borne pathogens.

1.1 Regulatory, Requirement, and Policy Compliance

This Blood-borne Pathogen Exposure Control Plan has been prepared in compliance with:

- 29 CFR 1910.1030, Blood-borne Pathogens
- *EM 385-1-1, Safety and Health Requirements Manual* (USACE, 2003), Section A.03.06

1.2 Exposure Determination

OSHA requires employers to perform an exposure determination, identifying employees who may incur occupational exposure to blood or other potentially infectious materials. The exposure determination is made without regard to the use of PPE. For exposure determination purposes, employees are considered to be exposed, even if they wear PPE.

In general, it is anticipated that project activities will not present a high risk of employee exposure to blood or other body fluids. An exception to this would be under circumstances when personnel administer first aid care or CPR to injured workers and when personnel clean-up areas

and equipment that may have been exposed to blood because of the incident. In these cases, there is reasonable potential for employee skin, eye, mucous membrane, or potential contact with blood or other bodily fluids.

The OSHA requires a listing of job classifications with identification of tasks performed in which some employees may have potential for occupational exposure. This requirement is for employees to clearly understand the tasks that they may perform have a potential for occupational exposure to infectious materials. The job classifications and associated tasks with an exposure potential are as follows:

- Construction Site Manager—Administer first aid or CPR; decontaminate or disinfect surfaces and articles that have contacted infectious materials, and prepare biohazard waste for temporary storage and subsequent disposal.

- Site Safety and Health Officer—Administer first aid or CPR; decontaminate or disinfect surfaces and articles that have contacted infectious materials, and prepare biohazard waste for temporary storage and subsequent disposal.

- Subcontractor Supervisors—Administer first aid or CPR; decontaminate or disinfect surfaces and articles that have contacted infectious materials, and prepare biohazard waste for temporary storage and subsequent disposal.

- Laborer—Administer first aid or CPR; decontaminate or disinfect surfaces and articles that have contacted infectious materials, and prepare biohazard waste for temporary storage and subsequent disposal.

These employees have potential for exposure to blood-borne pathogens when administering first aid or CPR and when performing post-accident clean-up operations due to the following:

- Contact or absorption of blood or blood-contaminated objects through open or broken skin (i.e., cuts, scratches, and rashes)

- Blood splashes to their eyes, nose, or mouth, or other mucous membranes

- Punctures through the skin with a contaminated sharp object (such as, scissors)

Workers can reduce their risk of contacting blood-borne pathogens by implementing the recommended work practices (outlined in this plan) before, during, and after responding to emergency medical incidents primarily involving personal injuries.

1.3 Schedule of Implementation

The procedures in this Blood-borne Pathogen Exposure Control Plan are to be implemented immediately.

Implementation includes:

- Verifying personnel who are available to voluntarily provide first aid care and CPR hold a valid training certificate from a reputable training provider (American Red Cross or American Heart Association).

The Construction Site Manager or SSHO is responsible for verifying that an appropriate number of personnel have been trained in and hold valid certification to perform first aid and CPR.

- Verifying that personnel voluntarily providing first aid care, CPR, post-accident clean-up operations, and biohazard waste handling have received the specialized training meeting the requirements of 29 CFR 1910.1030; EM 385-1-1, *Safety and Health Requirements Manual* (USACE, 2003), Section A.03.06. This training is required for applicable personnel prior to the commencement of work and at least annually thereafter. This training shall cover the following elements:

  – Copy of 29 CFR 1910.1030 and this procedure including an explanation of the contents

  – General explanation of the epidemiology and symptoms of blood-borne diseases

  – Explanation of the modes of transmission of blood-borne pathogens

  – Explanation of the appropriate methods for recognizing tasks and other activities that may involve exposure to blood and other potentially infectious materials

  – Explanation of the use and limitations of practices that will prevent or reduce exposure including appropriate engineering controls, work practices, and PPE

  – Information of the types, proper use, location, removal, handling, decontamination, and/or disposal of PPE

  – Explanation of the basis for selection of PPE

  – Information on the hepatitis B vaccine, including information on its efficacy, safety, and the benefits of being vaccinated

  – Information on the appropriate actions to take and persons to contact in an emergency

  – Explanation of the procedure to follow if an exposure incident occurs including the method of reporting the incident and the medical follow-up that will be made available

  – Information on the medical counseling that is provided for exposed individuals

  – Explanation of required signs and labels

The Construction Site Manager or SSHO is responsible for verifying that this blood-borne pathogen training has occurred.

- Verifying that engineering controls are readily available at the project for use in an emergency. Engineering controls for this project include the following:

  – Red-bags for temporary storage of contaminated PPE and cleaning materials

- Appropriately labeled, 30-gallon hard-plastic container for the temporary storage of red-bagged waste
- Whisk-broom and dust pan for cleaning up contaminated broken glass
- Gallon container of Clorox® household bleach
- Large utility sponge
- Rolls of paper towels
- Container of liquid disinfectant hand soap
- "Biohazard" warning labels
- Individually packaged disinfectant towelettes
- CPR barriers

The Construction Site Manager or SSHO is responsible for verifying that this inventory of engineering controls is readily available at the project site for emergency use.

Personal protective equipment is necessary to prevent employee exposures to infectious materials. The necessary PPE, which shall be maintained separately for use in an emergency include the following:

- P-100 Particulate filtering face-piece respirator (3-M 8293 or equivalent)
- Face-shields with ratcheting head-suspension
- Safety glasses with clear lens
- Disposable nitrile examination gloves
- PVC Monkey Grip work gloves
- Poly-coated or Saran-coated disposable Tyvek® coveralls with attached hood
- Vinyl or latex disposable boot covers
- Fluid-resistant surgical hoods

The Construction Site Manager or SSHO is responsible for verifying that the above inventory of PPE is readily available at the project site for emergency use.

1.4 Work Practice Controls

Work practice controls reduce the likelihood of exposure by altering the manner in which a task is performed. The work practice controls outlined in this section are applicable to the administration of first aid and the subsequent clean-up operations.

Work practice controls shall be instituted whenever there is potential for employee contact with blood and bodily fluid. Situational examples where these controls are to be implemented include, but are not limited to:

- The voluntary administration of first aid care, such as application of bandages to minor or major cuts and abrasions of another person. This care may allow for contact with sores, wounds, broken skin, blood, or other bodily fluids.

- The voluntary administration of first aid care, such as providing CPR.

- Clean-up activities involving handling soiled articles (e.g., gauze, bandages, compresses, etc.) and the decontamination or disinfecting of surfaces and articles that have contacted potentially infectious materials, such as blood or other bodily fluids.

- Prepare biohazard waste for temporary storage and subsequent disposal.

Based upon professional judgment, an employee may choose to temporarily forego the use of PPE if the employee determines that the use of the PPE will further jeopardize his well-being or that of the injured worker. This limited application must be carefully evaluated and considered by the employee. If this situation does occur, RWEC will investigate and document the circumstances in an effort to provide alternative means to avoid further occurrence.

The following are specific work practice controls that shall be implemented in the above noted situations or whenever an employee determines that the implementation of these work practices is prudent or necessary:

- The appropriate PPE shall be donned prior to engaging in any activities that have the potential for employee contact with potentially infectious materials, such as blood or other bodily fluids.

- Hands and face will be washed as soon as possible after engaging in any activities that have the potential for employee contact with potentially infectious materials, such as blood or other bodily fluids. If wash facilities are not readily available, individually packaged disinfectant towelettes may be used in the interim.

- Eating, drinking, or smoking is not allowed in any work area where a potential exists for occupational exposure to blood-borne pathogens.

- Open wounds or cuts shall be promptly bandaged.

- Work surfaces and areas shall be cleaned and disinfected immediately after being contacted by potentially infectious materials. A 10 percent bleach solution (one part bleach added to nine parts water) shall be applied and allowed to have a contact time of 15 minutes. Non-disposable articles, equipment, or materials contaminated with potentially infectious materials shall be similarly cleaned/disinfected prior to reuse.

- All bins, pails, cans, and similar receptacles intended for reuse, which have become contaminated with blood or other potentially infectious materials shall be cleaned and disinfected immediately after use.

- Broken glassware, which may be contaminated, shall not be picked up directly by hand. Broken glass shall be picked-up using mechanical means, such as by using a whiskbroom and dustpan.

- All PPE shall be immediately removed upon leaving the potentially contaminated work area, or as soon as possible if visibly contaminated. The contaminated PPE shall be placed in a labeled “red-bag” and then placed in the 30-gallon container for temporary storage and subsequent disposal.

- Any clothing that has contacted blood or other potentially infectious fluids shall be removed as soon as possible.

- Any clothing that has contacted blood or infectious fluids shall be placed in a labeled "red-bag" and then placed in the 30-gallon container for temporary storage and subsequent disposal.

1.4.1 Universal Precautions

Universal precautions is a method of infection control, which operates on the assumption that all human blood and bodily fluids are to be treated as if they are known to be infectious for HIV, HBV, or other blood-borne pathogens. Universal precautions shall be observed to prevent contact with blood or other potentially infectious materials. Universal precautions consist of the following practices:

- All workers shall routinely use appropriate barrier precautions to prevent skin and mucous-membrane exposure when contact with blood or other bodily fluids is anticipated. Gloves should be worn for touching blood and bodily fluids, mucous membranes, or non-intact skin and for handling items or surfaces contaminated with blood or body fluids. Masks and protective eyewear or face shields shall be worn during procedures that are likely to generate droplets of blood or other body fluids to prevent exposure of mucous membranes of the mouth, nose, and eyes. Protective suits shall be worn during procedures that are likely to generate splashes of blood or other bodily fluids.

- Hands and other skin surfaces shall be washed immediately and thoroughly if contaminated with blood or other bodily fluids. Hands shall be washed immediately after gloves are removed, using a disinfectant soap.

- Cardiopulmonary resuscitation barriers or other ventilation devices should be available for use in areas in which the need for resuscitation is foreseeable.

- Workers who have exudative lesions or weeping dermatitis shall be excluded from handling potentially infectious materials until the condition resolves.

- Pregnant workers should be especially familiar with and strictly adhere to precautions to minimize the risk of transmission.

1.4.2 Personal Protective Equipment

The proper use of PPE is an effective work practice control. The following requirements for PPE are mandatory whenever there is potential for employee contact with blood and bodily fluid:

- Inspect PPE prior to use to verify it is in good working order and without defects.

- Blood or other potentially infectious materials.

- Disposable (single use) gloves, such as surgical or examination gloves shall be replaced when visibly soiled, torn, punctured, or when their ability to function as a barrier is compromised. Gloves should be changed as soon as possible after contact with blood or bodily fluids. After use, remove gloves from top to bottom inside out, not allowing unprotected skin to contact the exterior of the gloves. Hands and other

skin surfaces shall be washed with disinfectant soap immediately after care has been rendered or clean up has been completed. Gloves reduce the incidence of blood contamination of hands, but they cannot prevent penetrating injuries caused by sharp objects. Do not reuse gloves once removed. A CPR barrier shall be used when administering CPR.

- Protection for the eyes, face, hands, body, feet, and against inhalation hazards shall be provided as appropriate for each job.

- Gloves shall be worn when employees have the potential for direct skin contact with or when handling items or surfaces soiled with blood, other potentially infectious materials, mucous membranes, and non-intact skin.

- Polyvinyl chloride work gloves may be disinfected for immediate reuse if the integrity of the glove is not compromised; however, gloves must be discarded if they are cracked, peeling, discolored, torn, punctured, or exhibit other signs of deterioration. All gloves shall be discarded at the conclusion of the activity or at the end of the shift – whichever comes first.

- Masks and eye protection or chin-length face shields shall be worn whenever splashes, spray, splatter, droplets, or aerosols of blood or other potentially infectious materials may be generated and there is a potential for eye, nose, or mouth contamination.

- Fluid-resistant clothing (e.g., coated Tyvek® suits) shall be worn if there is a potential for splashing or spraying of blood or potentially infectious materials. Coated Tyvek® coveralls shall also be worn during clean-up activities involving decontamination or disinfecting of surfaces and articles that have contacted potentially infectious materials, and when preparing biohazard waste for temporary storage and subsequent disposal.

- Fluid-resistant clothing (e.g., coated Tyvek® suits) shall be worn if there is a potential for clothing becoming soaked with blood or other potentially infectious materials.

- Surgical caps or hoods shall be worn if there is a potential for splashing or splattering of blood or potentially infectious materials on the head.

- Fluid-proof coverings shall be worn if there is a potential for shoes or boots to contact blood or other potentially infectious materials.

- Disposable nitrile or vinyl gloves shall be worn for touching blood and bodily fluids requiring universal precautions, mucous membranes, or non-intact skin and for handling items or surfaces soiled with blood or bodily fluids to which universal precautions apply.

1.4.3 Waste Handling

All wastes generated because of administering emergency first aid care and the subsequent clean-up activities shall be placed in red-bags, labeled as a biohazard, and kept separately from other trash. Wastes used in medical emergency treatment (i.e., gloves, towels, and gauze) shall also be bagged and stored in an identical manner. Red-bagged, biohazard waste shall be placed in the 30-

gallon collection container, labeled, and secured for temporary storage and disposal. Additional containers shall be obtained as needed and containers shall not be overfilled.

1.5 Biohazard Waste Disposal

The RWEC Transportation and Disposal Coordinator shall be contacted to arrange for proper disposal of biohazard wastes. The waste shall remain secured on site in labeled container(s) until disposal arrangements have been made at an approved disposal facility. Disposal of the infectious waste container(s) shall be in accordance with applicable local, state, and federal regulations.

1.6 Medical Requirements

The medical requirements of this exposure control plan include provisions for vaccinations to all exposed employees as well as for post-exposure procedures and evaluations. All employees with potential for occupational exposure to blood borne pathogens shall receive the hepatitis B vaccination and tetanus vaccination prior to workplace exposure.

1.6.1 Hepatitis B Vaccination

All potentially exposed employees will have made available to them, at no cost, a hepatitis B vaccination. Recombivax or Accelerated Recombivax vaccines shall be utilized. If the employee has previously received the hepatitis B vaccination and/or antibody testing reveals that the employee is immune, a new vaccination is not required. Employees may be subjected to occupational exposure immediately after receiving the first shot in the hepatitis B vaccination series. Antibody testing shall be performed 30-days after completing the hepatitis B vaccination series. Employees unable to develop immunity shall be precluded from further occupational exposure. If a physician recommends a booster dose(s), the doses shall be provided according to standard recommendations for medical practice. The employee will also receive training as to the vaccine's efficacy, safety, benefits, and consequences prior to administration. The vaccination series may also be initiated within 24-hours of an incident with exposure potential.

1.6.2 Tetanus Vaccination

All employees subject to this policy shall maintain current status documentation of their tetanus vaccination (current status for tetanus vaccination is within five (5) years). All potentially exposed employees shall be offered a tetanus vaccination at no cost.

1.6.3 Post-Exposure Procedures and Evaluation

All exposure incidents shall be reported as required by RWEC, Inc., "Accident Prevention Program: Reporting, Investigation and Review" (Current Revision). The occupational medicine physician shall be advised in addition to standard notification procedures.

Following a report of an exposure incident, each involved employee shall be offered a confidential medical evaluation and follow-up, which includes at least the following elements:

- Documentation of the route(s) of exposure.
- Hepatitis B virus and HIV antibody status of the source patient(s) (if known), and how the exposure occurred.
- The medical confidentiality rights of the source patient shall be preserved at all times.

- If the source patient can be determined and permission is obtained, collection of and testing of the source patient's blood to determine the presence of HIV or HBV infection shall be conducted under the direction of the attending physician.

- Collection of blood from the exposed employee as soon as possible after the exposure incident for the determination of HIV and/or HBV status. Actual core antibody and surface antigen testing of the blood or serum sample may be done at that time or later if the employee so requests. If the test is deferred, arrangements shall be made through the attending physician to properly archive the specimen.

- Follow-up of the exposed employee including antibody and antigen testing, counseling, illness reporting, and safe and effective post-exposure prophylaxis, according to standard recommendations for medical practice as defined by the occupational medicine physician.

Where applicable laws require employee consent, documented consent shall be obtained prior to testing. If an employee refuses the blood test, documentation of the refusal will be made. Documentation of the test results shall be made available to the exposed employee(s). All test results shall be kept confidential.

1.6.4 Physician Information

The following information shall be provided to the evaluating physician:

- Copy of 29 CFR 1910.1030 and its appendices

- Description of the affected employee's duties as they relate to the employee's occupational exposure

1.6.5 Physician Opinion

For each potentially exposed employee evaluation, the employee shall receive a copy of the evaluating physician's written opinion within 15 working days of the completion of the evaluation. The written opinion shall be limited to the following information:

- The physician's recommended limitations upon the employee's ability to receive the hepatitis B vaccination.

- A statement that the employee has been informed of the results of the medical evaluation and that the employee has been told about any medical conditions resulting from exposure to blood or other potentially infectious materials, which require further evaluation or treatment.

- Specific findings or diagnoses, which are related to the employee's ability to receive the HBV vaccination. Any other findings and diagnoses shall remain confidential.

1.6.6 Hazard Communication

There are regulatory requirements for labels, signs, and training. The provisions and exceptions for these are contained in the subsections below.

1.6.7 Warning Labels

Containers used for disposal of blood-contaminated supplies and waste will be labeled in accordance with the word "biohazard." The following symbol shall be an integral part of the label:

APPENDIX D
ROUTE TO HOSPITAL AND HEALTH RESOURCE CLINIC

Direction to Hospital:

1. Take Langley Road to Base Exit # 3 and turn north unto Road # 53.
2. Road # 53 towards Fajardo for 7.7 miles and turn right to Avenida El Conquistador
3. Drive 0.61 miles on Avenida El Conquistador and turn right to Ave. General Valero.
4. Drive 0.33 miles in General Valero Ave. Arrive at Hospital San Pablo del Este on your right.

1.1 First Aid and Medical Facilities

The following addresses first aid and medical facilities:

- Effective emergency communication devices must always be available while personnel are present at the site.

- Employees working alone in a remote location or away from other workers shall be provided an effective means of emergency communications. The selected communication must be readily available (easily within the immediate reach) of the employee and must be tested prior to the start of work to verify that it effectively operates in the area/environment. An employee check-in/check-out communication procedure shall be developed to assure employee safety.

- Emergency telephone numbers shall be posted at all RWEC-controlled telephones.

- A large first aid kit shall be provided and maintained at the project. The first aid kit shall be inspected weekly by the SSHO. A seal may be placed on first aid kits to allow for less frequent inspections, such as, if the seal is not broken, then an inspection is not required. There shall be a small first aid kit available in all project vehicles. First aid kits in project vehicles do not need to be inspected if the factory plastic wrapping is intact.

- The nearest hospital for the project is:

  Hospital San Pablo
  404 General Valero Avenue
  Fajardo, Puerto Rico
  00738
  (787) 655-5050

The route maps to the hospital shall be available in all project vehicles; however, the facility to care for serious medical emergencies shall be determined by the Emergency Medical Services responding to the incident. At a minimum, Construction Site Manager, the SSHO, and at least one other on-site employee (subcontractor) shall be certified in first aid and cardiopulmonary resuscitation (CPR) during intrusive activities. First aid and CPR training/certification must be made by a reputable provider, such as, the American Red Cross or American Heart Association.

APPENDIX E
OSHA 300 LOG

OSHA's Form 300A (Rev. 01/2004)

Summary of Work-Related Injuries and Illnesses

Year 2008

U.S. Department of Labor
Occupational Safety and Health Administration
Form approved OMB no. 1218-0176

All establishments covered by Part 1904 must complete this Summary page, even if no injuries or illnesses occurred during the year. Remember to review the Log to verify that the entries are complete

Using the Log, count the individual entries you made for each category. Then write the totals below, making sure you've added the entries from every page of the log. If you had no cases write "0."

Employees, former employees, and their representatives have the right to review the OSHA Form 300 in its entirety. They also have limited access to the OSHA Form 301 or its equivalent. See 29 CFR [illegible], in OSHA's Recordkeeping rule, for further details on the access provisions for these forms.

Total number of deaths	Total number of cases with days away from work	Total number of cases with job transfer or restriction	Total number of other recordable cases
0	0	0	0
(G)	(H)	(I)	(J)

Total number of days away from work	Total number of days of job transfer or restriction
0	0
(K)	(L)

Total number of...

(M)			
[illegible]jury	0	(4) Poisoning	0
[illegible]kin Disorder	0	(5) Hearing Loss	0
(3) Respiratory Condition	0	(6) All Other Illnesses	0

Post this Summary page from February 1 to April 30 of the year following the year covered by the form

Public reporting burden for this collection of information is estimated to average 56 minutes per response, including time to review the instruction, search and gather the data needed, and complete and review the collection of information. Persons are not required to respond to the collection of information unless it displays a currently valid OMB control number. If you have any comments about these estimates or any aspects of this data collection, contact: US Department of Labor, OSHA Office of Statistics, Room N-3644, 200 Constitution Ave. NW, Washington, DC 20210. Do not send the completed forms to this office.

Establishment information

Your establishment name Right Way Environmental Contractors, Inc.

Street Road 153 Km 8.1

City Barranquitas State PR Zip 794

Industry description (e.g., Manufacture of motor truck trailers)
Environmental restoration and construction company

Standard Industrial Classification (SIC), if known (e.g., SIC 3715)
###

OR North American Industrial Classification (NAICS), if known (e.g., 336212)
###

Employment information

Annual average number of employees 27

Total hours worked by all employees last year 44,167

Sign here

Knowingly falsifying this document may result in a fine.

I certify that I have examined this document and that to the best of my knowledge the entries are true, accurate, and complete.

Pedro Tejada — Company executive

Vice-President — Title

787-857-8832 — Phone

17-Jan-09 — Date

APPENDIX F
ADVERSE WEATHER CONDITIONS PLAN

1.0 ADVERSE WEATHER CONDITIONS PLAN

1.1 Adverse Weather Conditions/Natural Disasters

Personnel should be aware of the possibility for the occurrence of severe weather such as hurricanes, lightning, thunderstorms, or high winds. Necessary precautions or response, directed by the Construction Site Manager, will be taken in the event of severe weather. For example, outdoor operations will be suspended when the potential for lightning occurs. Local weather broadcasts will be monitored by the Construction Site Manager or SSHO when the likelihood for severe weather exists. Voice, phone, or radio communication will be utilized to alert crews to threatening weather. A severe weather shelter shall be identified and the location communicated with the crew(s) upon project mobilization.

1.1.1 Storm Procedures

If weather authorities issue a gale warning or warn of any other storm of greater magnitude, such as a hurricane, the site shall be secured to protect personnel, nearby residents, and surrounding property. At a minimum, the following procedures should be implemented:

- Monitor emergency radio frequency
- Close all openings in pipelines, tanks, drums, or similar material containers
- Remove loose materials, tools, and other equipment from open areas; secure all work items

All work activities will stop and be evaluated when winds are greater than 25 miles per hour. During wind conditions of 15 to 25 miles per hour, dust control measures will be upgraded, and specific hazards due to high winds must be evaluated for control.

1.1.2 Hurricane Procedures

NAPR requires that site be secured and contractors' personnel move off the base 24 hours before Condition 1 exists**.**

Unless otherwise directed by the AFCEE COR, comply with the following guidelines:

- ***Condition One***—(sustained winds of 50 knots/57.5 mph or greater expected within 12 hours): Secure the job site. Continue recommended evacuation of personnel.

- ***Condition Two***—(sustained winds of 50 knots/57.5 mph or greater expected within 24 hours): Control or cease routine activities until securing operation is complete. Reinforce or remove formwork and scaffolding. Secure machinery, tools, equipment, and materials, or remove from the job site. Begin recommended evacuation of personnel.

- ***Condition Three***—(sustained winds of 50 knots/57.5 mph or greater expected within 48 hours): Maintain "Condition Four" requirements and commence securing operations necessary for "Condition One" that cannot be completed within 18 hours.

- ***Condition Four***—(sustained winds of 50 knots/57.5 mph or greater expected within 72 hours): Perform normal daily job-site cleanup and maintain good housekeeping practices. Collect scrap lumber, waste material, and rubbish for removal and disposal

at the close of each workday. Maintain good housekeeping at the construction site, including storage areas. Stack form lumber in neat piles less than four (4) feet high.

1.1.3 Lightning Safety

Outdoor activities will be suspended when the potential for lightning occurs. The following measures, offered by the National Lightning Safety Institute of Louisville, Colorado shall be taken to minimize the possibility of injury to personnel by lightning:

- The Construction Site Manager or SSHO is responsible to monitor weather conditions.

- Upon seeing lightning or hearing thunder, outdoor activities shall be suspended and personnel shall be evacuated to safe areas (i.e., inside vehicles or buildings). When clouds with dark bases and wind speeds pick up, anticipate thunderstorms. Those who have been struck by lightning did not seek cover in a timely fashion.

- The Construction Site Manager or SSHO will continue to monitor weather conditions.

- Outdoor activities may resume 30-minutes after the last bolt of lightning was observed and the last clap of thunder was heard.

People who have been struck by lightning do not carry an electrical charge and are safe to handle. Apply first aid immediately, if you are qualified to do so. Get emergency help promptly.

Safe areas include:

- Fully enclosed metal-topped vehicles with windows up
- Substantial and permanent buildings

Unsafe areas include:

- Small structures including huts and rain shelters

- Nearby metallic objects like fences, gates, instrumentation and electrical equipment, wires, and power poles

The following shall be avoided when lightning is in the area:

- Trees
- Water
- Open fields
- Using hard-wired telephones and headsets

If hopelessly isolated from shelter during close-in lightning, adopt a low crouching position with feet together (up on toes, if possible) and hands on ears. If hair stands on end or rises on back of neck, a lightning strike is imminent.

Remember the warning phrase from the National Lightning Safety Institute: “If you can see it (lightning), flee it; if you can hear it (thunder), clear it.”

1.2 Emergency Equipment

At a minimum, the following emergency equipment shall be maintained at the project site(s):

- Fire extinguishers
- First aid kits
- Blood borne pathogen control supplies or kit
- Emergency eyewash, if corrosive materials are being used
- Spill control
- Communication devices

This equipment is to be inspected by the Construction Site Manager or SSHO on a weekly basis to verify that they are in good condition, ready to use, and easily accessible. Note: a seal may be maintained on first aid kits to indicate if the kit has been accessed within the preceding week. The weekly inspection of the first aid kit will only be necessary if the seal has been broken.

1.3 Critique and Follow-Up of Emergency Procedures

The Program HSM and AFCEE COR shall be verbally notified immediately and receive a written notification within 24 hours of all accidents or incidents including releases, fires, or explosions. The report shall include the following items:

- Name, organization, telephone number, and location of the contractor
- Name and title of the person(s) reporting
- Date and time of accident/incident
- Location of accident/incident
- Brief summary of accident/incident including pertinent details, such as, type of operation ongoing at time of accident
- Cause of accident/incident, if known
- Casualties
- Details of any contamination
- Estimated property damage, if applicable
- Nature of damage, effect on contract schedule
- Action taken by RWEC to maximize safety and security
- Other damage or injuries sustained (public or private)

The Construction Site Manager and SSHO will investigate the cause of the incident to prevent its re-occurrence. The investigation should begin as soon as practical after the incident is under control but not later than the first workday after the incident. Investigations will follow the procedures described below:

- Interview witnesses and participants as soon as possible or practical
- Determine the chronological sequence of events (opinions as to cause should not be solicited at this time)
- Note any movement, sounds, noises, or other sensory perceptions experienced by the participants or witnesses
- Obtain weather data
- Ascertain the location and position of all switches, controls, etc.
- Verify the condition of all safeguards
- Determine if a revision to emergency procedures is warranted

After the facts have been collected, causal factors should be identified and controlled/eliminated

APPENDIX G
ACCIDENT PREVENTION PLAN

1.0 ACCIDENT PREVENTION PLAN

This section addresses general safety areas specified in Appendix A of the EM 385-1-1, *Safety and Health Requirements Manual* (USACE, 2003), as components of the Accident Prevention Plan.

1.1 Project Safety Goal

Safety is RWEC's highest priority. Right Way Environmental Contractors, Inc. and project personnel have targeted a goal of zero injuries, illnesses, and environmental incidents for the duration of this project. All activities shall be conducted in a manner that supports this goal.

1.2 Indoctrination of New Employees

Both RWEC and subcontractor personnel are required to attend a safety-orientation meeting prior to commencing work. Safety-orientation meetings shall be documented and kept on file. Refer to Section 9.3 for an outline of the information that is conveyed to all personnel.

1.3 Fire Prevention and Protection

This section details fire prevention and protection procedures/resources to be used at each project.

1.3.1 Workplace Fire Hazards

The primary fire hazards at the NAPR project consist of fueling operations, storage of fuels and other flammable liquids at the project site, and welding and cutting activities.

1.3.2 Potential Ignition Sources

The potential ignition sources at the project include smoking materials, welding/cutting equipment, vehicle/equipment exhaust, catalytic converters, and engine block surfaces. Personnel shall also be alert for other ignition sources such as, static electricity, lightning, and electrical equipment.

1.3.3 Fire Control Systems, Equipment, and Procedures

Depending on the nature and extent of any fire, the following fire control systems and equipment shall be evaluated or provided at the project:

- The Chief, Ceiba Airport Fire Department shall be contacted, prior to beginning new operations at the project site. The Chief, Ceiba Airport fire Department shall also be contacted at the conclusion of operations.

- Fire extinguishers shall be available at all active work areas. Project vehicles and heavy equipment shall also be equipped with fire extinguishers.

- A RWEC Hot Work Permit is required before a flame or spark-producing activity is to commence (Section 4.2.3). A Cutting, Welding, and Brazing Permit may also be required from the Ceiba Airport Fire Department.

- The AHA for fueling operations shall be followed.

- Flammable and oxidizing materials shall be stored in marked (No Smoking, Matches, or Open Flame) flammable materials storage areas with fire extinguishers available.

- Smoking shall only be permitted in designated areas. Personnel shall never discard cigarette butts into the environment while working at the project.

- All fires, no matter how small, shall be reported to the NAPR and Ceiba Airport Fire Department immediately.

- Project personnel are only permitted to extinguish small fires in their incipient stages.

- Fighting fires is prohibited by project personnel and shall only be performed by fire department personnel (Section 11.5).

1.3.4 Fire Control Equipment Maintenance Responsibilities

Subcontractors are responsible for performing the monthly inspections and obtaining annual service for all fire extinguishers used at the project. Vehicle and heavy equipment operators are responsible for the inspection of fire extinguishers on vehicles/equipment. The Construction Site Manager or SSHO is responsible for verifying the monthly inspections and annual service of all fire extinguishers used at the project are completed.

1.4 Housekeeping

Housekeeping shall be a priority at each project site. The following provisions are specified to maintain a high standard of housekeeping:

- The importance of housekeeping and the expectations that good housekeeping shall be maintained will be regular topics of the morning safety meetings.

- Job sites and work areas shall be cleaned up on a daily basis.

- All subcontractors are required to maintain good housekeeping practices.

- Dumpsters and adequate waste/trash receptacles shall be provided as necessary in sufficient quantities in active work areas and are to be emptied regularly.

- Housekeeping is an operational/safety item, which shall be regularly considered during routine inspections.

- Nails shall be bent-over or removed from scrap lumber immediately.

1.5 Mechanical Equipment Inspections

Before any machinery or mechanized equipment is placed in use, it shall be inspected and tested in accordance with the manufacturer's recommendations and requirements of the EM 385-1-1, *Safety and Health Requirements Manual* (USACE, 2003) and shall be certified in writing by a competent person to meet the manufacturer's recommendations and requirements of the manual. Subsequent re-inspections will be conducted at least annually thereafter. All safety deficiencies noted during the inspection shall be corrected prior to the equipment being placed in service at the project. If at any time the machinery or mechanized equipment is removed and subsequently returned to the project (other than equipment removed for routine off-site operations as part of the project), it shall be re-inspected and recertified prior to use. All heavy equipment shall be inspected by each operator prior to use on the project and shall then be inspected on a daily basis. Daily inspections shall be documented on the Daily Equipment Inspection form. All small equipment shall be inspected by each operator prior to use on the project and shall then be inspected according to manufacturer recommendations on a daily basis. Deficiencies in the equipment shall be noted on the form. All inspection documentation shall be submitted to the Construction Site Manager or SSHO prior to using the equipment if safety deficiencies are observed and at the end of the day if no safety deficiencies are observed.

The SSHO shall immediately evaluate the inspection forms and determine if the equipment is in need of immediate repairs and if it should be "red tagged" and taken out of service. If the equipment is taken out of service, then the equipment shall not be used until the Construction Site Manager or SSHO is satisfied that the necessary repairs have been made. For minor deficiencies that do not compromise the safe operation of the equipment, repairs shall be made at the discretion of the equipment owner.

APPENDIX H
SAFETY PLAN ACKNOWLEDGEMENT

WORKER ACKNOWLEDGEMENT TO HEALTH-AND-SAFETY PLAN

I have been informed of, and will abide by, the procedures set forth in the SSHSP developed for the NAVAL ACTIVITY PUERTO RICO site. I have also been provided with an opportunity to read this SSHSP and the hazard communication program. I also have been properly trained, medically monitored, and fit tested for the work that I am to perform.

Name	**Date**

APPENDIX I
HEALTH AND SAFETY PLAN AMENDMENT DOCUMENTATION FORM

Site Specific Health & Safety Plan
Amendment Documentation

Project Name: **Project No.**

Amendment No. **Date:**

The Amendment Addresses the Following Sections:

Task(s) Amendment Affects:

Reason For Amendment:

Amendment:

Completed by: **Approved by:**