



# ***FINAL WORK PLAN FOR CONTAMINATED SOIL REMOVAL PICO DEL ESTE RADAR FACILITY***

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## ***CARIBBEAN NATIONAL FOREST LUIQUILLO, PUERTO RICO***



*Prepared for:*



**Department of the Navy  
NAVFAC SOUTHEAST**  
*North Charleston, South Carolina*

*Prepared by:*

Right Way Environmental  
Contractors, Inc.  
Naranjito, Puerto Rico

Contract No. N69450-08-C-0093

December 12, 2011

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**Corrective Action for SWMUs 14, 56, 68, and 69  
Contract Number N69450-08-C-0093**

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**WORK PLAN FOR CONTAMINATED SOIL REMOVAL**  
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**LUIQUILLO, PUERTO RICO**

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**RIGHT WAY ENVIRONMENTAL CONTRACTORS, INC.**  
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- Appendix E – Submittal Register
- Appendix F – Project Schedule
- Appendix G – Site Specific Health and Safety Plan
- Appendix H – Technical Specifications

## LIST OF ACRONYMS AND ABBREVIATIONS

AHA	Activity Hazard Analysis
ANSI	American National Standards Institute
Baker	Michael Baker Jr., Inc.
bgs	Below Ground Surface
BRAC	Base Realignment and Closure
BTEX	Benzene, Toluene, Ethylbenzene, and Xylenes
CAOs	Corrective Action Objectives
CD	Construction Debris
CFR	Code of Federal Regulations
CIH	Certified Industrial Hygienist
CO	Contracting Officer
COR	Contracting Officer's Representative
CQC	Contractor Quality Control
DFW	Definable Features of Work
DI	Deionized
DPW	Department of Public Works
DQCR	Data Quality Control Report
DRO	Diesel Range Organics
EBS	Environmental Baseline Survey
El Yungue	El Yungue National Forest
EM	Engineering Manual
EQB	Puerto Rico Environmental Quality Board
FAA	Federal Aviation Administration
FVR	Field Variance Report
kg	Kilogram
MDLs	Method Detection Limits
mg	Milligram
MS/MSDs	Matrix Spike/Matrix Spike Duplicates
NAVFAC	Naval Facilities Engineering Command Atlantic Division
NCR	Nonconformance Report
NDE	Nondestructive Examination
NEPA	National Environmental Policy Act
NPDES	National Pollutant Discharge Elimination System
NTR	Navy Technical Representative

## LIST OF ACRONYMS AND ABBREVIATIONS

(continued)

OSHA	Occupational Safety and Health Administration
PAHs	Polynuclear Aromatic Hydrocarbons
PGM	Program Manager
PM	Project Manager
PMO	Program Management Office
PPE	Personal Protective Equipment
ppm	Parts Per Million
PREQB	Puerto Rico Environmental Quality Board
PRGs	Preliminary Remediation Goals
PVC	Polyvinyl Chloride
QA	Quality Assurance
QA/QC	Quality Assurance/Quality Control
QC	Quality Control
QCSM	Quality Control Systems Manager
RWEC	Right Way Environmental Contractors, Inc.
SAP	Sampling and Analysis Plan
SE	Southeast
SHM	Safety and Health Manager
SOW	Statement of Work
SSHO	Site Safety and Health Officer
SSHSP	Site Specific Health and Safety Plan
TPH	Total Petroleum Hydrocarbons
US	United States
USACE	United States Army Corp of Engineers
USEPA	United States Environmental Protection Agency
VOCs	Volatile Organic Compounds

## **1.0 INTRODUCTION**

This document provides overall guidance for the successful completion of contaminated soil removal at the Pico del Este Radar Facility site, located in the Caribbean National Forest, near Luquillo, 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 performed by Right Way Environmental Contractors, Inc. (RWEC) and its subcontractors under the above-referenced contract.

This document is divided into nine sections. Section 1 introduces the document, provides site location, background and history, the project statement of work (SOW), and the corrective action 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: Remedial Design for Contaminated Soil Removal
- Appendix B: Organizational Chart
- Appendix C: Sampling and Analysis Plan (SAP)
- Appendix D: Quality Control (QC) Forms
- Appendix E: Submittal Register
- Appendix F: Project Schedule
- Appendix G: Site Specific Health and Safety Plan (SSHSP)
- Appendix H: Technical Specifications

### **1.1 Purpose**

This Work Plan has been prepared to provide overall guidance for the successful completion of fieldwork described in the project statement 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 Current Site Conditions**

The Pico del Este Radar Facility is located near the center of the eastern end of the main island of Puerto Rico within the Caribbean National Forest, also referred to as the El Yunque National Forest (El Yunque), in the Luquillo Mountains, as shown on Figure 1-1. The Caribbean National Forest is considered a rainforest, with a climate that is frost-free. It can receive up to 240 inches of rainfall per year in some areas, and is typically cooled by strong easterly trade winds. The temperature in the higher elevations is typically 10 to 20 degrees cooler than nearby coastal areas ([www.welcome.topuertorico.org](http://www.welcome.topuertorico.org), Riveria, 2007).

The radar/communications complex lies at the top of a mountain peak (Pico del Este or “East Peak”) at an elevation of approximately 3,500 feet above sea level. The site is surrounded on all sides by undeveloped, heavily forested lands. The site was formerly used by the Navy as a radar facility to track various weapons systems and communications during military training exercises. Its use by the Navy was discontinued in early 2003 (NAVFAC, 2003). Currently, the Federal Aviation Administration (FAA) is licensed to use the site as a radar facility (Baker, 2009). A site map is presented on Figure 1-2, depicting the radar facility layout.

### **1.3 Geology**

The rocks underlying the Luquillo Mountains were formed by active volcanoes at or near sea level during the Cretaceous and Tertiary geological periods. Debris from these volcanoes was deposited in deep water after being moved by submarine landslides and currents. Later tectonic activity uplifted this debris and it became the dominant structure of the Luquillo Mountains. The Luquillo Mountains are composed mainly of igneous rock formed in the Cretaceous period, with some intrusive materials from the Tertiary ([www.elyunque.com](http://www.elyunque.com), Mowbray, 2007).

### **1.4 Previous Investigations**

An Environmental Baseline Survey (EBS) was performed by the Navy in 2003 on the Pico del Este Radar Facility site in support of a proposed real estate transaction (NAVFAC, 2003). The EBS report documents a diesel fuel spill which occurred on the site in April 2002. A broken seal on a fuel feed pump caused a release of diesel fuel from the emergency generator formerly housed in Building 3034. According to the EBS report, the approximate aerial extent was 116 square feet of soil that was contaminated during this release. The report also states that the contaminated soil was removed and properly disposed off site, and the excavated areas were restored with clean backfill.

Seven surface soil (0 to 1 foot below ground surface [bgs]) samples were collected as part of the EBS. Four of the seven soil samples reportedly exceeded the Puerto Rico Environmental Quality Board (EQB) Cleanup Standard of 100 milligram (mg)/kilogram (kg) for Total Petroleum Hydrocarbons (TPH) Diesel Range Organics (DRO). Benzene, Toluene, Ethylbenzene, and Xylenes (BTEX) were not detected above the method detection limits (MDLs) for each parameter at the seven surface soil sample locations.

In 2007, a site investigation was performed at the Pico del Este Radar Facility. Fourteen surface soil samples along with three duplicate samples and two matrix spike/matrix spike duplicates (MS/MSDs) were collected and analyzed for Appendix IX volatile organic compounds (VOCs), Low-level polynuclear aromatic hydrocarbons (PAHs), and TPH DRO. Analytical results were compared to United States Environmental Protection Agency (USEPA) Region IX Residential Soil Preliminary Remediation Goals (PRGs), Industrial Soil PRGs and the EQB Soil Screening Criteria for DRO. Twenty eight subsurface soils samples along with two duplicate samples and one MS/MSD were collected and analyzed for Appendix IX VOCs, Low-level PAHs, and TPH DRO. Analytical results were compared to USEPA Region IX Residential Soil PRGs, Industrial Soil PRGs and the EQB Soil Screening Criteria for DRO.

Surface soil samples collected in January 2008 included 18 samples, two duplicates and one MS/MSD taken at locations outside of the fence line, within the Caribbean National Forest. These samples were analyzed for TPH DRO. Analytical results were compared to the EQB Soil Screening Criteria for DRO. DRO was found at concentrations exceeding the EQB DRO soil screening criteria in some surface soil samples located outside the perimeter fence however, no individual VOC or PAH parameters exceed the USEPA Regional Screening Levels (USEPA,

2009). No subsurface soil samples were collected in the US National Park, outside the fence, due to the sensitive nature of the rainforest ecosystem. It was decided by Puerto Rico Environmental Quality Board (PREQB), EPA, the United States (U.S.) Navy, and the U.S. Forestry Service that excavation of contaminated soil would not be performed outside of the perimeter fence line due to the potential detrimental effects on the rainforest ecosystem. It is expected that once the point source area of the DRO contamination is removed, the residual DRO that remains within the soil will eventually biodegrade.

### **1.5 Project Statement of Work**

The objective of this project is to remove TPH DRO contaminated soil within the radar facility site to below 100 mg/kg, the established Corrective Action Objective (CAO) for the Pico del Este Radar Facility. All work to be conducted as part of this project will be in accordance with the remedial design for the contaminated soil removal developed for the Pico del Este Radar Facility site. The overall objective of the soil removal is the protection of human health and the environment by removal of contaminated soil to established remedial goals.

The following activities will be performed:

- Coordinate schedule with the Navy Technical Representative (NTR);
- Get appropriate clearance and identification for all personnel and vehicles;
- Survey and stake all planned excavation areas in accordance with boundaries given in the design documents ensuring that all removal work is confined to within the fence line;
- Set up equipment lay down area;
- Construct a lined, bermed soil staging area;
- Construct a lined, bermed equipment decontamination pad
- 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, as appropriate;
- Once excavation limits are reached or until excavation cannot be advanced further due to obstructions (e.g. bedrock, structure foundation limits, or utilities), collect

confirmation samples for laboratory analysis in accordance with the SAP (Appendix C);

- If confirmation sample results indicate contaminant concentrations are below corrective action objectives (i.e. DRO levels below 100 mg/kg), discontinue excavation activities and backfill excavations;
- Collect any additional waste characterization samples as required by waste disposal facilities and complete profile acceptance;
- Transport waste soil to appropriate disposal facilities using all required manifesting;
- Backfill and compact excavation with approved “clean” soil, meeting requirements as described in Section 4.7 of this Work Plan and Tables 3-1 and 3-2 of the SAP;
- Re-vegetate site.
- Restore the entire site to pre-construction conditions, including repair of the fence in the event of damage;
- Demobilize from the site;
- Obtain final disposition documentation from disposal facility;
- Produce closeout reports.

A brief overview of the primary corrective measures and objectives for the removal of contaminated soil at the Pico del Este Radar Facility site is provided as follows:

- Excavation of approximately 480 cubic yards of TPH DRO contaminated soil from a depth ranging from approximately 1 feet bgs northeast of Building 3034 (in the vicinity of PESB01, PESB03 and PESB04) to approximately 15 feet bgs east and southeast of Building 3034 to the fence line. Also included in this volume are the two areas located around PESB10 and PESB12.
- While previous sampling results indicate that TPH DRO contamination appears to exist beyond the limits of the radar facility site, soil excavation will not extend beyond the perimeter fence line, beneath Building 3034, or the concrete pad. No confirmatory samples will be collected adjacent to these structures.

## **1.6 Corrective Action Objectives**

The remedial goal of 100 mg/kg for DRO in the soil at the Pico del Este Radar Facility site is based upon Commonwealth Government of Puerto Rico, Office of the Governor, Environmental Quality Board, Underground Storage Tank Control Regulation, Rule 205.C, the current property use, the future use of the parcel as a radar facility, and the most likely future potential human and ecological receptors.

## **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 statement 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:

Debbie Sanders  
Base Realignment and Closure (BRAC) Program Management Office, Southeast  
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 soil removed. 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, Southeast  
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 – Department of Public Works**

Pedro Ruiz represents the U.S. Navy Department of Public Works (DPW) and has the responsibility for Navy oversight of field activities on the main island of Puerto Rico, including assisting on site contractors with site background information and all other issues not related to contracts.

### **2.3 U.S. Environmental Protection Agency – Region 2**

Tim Gordon has overall responsibility to ensure the environmental program on the main island of Puerto Rico is in compliance with the USEPA environmental program. USEPA will be provided a copy of the project plans and the project closeout report for informational purposes only.

### **2.4 Puerto Rico Environmental Quality Board**

Wilmarie Rivera and Gloria Toro have overall responsibility to provide regulatory oversight for Puerto Rico's Environmental Quality Board (EQB). EQB will review the project documents to ensure they meet all applicable requirements.

### **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 Quality Control (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 budgets 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 communicate 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 Quality Control Officer;
- Assign and track site safety and health responsibilities by reviewing site safety and health documentation and communication with the Site Safety and Health Officer (SSHO);
- 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 Quality Control System Manager (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 Safety and Health Manager**

The Safety and Health Manager (SHM) for this contract is Felix Gonzalez, Certified Industrial Hygienist (CIH). He has the overall responsibility for the RWEC Corporate Safety and Health Program.

The SHM 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 SHM is responsible for all aspects of the Site Specific Health and Safety Plan (SSHSP). The SHM will provide overall direction of safety and health functions perform safety inspections and document reviews as required by the SSHSP. Any proposed deviations from the SSHSP or changes in the expected site conditions are immediately presented to the SHM for consideration and approval. The SHM 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 Rodriguez. The QC Officer is responsible for the implementation of the Contractor Quality Control (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 Project Manager 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.

The QC Officer will report any deficiencies immediately to the PGM and PM 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.

### **2.5.7 Site Safety and Health Officer**

Felix Gonzalez will also serve as the Site Safety and Health Officer (SSHO) in addition to his role as SHM. In this role, Mr. Gonzalez will be responsible for ensuring all work is conducted in compliance with the SSHSP. The SSHO will communicate with the PM on day-to-day health and safety issues. For functional safety issues, the SSHO has the authority to enforce all safety and health issues in the field, including the authority to stop work for safety violations and as a result of nonconformance with the SSHSP. No field activities will be performed at any time without the presence of the SSHO, The SSHO will remain on site for the duration of any field activities.

### **2.5.8 Site Personnel**

All site personnel will be required to adhere to the procedures set forth in this Work Plan. The QC Officer and the SSHO 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 SSHSP. All site personnel will report and coordinate all field activities through the Site Superintendent.

## **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/SSHO will be responsible for ensuring that subcontractors perform all aspects of the work in accordance with the CQC Plan and SSHSP.

### **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.

#### **3.2 Site Controls**

RWEC will erect temporary construction barriers (i.e., fencing or caution tape) around active work sites where necessary to deter entry by unauthorized personnel. Barriers will meet the standard of the United States Army Corps of Engineers (USACE) Engineering Manual 385-1-1 for Class III perimeter protection (USACE 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. The existing fence that separates the radar facility site from the El Yungue will be used as a barrier, as appropriate.

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. To avoid confined space entry requirements any excavation over 4 feet deep, all confirmatory samples will be collected from excavator bucket at the existing ground surface. No one will enter excavations over 4 feet deep. In addition, RWEC will conform to all requirements of OSHA Standard 29 CFR 1926 and USACE Engineering Manual 385-1-1 for sheeting/shoring/sloping of excavation sidewalls to insure a safe and stable excavation. RWEC will take preventative measures to avoid undermining or damaging existing structures (e.g. Building 3034, perimeter fence and concrete pad) from excavation activities.

RWEC's Emergency Response Plan is contained in the SSHSP, which is included as Appendix G of this plan. The SSHSP 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**

Heavy equipment will be decontaminated by dry means (e.g., brushes and 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).

The excavator bucket will be decontaminated using both dry means and a power washer, water-soap solution prior to collecting each confirmation soil sample.

#### **3.5.1 Dry Decontamination**

- As a first measure in decontamination, use shovels and brooms to remove large dirt clods and debris. If possible, lift and spin tracks to loosen material;
- Collect solids and combine with excavated “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 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, staged, and characterized as described in the SAP (Appendix C);
- Allow equipment to air dry.

#### **3.5.3 Sample Equipment Decontamination**

It is not possible to exclusively use disposable sampling equipment, therefore non-disposable sampling equipment will be decontaminated. Hand augers, 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. The following procedures will be used to decontaminate field sampling equipment and personal protective equipment at least 24 hours before sampling::

- Rinse with potable water. This step will decrease the gross contamination and reduce the frequency at which the non-phosphate detergent and water solution need to be changed. Change the water frequently;
- Wash with non-phosphate detergent (Alconox) or equivalent laboratory-grade

detergent and potable water solution. This step will remove remaining contamination from the equipment. Dilute the detergent as directed by the manufacturer;

- Rinse with potable water. This step will rinse the detergent solution away from the equipment. Change the water frequently;
- Triple-rinse with deionized water. This step will rinse any detergent solution and potable water residues. Rinsing will be done by applying the deionized water 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;
- Remove oil, grease, or free product contaminant by rinsing equipment with pesticide-grade methanol;
- Rinse with distilled or deionized (ASTM Type II) water;
- Rinse with pesticide-grade hexane;
- Rinse with distilled or deionized (ASTM Type II) water;
- Allow equipment to air dry. If sampling device will not be used immediately after being decontaminated, wrap equipment with oil-free aluminum foil and cover with plastic;
- Decontamination fluids will be placed in drums or tanks and staged for disposal in accordance with SAP (Appendix C).

Wherever possible, disposable equipment will be used to minimize the amount of field decontamination that will be required.

### **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 may be required. These permits will be requested by RWEC. The basis of the permit request will be the directive from EQB. RWEC will be responsible for obtaining Puerto Rico EQB permits, if necessary.

#### **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 and Appendix H.

The following subsections provide details of the field activities associated with the soil removal at the Pico del Este Radar Facility.

##### **4.1 Mobilization and Site Preparation**

RWEC will mobilize a Site Superintendent/QC Officer/SSHO. 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 the design drawings and Erosion and Sedimentation Control 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. The subcontracted surveyor will field mark the removal limits of each excavation area with flagging to include the appropriate depths. Surveys will be tied into local reference points as indicated on the remedial design documents. The limits of the soil removal will not extend beyond the fence line on the radar facility site's southern and eastern boundary.

##### **4.3 Rainforest Delineation**

Before intrusive work is initiated, the fence line will be marked with flagging designating the limits of soil removal activities. Under no circumstances shall soil removal work be performed beyond the limits of the radar facility fence line into the Caribbean National Forest.

##### **4.4 Excavation Procedures**

As depicted on Figure 4-1, nine areas totaling approximately 1,128 square feet in aerial size containing DRO contaminant at levels exceeding 100 mg/kg shall be excavated at depths ranging from approximately 1 to 5 feet bgs northeast of Building 3034 (in the vicinity of PESB01, PESB03 and PESB04) to approximately 15 bgs east and southeast of Building 3034 to the fence line. This includes three square shaped areas surrounding PESB09, PESB10, and PESB12. In total, it is estimated that 480 cubic yards of DRO contaminated soil will be excavated from the site. Excavation refusal may occur due to presence of existing structures or rock outcrops, thereby the proposed vertical or horizontal limits may not be achieved.

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 Site Specific Health and Safety Plan (SSHSP) and as determined on site by the SSHO. There will be no entry permitted into an excavation over 4 feet in depth. Confirmation samples will be collected from excavator bucket in soils removed from the required sampling depths and locations. Additionally, confirmation samples will be collected along all sidewalls of each excavation.

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 provided 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. It is imperative that construction not extend beyond the fence line into the Caribbean National Forest. If construction inadvertently occurs beyond the fence line, into the Caribbean National Forest, work should halt immediately and the COR shall be notified.

#### **4.5 Material Handling, Staging and Loadout**

Details of the waste management procedures are described in Section 3 of the SAP (Appendix C). Specifically, for waste soil, the excavated material will be stockpiled in the staging pads for subsequent characterization/profiling, loading, and transport to and disposal at a Navy and PREQB approved facility. Staging areas will be lined with 20-mil polyethylene sheeting and berms will be created using straw bales or polyvinyl chloride (PVC) piping placed around the perimeter of the staging pad. Stockpiles 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. At the end of each day, the polyethylene sheeting will be secured with straw bales or sandbags to prevent disruption by wind or heavy precipitation. Stockpiles and staging areas will be inspected weekly or after rain events for liner and berm integrity and inspection comments will be noted on the DQCR.

During excavation activities, samples will be collected from the waste soil stockpile at a rate of 1 sample per 25 cubic yards of waste for disposal characterization. The characterization samples will be collected and analyzed to determine proper off-site disposal facility. Excavated soil will be analyzed as summarized in Table 3-1 of the SAP.

A hydraulic excavator will be used to remove the contaminated soil in stages starting with the deepest excavation areas to avoid working in excavated areas and potential for migration of contaminants. The excavator will be strategically located to allow it to remain in place while depositing the excavated soil on to the lined stockpile area. 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 SSHSP and as determined on-site by the SSHO.

#### **4.6 Sampling and Analysis**

As part of the soil removal project, RWEC will collect representative samples. Sampling activities for this project include waste characterization sampling for excavated soil, confirmation sampling for remaining soil at bottom and sidewalls of excavation, off-site backfill material characterization, and waste characterization sampling for other incidental 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. The excavation limits and soil confirmation sample locations will be surveyed for final documentation.

#### **4.7 Backfill and Site Restoration**

Backfill and site restoration will be performed in accordance with the project plans and technical specifications. The term “clean” or “certified-clean” backfill is determined by contaminant analysis and industrial soil screening level goals as presented in EPA Regional Screening Level (RSL) Summary Table (USEPA 2010). Soil samples with analyte values below the screening criteria will be considered clean.

RWEC will maintain a clean site by disposing of any generated construction debris (CD) on a regular basis. CD will be stored within the designated work areas and will be disposed as directed by the NTR. Once project activities are completed, RWEC will restore the site to its original condition to the extent possible, including, if needed, repair of the fence line separating the radar facility from the Caribbean National Forest, buildings, foundations, roadways, curbs, utilities, and concrete pad. However, RWEC will not restore or replace trees that are damaged or removed for site access or as a result of soil removal activities. Surplus materials, rubbish, temporary structures, barricades, and project signs will be removed from the site.

Upon completion of excavation and satisfactory confirmatory sampling activities, site restoration will begin. Restoration consists of backfilling the excavation with clean borrow source material from an NTR-approved offsite source. Refer to the SAP (Appendix C) for backfill sampling requirements.

The fill soil material will be tested to determine its chemical and geotechnical properties. Fill soil will achieve the required composition and placed in accordance with (Appendix H) Technical Specifications. A 6-inch layer of certified-clean topsoil will be used to restore the surfaces of all excavation areas. The chemical and physical composition of the topsoil will be in accordance with the SAP Tables 3-1 and 3-2 and Appendix H, Technical Specifications..

Final grading will provide positive drainage of surface water across the restored area, 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 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, fences, 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 or an acceptable alternative and fertilizer.

## **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. No construction activities shall be performed within the Caribbean National Forest. 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 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 to determine an appropriate haul route for equipment and material, and the 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 and Sedimentation Control Plan**

The Erosion and Sedimentation Control (ESC) Plan to be implemented during excavation and restoration at the Pico del Este Radar Facility are temporary measures to be implemented only during these construction activities. The ESC Plan describes the measures to be used during construction to protect natural resources outside the limits of work. RWEC is responsible for implementing, enforcing, maintaining, and revising the ESC plan based on changing site conditions.

Silt fencing has been selected as the best management practice (BMP) for temporary control of off-site erosion and sedimentation from rainfall at the site. The BMP will provide storm water management by minimizing or preventing storm water pollution. The silt fence shall be installed in accordance with the drawings provided in Appendix A, Remedial Design for Contaminated Soil Removal. RWEC is responsible for installing, monitoring, and maintaining all temporary BMPs through the duration of the work, removing BMPs when they are no longer necessary and establishing final erosion control vegetation upon completion of project.

Established vegetation over all disturbed areas will be the final permanent erosion and sediment control measure for this site. Final site stabilization will be implemented at the completion of backfilling activities. Seeding and mulch to establish vegetation will be in accordance with the technical specifications. The BMPs will be removed within 30 days after final site stabilization is achieved, vegetation established, and approved by the NTR.

#### **5.4 Spill Control Plan**

RWEC will be responsible for any spills or leaks caused by its operations during the performance of this a. 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 lining soil stockpile areas with polyethylene sheeting; installing liners inside rolloff boxes; carefully loading soil into trucks to avoid spillage; and always using good work practices to avoid unnecessary spillage.

##### **5.4.1 Spill Response**

The following requirements will be addressed for a spill of a suspected hazardous material:

- Take immediate measures to control and contain the spill to prevent releases into sewers to surface water;
- Notify the NTR immediately;
- Notify the local 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.

Refer to the SSHSP 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 SSHSP 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 potable 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 SSHSP. The particulate (dust) concentration and action levels will be determined and documented as described in the SSHSP, 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. All equipment will be decontaminated prior to arrival at the site as another means of contamination prevention. Onsite handling of soils will occur during excavation, loading, and sampling activities. Soil that is stockpiled on site will be stored on a polyethylene liner, surrounded by a berm, and covered with polyethylene to prevent contaminant migration.

Exclusion zones will be established within the work areas by the SSHO. 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 PLAN**

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. This section also covers actual procedure selection, control, monitoring, change, and application to remedial measures and construction activities outlined in the project statement of work.

### **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, the QCSM (or designated

representative), the SHM/SSHO, as required. Minutes of these meetings will be recorded by the project QC Officer and distributed to all participants. The CQC Plan will then 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 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 SSHO 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 project contracts.

### **6.2.3 Daily Safety and Coordination Meetings**

The Site Superintendent and the SSHO 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 QCSM 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, if 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 QCSM will monitor the documentation and provide support as necessary. 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.

## **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 design drawings, a SAP, CQC Plan, and SSHSP; draft and final versions of the Construction Completion Report; data, procedures, and characterization, confirmation, borrow, and profiling sampling results. Submittals that RWEC expects from its subcontractors include laboratory analytical results and Quality Assurance/Quality Control (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;
- Locate and establish equipment and material staging areas.

Mobilization will be executed upon approval by the NTR.

### **6.5.3 Site Preparation**

RWEC will perform the following site preparation activities:

- Document preconstruction conditions using photographs;
- Establish construction support area;
- Establish initial site controls and zones;
- Establish/Construct staging areas;
- 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 the surveyor. During use of temporary laydown areas and staging areas, RWEC will maintain the areas in an orderly manner and the sites will be returned to the government in preconstruction conditions.

#### **6.5.4 Solid (Soil) Excavation and Staging**

RWEC will remove contaminated materials from the defined areas at the site and stockpile the materials in a designated soil staging area 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 initially use a multiplier of 1.7 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 pre-graded, the excavations will be backfilled with clean borrow source material, graded, seeded, and fertilized. Allow 4 to 6 weeks after seeding before removing erosion control measures to allow sufficient time for grass to grow.

#### **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.

Non-disposable field equipment, such as probes, tools, etc., will be decontaminated with dry methods and with a solution of biodegradable detergent and potable water and rinsed with potable water from the base and/or local water supply. Distilled water will be used to rinse reusable sampling equipment such as trowels, scoops, and bailers followed by a methanol and hexane rinse

to insure equipment is oil and grease free. 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, 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 described 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, 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.

Pre-final 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 pre-final 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.

## **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 closeout 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 SSHSP;
- 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 and sample validation;
- 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 the 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

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**FIGURES**

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1 inch = 4 miles



FIGURE 1-1  
 REGIONAL LOCATION MAP  
 WORK PLAN FOR  
 CONTAMINATED SOIL REMOVAL  
 PICO DEL ESTE RADAR FACILITY  
 CARRIBEAN NATIONAL FOREST  
 PUERTO RICO

SOURCE: METRODATA, INC., 1999.

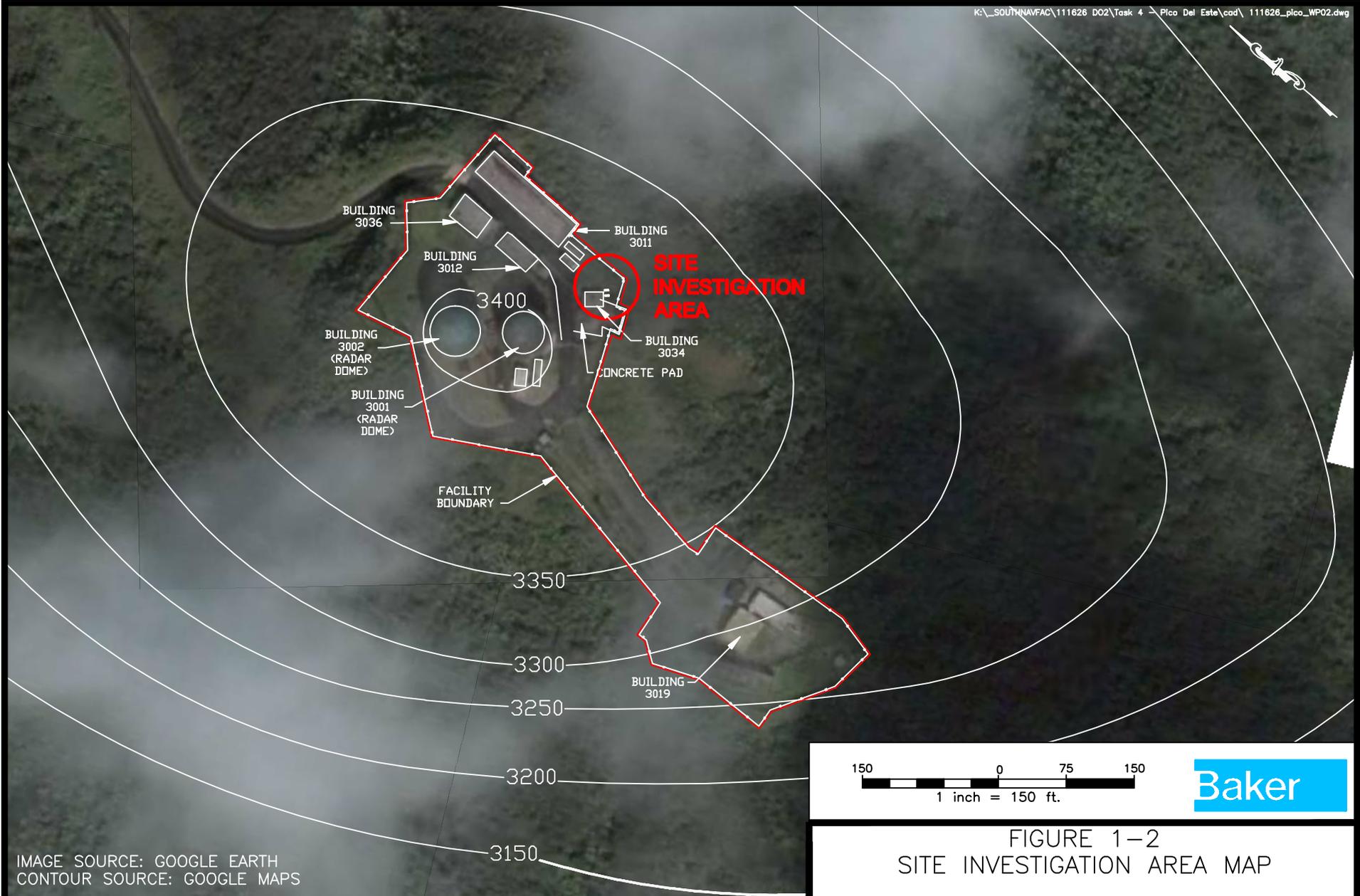
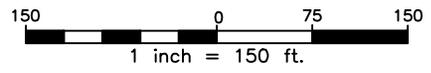


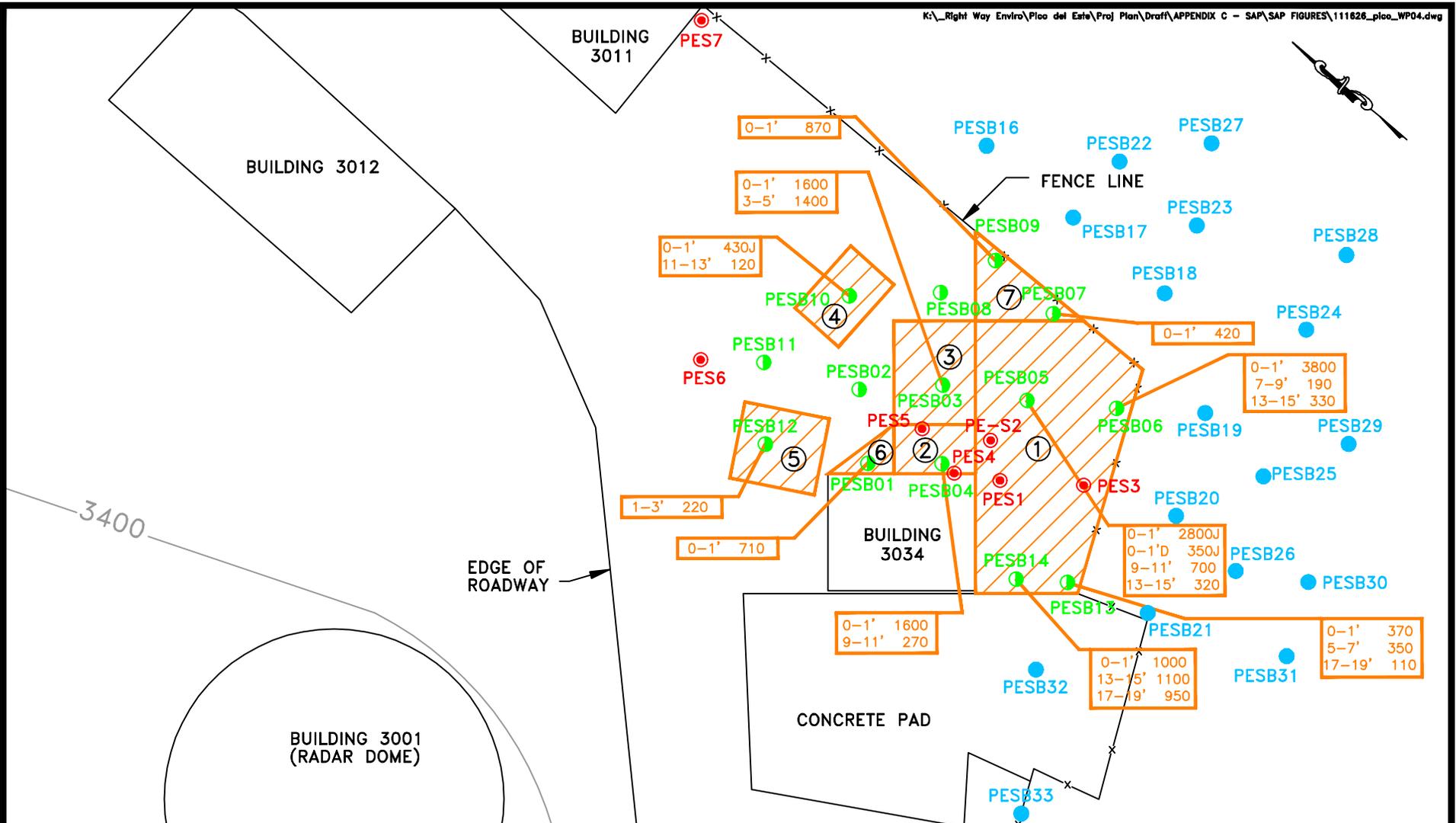
IMAGE SOURCE: GOOGLE EARTH  
CONTOUR SOURCE: GOOGLE MAPS

**LEGEND**

—3300—	TOPOGRAPHIC CONTOUR (ELEVATION IN FEET ABOVE MEAN SEA LEVEL)
—	FACILITY BOUNDARY
—x—	FENCE LINE

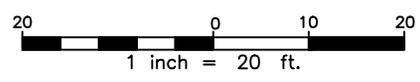


**FIGURE 1-2**  
**SITE INVESTIGATION AREA MAP**  
 WORK PLAN FOR  
 CONTAMINATED SOIL REMOVAL  
 PICO DEL ESTE RADAR FACILITY  
 CARRIBEAN NATIONAL FOREST  
 PUERTO RICO



EXCAVATION AREA	APPROXIMATE AREA TO BE REMOVED (SQUARE FEET)	DEPTH OF REMOVAL (FEET)	APPROXIMATE VOLUME TO BE REMOVED (CUBIC YARDS)
①	699	15	388
②	76	11	31
③	159	5	29
④	92	13	44
⑤	125	3	14
⑥	31	1	1
⑦	92	1	3

- LEGEND**
- - 2007 SITE INVESTIGATION BORING LOCATIONS
  - - PREVIOUS EBS BORING LOCATIONS 2003
  - - 2008 SITE INVESTIGATION SURFACE SOIL LOCATIONS
  - ▨ - ESTIMATED AREA TO BE REMOVED (TPH-DRO GREATER THAN 100 mg/kg)
  - 1-3' 220 - SAMPLE VALUE (mg/kg)
  - 1-3' 220 - SAMPLE DEPTH (FT)
  - X - - FENCELINE (LIMITS OF WORK)
  - D - DUPLICATE SAMPLE



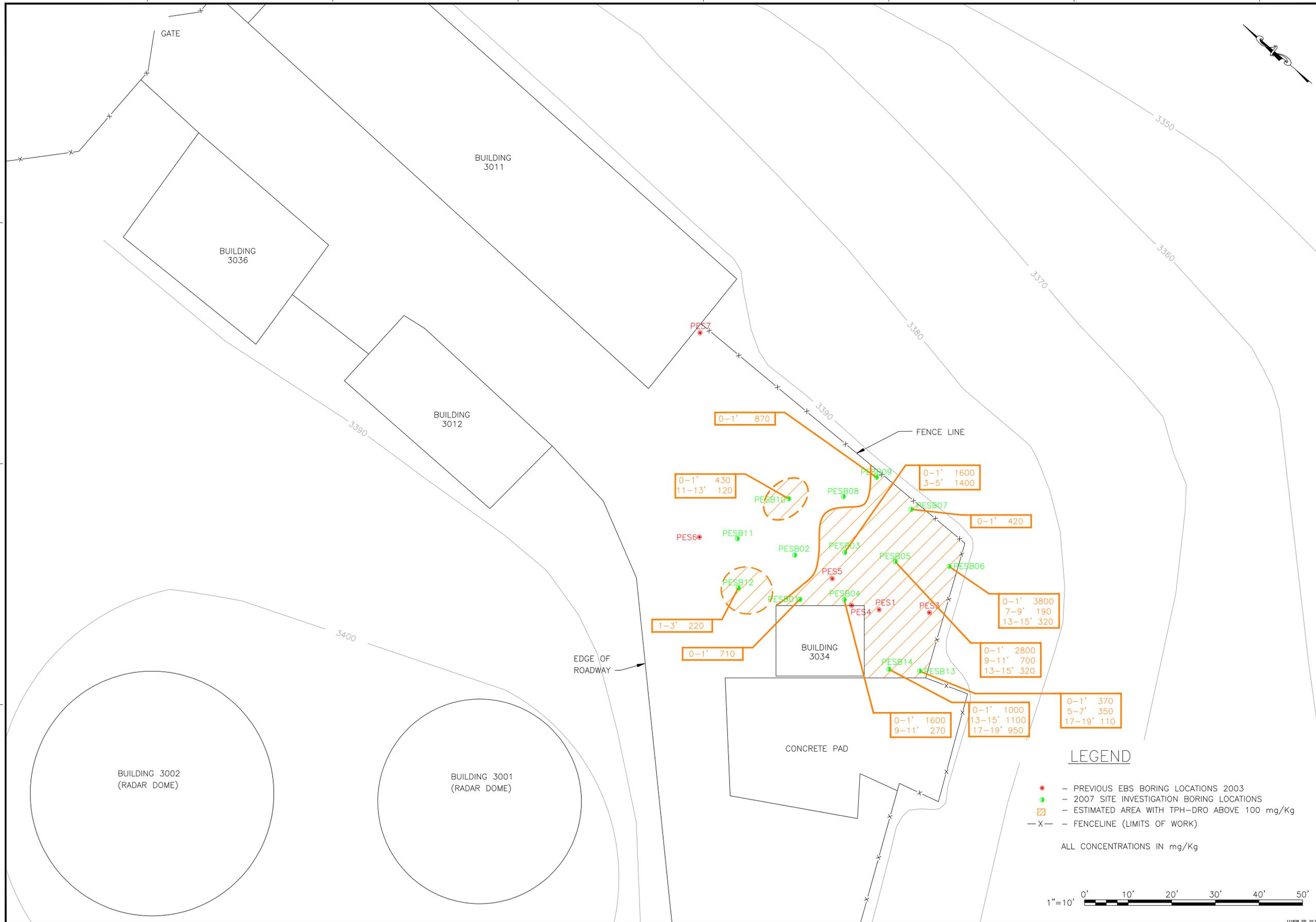
**FIGURE 4-1**  
**AREAS DESIGNATED FOR CONTAMINATED SOIL REMOVAL**  
**WORK PLAN FOR**  
**CONTAMINATED SOIL REMOVAL**  
**PICO DEL ESTE RADAR FACILITY**  
**CARIBBEAN NATIONAL FOREST**  
**PUERTO RICO**

**APPENDIX A**  
**REMEDIAL DESIGN FOR CONTAMINATED SOIL REMOVAL**

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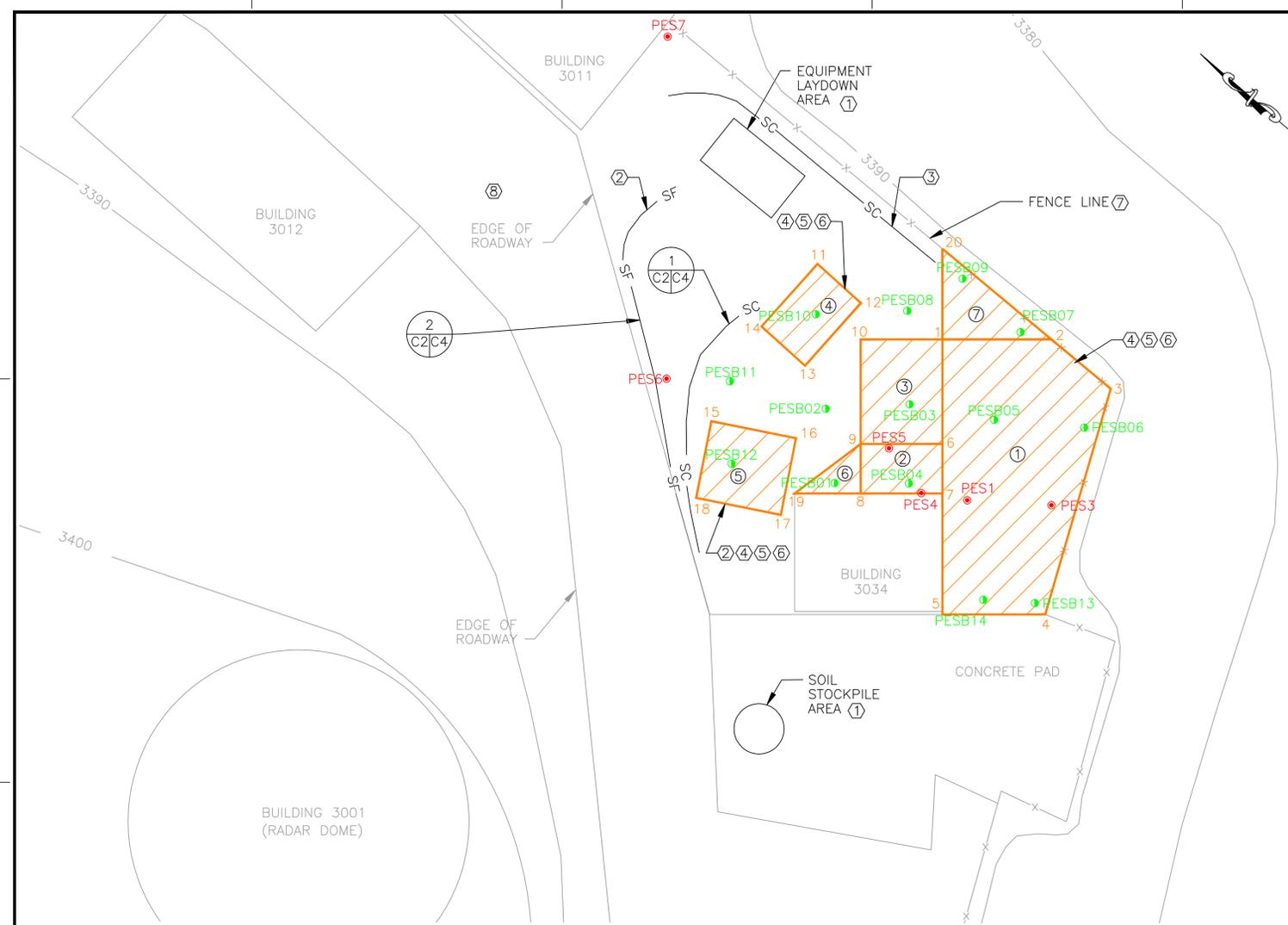


		MICHAEL BAKER JR., INC. 1800 TOWNSHIP, PENNSYLVANIA	
PROJECT NO.: N69450-08-C-0093		DATE:	
ACTIVITY: SOIL REMEDIATION		DATE:	
PROJECT MANAGER:		DATE:	
PROJECT ENGINEER:		DATE:	
PROJECT SUPERVISOR:		DATE:	
PROJECT CHECKER:		DATE:	
PROJECT APPROVER:		DATE:	
PROJECT REVIEWER:		DATE:	
PROJECT DESIGNER:		DATE:	
PROJECT DRAFTER:		DATE:	
PROJECT ESTIMATOR:		DATE:	
PROJECT OPERATOR:		DATE:	
PROJECT MAINTENANCE:		DATE:	
PROJECT MONITORING:		DATE:	
PROJECT RECORDS:		DATE:	
PROJECT ARCHIVE:		DATE:	
PROJECT REVIEW:		DATE:	
PROJECT APPROVAL:		DATE:	
PROJECT REVISIONS:		DATE:	
PROJECT DESCRIPTION:		DATE:	
PROJECT SNL:		DATE:	
PROJECT APPROVED:		DATE:	

DEPARTMENT OF THE NAVY  
 NAVAL FACILITIES ENGINEERING COMMAND  
 SOUTHEAST  
 CHARLESTON, S.C.  
 PICO DEL ESTE RADAR FACILITY  
 LUQUILLO, PUERTO RICO  
 REMEDIAL DESIGN FOR CONTAMINATED SOIL REMOVAL  
 PICO DEL ESTE RADAR FACILITY  
 EXISTING CONDITIONS PLAN

CODE ID. NO. 80091 SIZE D  
 SCALE: 1" = 10'  
 EFD NO.  
 STA. PROJ. NO.  
 SPEC. NO.  
 CONSTR. CONTR. NO.  
 NAVFAC DRAWING NO.  
 SHEET 2 OF 5  
 C-1

D  
C  
B  
A



**WORK NOTES**

- ① THE LOCATIONS SHOWN FOR THE DECONTAMINATION AND EQUIPMENT LAYDOWN AREAS AND THE CLEAN SOIL STOCKPILE AREA ARE SUGGESTED. THE CONTRACTOR SHALL ADJUST THE SIZE, SHAPE AND DESIGN OF THE NECESSARY AREAS TO ACCOMMODATE THE WORK AND FACILITATE PLACEMENT OF ADDITIONAL FACILITIES AS REQUIRED.
- ② PROVIDE SAFETY FENCING AROUND EXCAVATION AREAS FOR WORKER SAFETY AND PROTECTION OF WILDLIFE, FIELD ADJUST LOCATION AS NECESSARY. PROVIDE ACCESS TO EXCAVATION AREA. PUT CAUTION TAPE ON EXISTING FENCELINE TO ENSURE WORK DOES NOT EXTEND BEYOND FENCE LINE.
- ③ INSTALL NECESSARY EROSION AND SEDIMENT CONTROL FACILITIES TO ACCOMMODATE THIS WORK.
- ④ EXCAVATE THE DRO-CONTAMINATED SOIL TO DEPTHS AS FOLLOWS:

AREA	DEPTH (FEET)
1	15
2	11
3	5
4	13
5	3
6	1
7	1

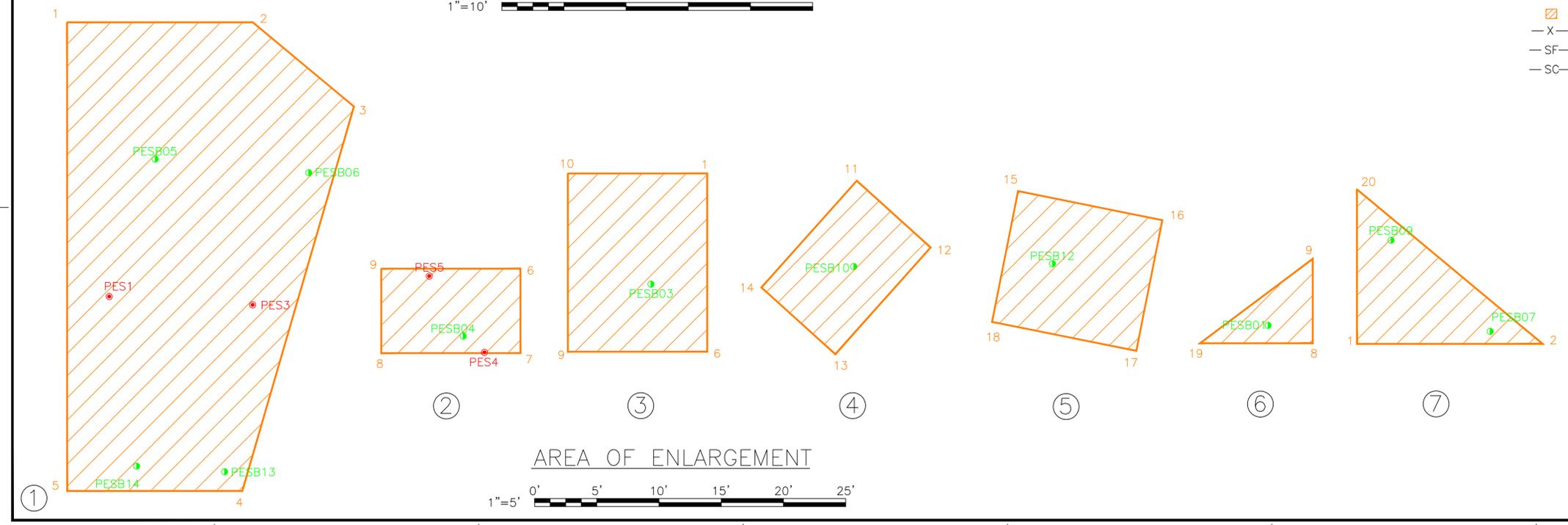
- ⑤ ENSURE ALL WORK IS PERFORMED WITHIN THE FENCELINE.
- ⑥ FOLLOWING EXCAVATION TO THE INDICATED LIMITS, THE NAVY'S ON-SITE REPRESENTATIVE WILL CONDUCT CONFIRMATORY SAMPLING AS SPECIFIED TO VERIFY THE REMOVAL OF DRO-CONTAMINATED SOIL.
- ⑦ TAKE ALL PRECAUTIONS NECESSARY TO MAINTAIN INTEGRITY OF FENCE DURING WORK.
- ⑧ ALL FACILITY ROADWAYS TO REMAIN OPEN TO VEHICULAR TRAVEL. DO NOT STAGE OR PARK VEHICLES, EQUIPMENT, MATERIALS, OR STOCKPILES IN THE ROADWAY.

**LEGEND**

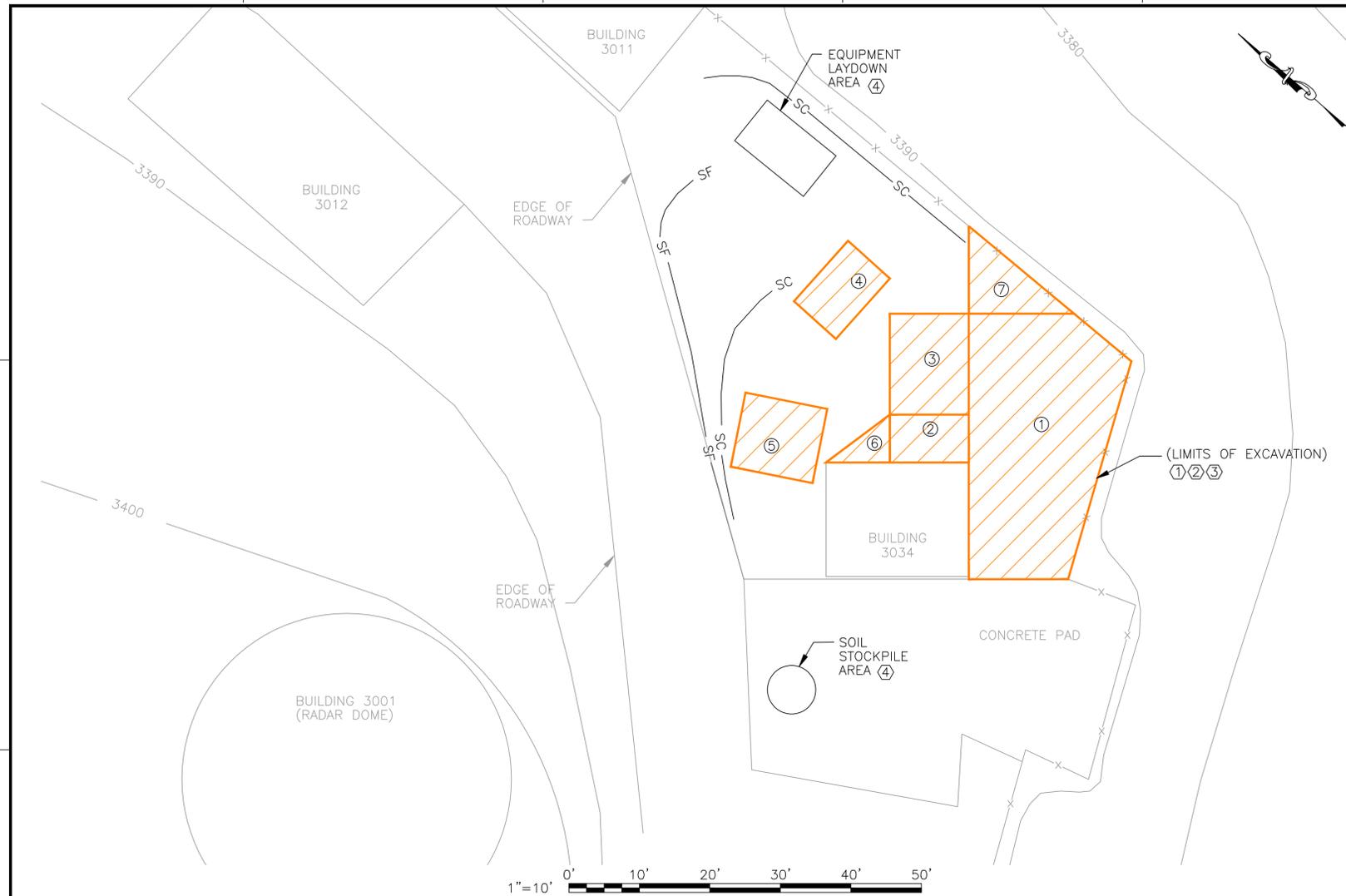
- - PREVIOUS EBS BORING LOCATIONS 2003
- - 2007 SITE INVESTIGATION BORING LOCATIONS
- ▨ - AREA WITH TPH-DRO ABOVE 100 mg/Kg
- X- - FENCELINE (LIMITS OF WORK)
- SF- - SAFETY FENCE
- SC- - SILT FENCE

ID	EASTING	NORTHING
1	890349.59	814752.31
2	890364.51	814752.31
3	890372.65	814745.58
4	890363.66	814714.84
5	890349.59	814714.84
6	890349.59	814738.07
7	890349.59	814731.32
8	890338.39	814731.32
9	890338.39	814738.07
10	890338.39	814752.31
11	890332.47	814762.61
12	890338.40	814757.27
13	890330.74	814748.74
14	890324.80	814754.08
15	890317.92	814741.18
16	890329.52	814738.85
17	890327.42	814728.40
18	890315.83	814730.73
19	890329.32	814731.32
20	890349.59	814764.66

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



DESIGN	CHECK	REVIEW	APPROVED	DATE	REVISIONS		
DATE	DATE	DATE	DATE	DATE			
<p style="text-align: center;"><b>Baker</b></p> <p style="text-align: center;">MICHAEL BAKER JR., INC. 1800 TOWNSHIP, PENNSYLVANIA</p>		<p style="text-align: center;">PROJECT NO.: N69450-08-C-0093</p> <p style="text-align: center;">ACTIVITY - SOIL REMEDIATION</p>		<p style="text-align: center;">DATE</p>			
<p>DEPARTMENT OF THE NAVY    NAVAL FACILITIES ENGINEERING COMMAND    CHARLESTON, S.C.</p> <p>NAVAL STATION    SOUTHEAST    LUQUILLO, PUERTO RICO</p> <p>PICO DEL ESTE RADIO FACILITY</p> <p style="text-align: center;"><b>REMEDIAL DESIGN FOR CONTAMINATED SOIL REMOVAL</b></p> <p style="text-align: center;"><b>PICO DEL ESTE RADAR FACILITY</b></p> <p style="text-align: center;">REMOVAL ACTION PLAN</p>							
<p>CODE ID. NO. 80091</p> <p>SCALE: AS SHOWN</p> <p>EFD NO.</p> <p>STA. PROJ. NO.</p> <p>SPEC. NO.</p> <p>CONSTR. CONTR. NO.</p> <p>NAVFAC DRAWING NO.</p> <p>SHEET 3 OF 5</p>		<p>11182 EP 02/05</p>		<p style="font-size: 24pt; font-weight: bold;">C-2</p>			

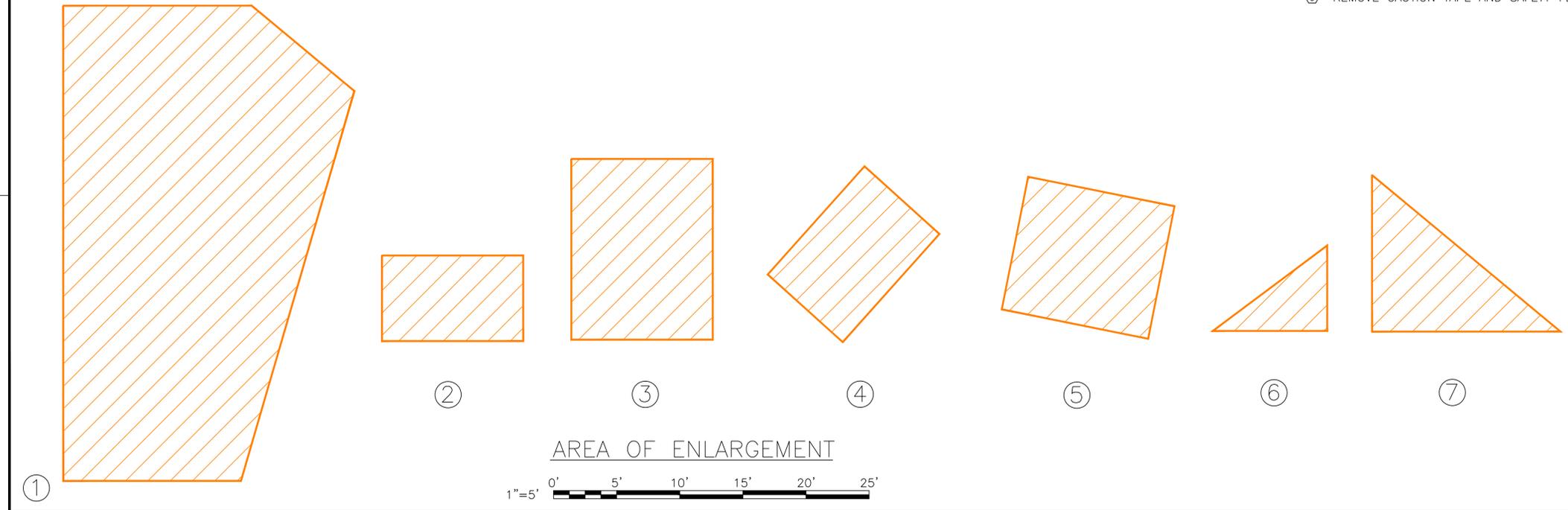


**WORK NOTES**

- ① LIMIT OF EXCAVATION SHALL BE AS SHOWN, FOR AREAS 1 THRU 7.
- ② DO NOT DISTURB AREAS OUTSIDE THOSE SPECIFIED WITHOUT APPROVAL OF THE NTR. ALL WORK SHALL BE PERFORMED WITHIN THE FENCELINE.
- ③ UPON APPROVAL FROM THE NTR, BACKFILL THE EXCAVATION AREAS AS SPECIFIED WITH MATERIAL. GRADE AREA TO MEET EXISTING GRADE. FINAL GRADE SHOULD INCORPORATE PLACEMENT OF 6 INCHES OF TOPSOIL. ALL GRADING SHALL BE PERFORMED WITHIN THE FENCELINE. REVEGETATE DISTURBED AREAS AS SPECIFIED.
- ④ REMOVE THE DECONTAMINATION AND EQUIPMENT LAYDOWN AREA AND THE SOIL STOCKPILE AREA UPON COMPLETION OF BACKFILL ACTIVITIES.
- ⑤ UPON THE RE-ESTABLISHMENT OF VEGETATION AND APPROVAL FROM THE NTR, REMOVE ALL EROSION AND SEDIMENTATION CONTROL FACILITIES. REVEGETATE AS NEEDED.
- ⑥ REMOVE CAUTION TAPE AND SAFETY FENCING UPON COMPLETION OF WORK.

**LEGEND**

- AREA WITH TPH-DRO ABOVE 100 mg/Kg
- X- - FENCELINE (LIMITS OF WORK)
- SF- - SAFETY FENCE
- SC- - SILT FENCE



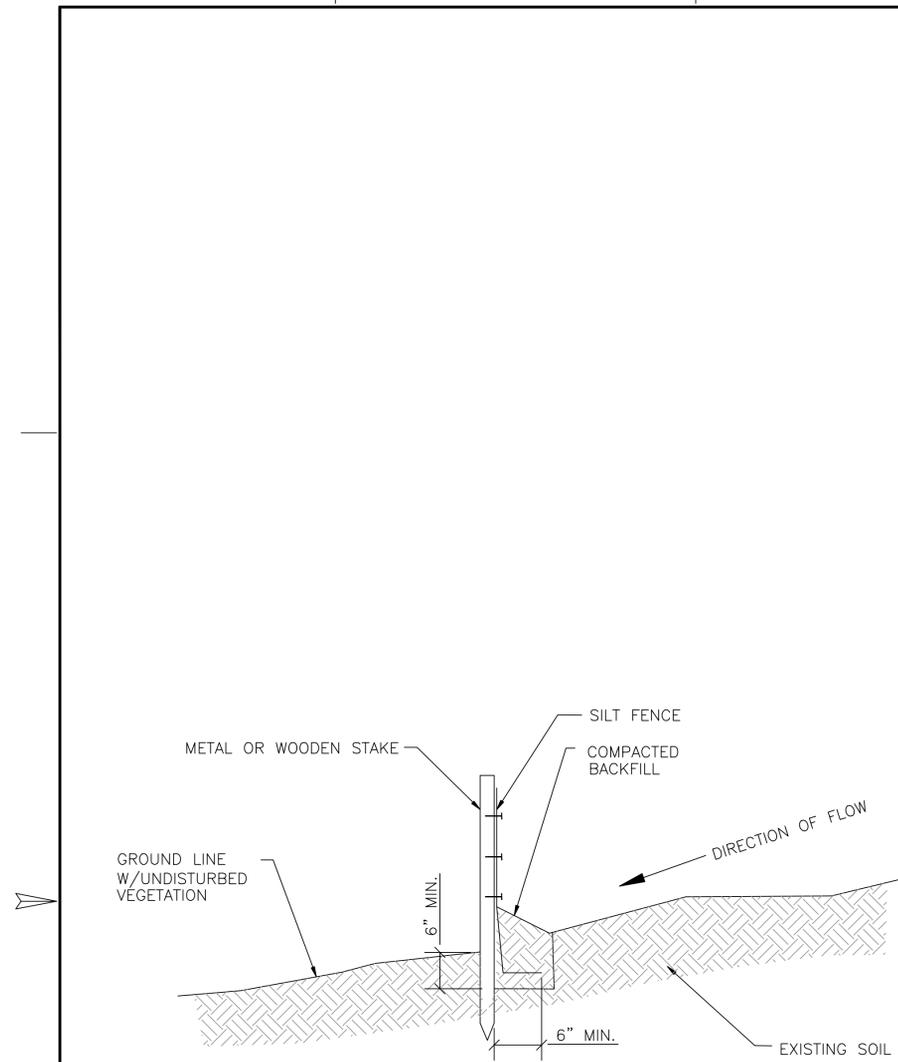
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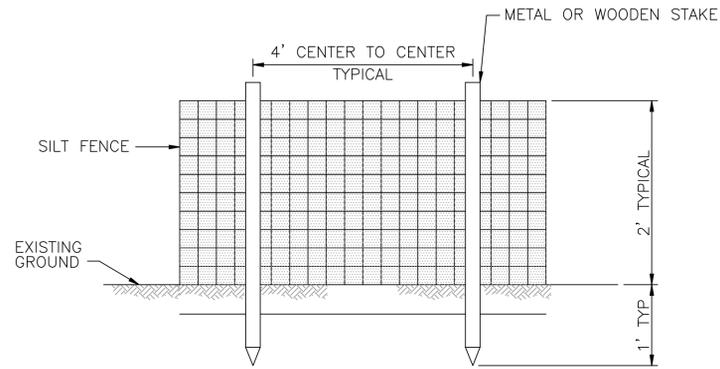
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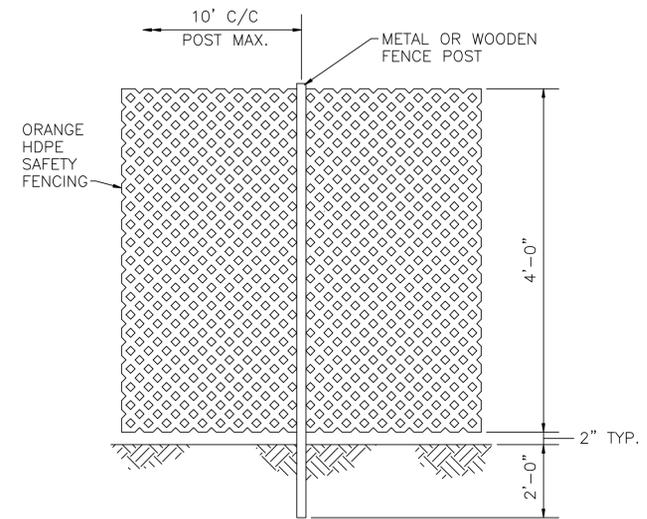
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SILT FENCE

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2 SAFETY FENCE  
NOT TO SCALE  
C-2/C-4

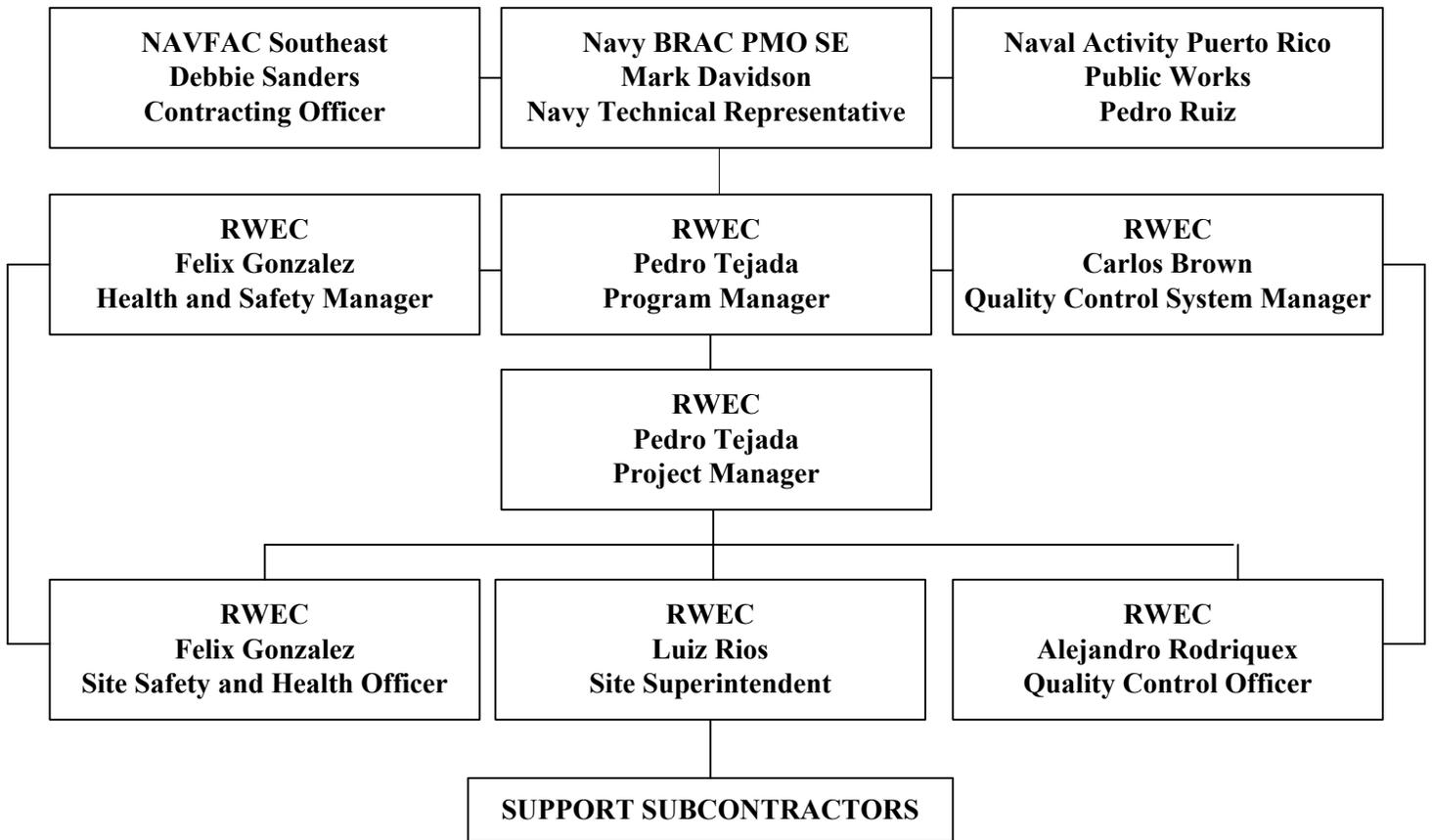
DEPARTMENT OF THE NAVY NAVAL STATION PICO DEL ESTE RADAR FACILITY REMEDIAL DESIGN FOR CONTAMINATED SOIL REMOVAL PICO DEL ESTE RADAR FACILITY		NAVAL FACILITIES ENGINEERING COMMAND SOUTHEAST CHARLESTON, S.C. LUQUILLO, PUERTO RICO		CIVIL DETAILS	
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**APPENDIX B**  
**ORGANIZATIONAL CHART**

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**APPENDIX B  
PROJECT ORGANIZATION  
CONTAMINATED SOIL REMOVAL  
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO**



*RWEC - Rightway Environmental Contractors, Inc.*

**APPENDIX C**  
**SAMPLING AND ANALYSIS PLAN**

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**FINAL**  
**SAMPLING AND ANALYSIS PLAN**  
**CONTAMINATED SOIL REMOVAL**  
**PICO DEL ESTE RADAR FACILITY**

**LUQUILLO, PUERTO RICO**

**December 12, 2011**

*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*

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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 Objectives
CFR	Code of Federal Regulations
COC	Chain of Custody
COR	Contracting Officer's Representative
CRQL	Contract Required Quantitation Limits
CY	Cubic Yards
DQO	Data Quality Objective
DRO	Diesel Range Organics
EBS	Environmental Baseline Survey
El Yungue	El Yungue National Forest
FAA	Federal Aviation Administration
GRO	Gasoline Range Organics
IDW	Investigation-Derived Waste
IRC	Ignitability, Reactivity and Corrosivity
mg/kg	Milligrams per Kilogram
mil	millimeter
NAVFAC	Naval Facilities Engineering Command
NTR	Navy Technical Representative
PMO	Program Management Office
PPE	Personal Protective Equipment
PVC	Polyvinyl chloride
QA	Quality Assurance
RCRA	Resource Conservation and Recovery Act
RWEC	Right Way Environmental Contractors, Inc.
SAP	Sampling and Analysis Plan
SE	Southeast
sf	square feet
SOP	Standard Operating Procedures
SOW	Statement of Work
TCLP	Toxicity Characteristic Leaching Procedure
TAT	Turnaround Time
TPH	Total Petroleum Hydrocarbons
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 the implementation of a contaminated soil removal at the Pico del Este Radar Facility, located in the Caribbean National Forest, also referred to as the El Yungue National Forest (El Yungue), located near Luquillo, Puerto Rico.

The soil removal will be 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-C-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 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 Contaminated Soil Removal Work Plan for Pico del Este Radar Facility (Baker, 2010) will be followed for this project.

### **1.1 Pico del Este Radar Facility**

The Pico del Este Radar Facility is located near the center of the eastern end of the main island of Puerto Rico within the Caribbean National Forest, as shown on Figure 1-1. The Caribbean National Forest is considered a rainforest, with a climate that is frost-free. It receives up to 240 inches per year in some areas, and is typically cooled by strong easterly trade winds. The temperature in the higher elevations is typically 10 to 20 degrees cooler than nearby coastal areas ([www.welcome.topuertorico.org](http://www.welcome.topuertorico.org), Riveria, 2007).

The radar/communications complex lies at the top of a mountain peak (Pico del Este or “East Peak”) at an elevation of approximately 3,500 feet above sea level. The site is surrounded on all sides by undeveloped, heavily forested lands. The site was formerly used by the Navy as a radar facility to track various weapons systems and communications during military training exercises. Its use by the Navy was discontinued in early 2003 (NAVFAC, 2003). Currently, the Federal Aviation Administration (FAA) is licensed to use the site as a radar facility (Baker, 2009). A site map is presented on Figure 1-2, depicting the radar facility layout.

## **2.0 SCOPE AND OBJECTIVES**

The Statement of Work (SOW) for this project includes activities to accomplish a removal of contaminated soil at the Pico del Este Radar Facility located in the Caribbean National Forest, near Luquillo, 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 confirmation sampling to indicate contaminant concentrations are below remedial goals in order to discontinue excavation activities and restore excavations. Excavated soil will also be sampled for disposal requirements.

### **2.1 Corrective Measure Objectives**

The objective of the corrective measure is to remove diesel range organics (DRO) contaminated soil from Pico del Este Radar Facility which currently poses an unacceptable risk to human and ecological receptors. The Corrective Action Objectives (CAO) developed for the contaminated soil is DRO at a corrective action objective level of 100 milligrams/kilogram (mg/kg).

### **3.0 FIELD ACTIVITIES AND SAMPLING METHODS**

The following sections provide collection procedures for obtaining identification, confirmation, and characterization samples. Confirmation and characterization sampling will be conducted during the soil removal planned at the seven defined areas on the Pico del Este Radar Facility site as located on Figure 3-1.

Grab and composite sampling methods will be used during sample collection. Grab samples will be collected from a discrete location and placed in the appropriate laboratory-provided sample container. Composite samples will be made up of several individual grab samples of equal volume collected within a sampling interval or area. For composite soil samples, each individual discrete soil sample will be placed into a disposable aluminum pie pan (or other appropriate container) and thoroughly homogenized using a decontaminated stainless steel trowel (or other appropriate device) prior to filling the appropriate laboratory-provided sample containers.

Grab samples for toxicity characteristic leaching procedure for volatile organic compound (TCLP-VOC), Benzene, Toluene, Ethylbenzene, and Xylenes (BTEX), and TPH-GRO analysis will be collected using a Terra Core® sampler and field-preserved using methanol and deionized water. A thoroughly mixed composite sample will be collected for the remaining analyses and placed into an approved laboratory container for shipment.

#### **3.1 Soil Confirmation and Characterization Sampling**

The following subsections provide details of the field activities associated with the soil removal action at the Pico del Este Radar Facility. Table 3-1 details the sampling frequency and laboratory analyses to be performed. Soil samples will be collected by stainless steel spoon, trowel or excavation bucket and placed into an approved laboratory container for overnight shipment with a laboratory chain-of-custody form.

##### **3.1.1 Pico del Este Radar Facility Site**

As shown on Figure 3-1, seven areas of soil contamination, comprising an area of approximately 1, 274 square feet (SF) will be excavated from the Pico del Este Radar Facility site. As a result of the meeting held on 9/9/08 between Tim Gordon (EPA Region 2), Wilmarie Rivera (Federal Facilities Coordinator PREQB), and Manuel Ortiz (U.S. Park Service), the soil below Building 3034 is not included in the removal action, nor is the soil beneath the concrete pad, located southwest of Building 3034. No excavation shall occur outside of the fence line because the soil located outside of the fence line is unique and cannot be replaced. The soil is specific to the rain forest and is not found anywhere else on the island. The areas to be excavated within the fence line boundary are as indicated on the following table with the associated excavation depth:

<b>Excavation Area Designation</b>	<b>Estimated Surface Area (SF)</b>	<b>Estimated Depth (feet)</b>	<b>Estimated Volume (CY)</b>
1	699	15	388
2	76	11	31
3	159	5	29
4	92	13	44
5	125	3	14
6	31	1	1
7	92	1	3
<b>TOTAL</b>	<b>1,274</b>		<b>510</b>

RWEC will excavate the predetermined locations to the surveyed boundaries and planned depths unless encounter excavation refusal due to obstructions then samples will be taken at the lowest achievable depth at a frequency of one sample per 100 square feet (10 ft by 10 ft) with a minimum of one sample per excavation area. RWEC will collect confirmation samples from the sidewall of each excavation area at a minimum frequency of one sample every 25 feet and the bottom of the excavation to confirm removal of DRO contaminated soil at levels above 100 mg/kg. Sidewall samples will be collected every five feet of depth intervals along the excavation sidewalls. Samples will be taken along the fence line, concrete pad, and adjacent to Building 3034, however, should sample results indicate elevated levels of contamination; excavation will not be conducted beyond the fence line, under the concrete pad or beneath Building 3034. The sample identification, depth, number of samples, and QC samples within each area is indicated on Table 3-1. To avoid confined space entry, confirmatory samples will be collected directly from the excavator bucket at the required depths. Confirmation samples will be collected and analyzed in accordance with Technical Specification 01 35 45.00 10, Part 3.1.1.

All samples will be analyzed by the laboratory on a quick turnaround time (TAT) basis (24 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.

When the confirmation sampling results indicate that the extent of contaminated soil has been removed or excavation refusal due to obstructions (and the limits of the concrete pad, Building 3034, and the fence line have been reached), RWEC will communicate the final sampling results to the NTR. The NTR will approve the completed excavation based on the confirmation sample analytical results.

Two soil samples will be collected at the Pico del Este Radar Facility to investigate whether conditions are conducive to TPH-DRO degradation. One surface soil sample (0 – 1 feet bgs) will be collected upgradient of existing contamination and one subsurface soil sample (13 – 15 feet bgs) will be collected in an area of existing contamination along the fence line. The soil samples collected from each interval will be field-measured using a Landtec GEM-500 portable gas extraction monitor. The field parameters to be measured are oxygen, carbon dioxide, and methane. Heterotrophic plate counts will be performed on each sample by the laboratory to measure the viability of the indigenous microbial population. For safety reasons, both samples

will be collected using a Geoprobe direct push rig and prior to excavation activities.

### **3.1.2 Waste Characterization**

One waste characterization sample for excavated stockpiled soil will be collected and analyzed for full TCLP, Total Petroleum Hydrocarbons-Diesel Range Organics (TPH-DRO), characteristics of ignitibility, reactivity and corrosivity (IRC), and paint filter liquids test in accordance with Table 3-1 and Technical Specification 01 35 45.00 10, Part 3.1.2.

Incidental Waste samples will be collected and analyzed for full TCLP, TPH-DRO, and IRC in accordance with Table 3-1 and (Appendix H) Technical Specification 01 35 45.00 10, Part 3.1.3.

### **3.1.3 Backfill**

The contractor shall provide documentation that the backfill selected for fill in the excavation (common soil and topsoil) has met the requirements for off-site soil as presented in Technical Specification 31 23 00.00 20 Part 1.6 prior to placement on the site. If this certification is not available prior to delivery on site, the contractor shall perform sampling and obtain analysis of the stockpiled soil prior to placement in the excavation. The soil shall be tested for full TCLP including IRC, BTEX, and TPH-DRO/GRO in accordance with Table 3-1 and Technical Specifications 02 61 13 Part 2.2 and 31 23 00.00 20 Part 1.6. Off-site soil backfill will be sampled at a minimum frequency of one sample per 500 cubic yards per borrow source. Sample results must indicate levels of any existing contaminants are below regulatory requirements in accordance with EQB UST Rule 205 and 40 CFR 261.24.

## **3.2 Laboratory Analysis**

Chemical analysis samples will be packed in ice and shipped next day air to the “fixed base” laboratory. Geotechnical analysis samples do not require ice preservation. 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 the certified licensed chemist from Puerto Rico will be determined at a later date. The laboratory data deliverable will include all raw data in accordance with Level IV Data Package.

### **Quality Assurance/Quality Control Sampling**

Quality Assurance/Quality Control (QA/QC) samples will be analyzed for parameters as shown in Table 3-3 by analytical methods presented in Table 3-2. QA/QC samples collected as part of the SAP will include matrix spike/matrix spike duplicates (MS/MSD), trip blanks, equipment rinsate samples, field blank samples, and field duplicate samples.

### Matrix Spike/Matrix Spike Duplicates

MS/MSDs are laboratory derived and are collected to evaluate the matrix effect of the sample upon the analytical methodology. One MS/MSD will be collected for every 20 samples collected of a similar matrix as shown on Table 3-1.

### Trip Blanks

Trip blank samples are required to accompany all samples submitted to the laboratory for analyses of volatile organic compounds (e.g. TCLP, BTEX, and TPH-GRO). In addition, trip blank samples will accompany off-site borrow source and waste characterization samples, as shown on Table 3-3.

### Equipment Rinsates

Equipment rinsates are collected by capturing analyte-free rinse water from decontamination of equipment, both disposable and non-disposable. Equipment rinsates will be collected on a daily basis and submitted to a fixed-base analytical laboratory for analysis. The results from the blanks will be used to determine if the sampling equipment was free of contamination. The equipment rinsates are analyzed for the same parameters as the related samples. Sampling equipment (stainless steel spoon, trowel or bucket auger, etc.) will be analyzed for the analytes presented in Table 3-3.

### Field Blanks

Field blanks consist of the source water used in equipment decontamination procedures. At a minimum, one field blank for each source of water must be collected and analyzed for the same parameters as the related samples. It is anticipated that two different sources of water (i.e., store-bought distilled water and laboratory-grade deionized water) will be utilized, as shown in Table 3-3.

### Field Duplicates

Field duplicates will be collected at the same time the confirmation soil samples are collected. One duplicate sample will be collected at a frequency of 10 percent of confirmation samples collected as shown on Table 3-1.

### Data Validation

All data from the laboratory will be certified by a Puerto Rican Chemist. One hundred percent of the laboratory data will be validated by a third party data validator in accordance with the most recent USEPA guidelines to ensure data usability. Only usable data as determined by the validator will be included in the evaluation, and the conclusions and recommendations sections of the report. Data validation reports will be included as an appendix to the report and will discuss:

- Overall Evaluation of the Data
- Potential Usability Issues
- Data Completeness
- Technical Holding Times
- Initial and Continuing Calibrations
- Method and QC Blanks

- Laboratory Control Samples
- Matrix Spikes
- Quantitation and Data Qualifications

The data validation reports also will include discussions on surrogates, internal standards, post digest spikes, field duplicates, the extent of outlier exceedances, which results were affected, and how results were qualified.

Holding Time, Sample Container, and Preservative Requirement

Parameter	Container / Preservative		Hold Time	
	Soil	Water	Soil	Water
TPH-GRO	Terra Core® 3 x 40 mL vials / 1 methanol, 2 DI water	3 x 40 mL VOA vials / Preserved with HCL pH<2	48 hours preserved / 14 days to analysis	14 days to analysis
TPH-DRO	8 oz jar / Unpreserved	2 x 1 L amber / with HCl	14 days / 40 days to analysis	7 days / 40 days to analysis
BTEX	Terra Core® 3 x 40 mL vials / 1 methanol, 2 DI water	3 x 40 mL VOA vials / Preserved with HCL pH<2	48 hours preserved / 14 days to analysis	14 days to analysis
TCLP VOCs	8 oz jar (no head space) / Unpreserved	2 x 40 mL VOA vials (no headspace) / Unpreserved	14 days to TCLP extraction and analysis	14 days for analysis
TCLP (non-VOCs)	8 oz jar (no head space) / Unpreserved	1 L amber / Unpreserved	14 days to prepare TCLP extract / 7 days to extract / 40 days for analysis	7 days to extract/ 40 days for analysis
TCLP Metals	8 oz jar / Unpreserved	500 mL plastic / Unpreserved	6 months to TCLP extraction (or 28 days for mercury) and analysis	6 months (or 28 days for mercury) for analysis
Ignitability	4 oz jar / Unpreserved	125 ml plastic / Unpreserved	14 days	14 days
Cyanide	250 ml plastic / Unpreserved	250 ml plastic / with sodium hydroxide	As soon as possible	As soon as possible
Sulfide	250 ml plastic / Unpreserved	2 x 250 ml plastic / with zinc acetate	As soon as possible	As soon as possible
pH	250 ml plastic / Unpreserved	125 ml plastic / Unpreserved	As soon as possible	As soon as possible

All samples will be preserved to 4°C for shipping.

#### Precision, Accuracy, and Completeness

Accuracy and precision will be assessed through the use of spike (matrix and blank) recoveries. The data must satisfy the QC acceptance criteria given in the analytical methods. Precision will also be determined by the calculated relative percent difference between duplicate analyses. The objectives for completeness are 90 to 95 percent.

#### Field Audits

A field audit may be conducted during excavation activities to verify that sampling is being performed according to the SAP. At the appropriate time, the Project Manager will conduct field audits. Discrepancies will be identified, resolved and documented within 24 hours of finding.

### **3.3 Decontamination of Sampling Tools**

All nondedicated 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.

It may not be possible to exclusively use disposable sampling equipment; therefore hand-auger sampling may be necessary. 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.

Under the circumstance where the excavator bucket will be used to collect confirmation soil samples (when direct access to the excavation is prohibited by field personnel), the excavator bucket will be decontaminated by dry means (e.g., brushes and shovels) and with a power washer and water-soap solution prior to collecting each confirmation soil sample.

To prevent possible contamination from sampling equipment, all sampling devices will be decontaminated and sealed before initiation of sample collection. The following procedures will be used to decontaminate field sampling equipment and personal protective equipment at least 24 hours before sampling.

- Rinse with potable water. This step will decrease the gross contamination and reduce the frequency at which the non-phosphate detergent and water solution need to be changed. Change the water frequently.
- Wash with non-phosphate detergent (Alconox) or equivalent laboratory-grade detergent and potable water solution. This step will remove remaining contamination from the equipment. Dilute the detergent as directed by the manufacturer.
- Rinse with potable water. This step will rinse the detergent solution away from the equipment. Change the water frequently.
- Triple-rinse with deionized water. This step will rinse any detergent solution and

potable water residues. Rinsing will be done by applying the deionized water 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.

- Remove oil, grease, or free product contaminant by rinsing equipment with pesticide-grade methanol followed by a rinse with distilled and deionized (ASTM Type II) water.
- Rinse equipment with pesticide-grade hexane.
- Rinse with distilled and deionized (ASTM Type II) water.
- Allow equipment to air dry. If sampling device will not be used immediately after being decontaminated, wrap equipment with oil-free aluminum foil and cover with plastic.
- Decontamination fluids will be placed in drums or tanks and staged for disposal in accordance with SAP (Appendix C).

Wherever possible, disposable equipment will be used to minimize the amount of field decontamination that will be required.

### **3.4 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 detergent and trace soils. Decontamination fluids will be collected, containerized, sampled and analyzed for TPH-DRO, Full TCLP and IRC as presented in Table 3-1 for Incidental Waste. An approved laboratory container will be used to dip into the containerized liquid to capture a sample. The sample(s) will be individually labeled and shipped overnight with the laboratory chain-of-custody form. Incidental waste will be 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 incidental waste characterization analysis.

### **3.5 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.

### **3.6 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.

#### **3.6.1 Waste Storage Areas**

In the event analyses indicate materials are hazardous waste to be handled and disposed of in the following manor. Rolloff boxes 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.

#### 3.6.1.1 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.

#### 3.6.1.2 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.

### 3.6.1.3 Stockpiles

The following procedures will be followed when stockpiling excavated (waste) soils.

- Stockpiles will be located near the excavation areas and within an area pre-approved by the NTR.
- Stockpiles will be provided with a liner, cover, and perimeter berm to prevent release or infiltration of liquids. The perimeter berm, typically PVC pipes or 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 runoff from precipitation events.
- Minimum 20-millimeter (mil) polyethylene sheeting will be used for liners and 8-mil for 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.

### 3.6.1.4 Roll-off Boxes

- Roll-off boxes will be inspected upon arrival on site. Any roll-off containers arriving with contents will be rejected.
- Roll-off boxes 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 roll-off boxes.
- Old labels will be removed.
- Roll-off containers will be inspected by the transporter after removal of the liner and decontaminated in the event of evidence of liner failure.

### **3.7 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 following the procedures given in the Work Plan. 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.

### **3.8 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 a U.S. Environmental Protection Agency (USEPA) 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 roll-offs 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 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 site (e.g., PE for Pico del Este). The second portion is the number designating the excavation area (1 to 7). The third portion is an identifier for the sample source (e.g., WL for excavation sidewall sample, BT for excavation bottom sample etc.). The fourth portion is a sequential sample number designator. The fifth part of the sample designation identifies the depth interval from which the sample was collected (e.g., -01 indicates a 5.0 to 10.0 feet below ground surface (bgs). Confirmation sample designations will follow the pattern shown below.

PE1WL01-00	Pico del Este Radar Facility Sample
PE2WL01-00	Excavation Area 2
PE1 <u>WL</u> 01-00	Excavation Area 1 Sidewall Sample
PE1WL <u>01</u> -00	Excavation Area 1 Sidewall Sample Number 1 (sequential numbering)
PE1WL01- <u>01</u>	5 to 10 foot bgs sampling interval

Other samples to be taken will be labeled as follows:

Off-Site Borrow Pile:	PEBP01	Pico del Este Radar Facility-Borrow Pile
Incidental Waste:	PEIDW01	Pico del Este Radar Facility-IDW
Waste Pile Sample:	PEWP01	Pico del Este Radar Facility-Waste Pile
QA Sample Duplicate:	PE5WL01-00D	Pico del Este Radar Facility-Confirmatory Sample

#### **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., 01/21/10);
- 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 - TPH-DRO, TCLP, and IRC;
- 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 airbill 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 (airbill);

- 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, chain of custody 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 closeout report, to be provided at the completion of the soil removal. 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 closeout report will also include the quantities of TPH-DRO-contaminated soil removed, problems encountered and solutions implemented. As-built drawings will be included as an appendix to the closeout report. Surveyed limits of excavation and locations of confirmatory soil samples will be included in as-built drawings.

## **6.0 REFERENCES**

Michael Baker Jr., Inc. (Baker), 2010. Draft Workplan for the Contaminated Soil Removal at Pico del Este Radar Facility, Caribbean National Forest, Luquillo, Puerto Rico. March 5, 2010.

Michael Baker J., Inc. (Baker), 2009. Final Site Investigation Report Pico del Este Radar Facility, Caribbean National Forest, Luquillo, Puerto Rico. November 19, 2009.

Naval Facilities Engineering Command (NAVFAC), 2003. Environmental Baseline Survey (EBS). Pico del Este Radar Facility.

Riveria, Magaly; 2007. Caribbean National Forest; El Yunque. 2007. <http://welcome.topuertorico.org/reference/yunque.shtml>.

## **TABLES**

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TABLE 3-1

Revised: December 12, 2011

**CONFIRMATION AND CHARACTERIZATION SAMPLING SUMMARY  
 SAMPLING AND ANALYSIS PLAN FOR  
 CONTAMINATED SOIL REMOVAL  
 PICO DEL ESTE RADAR FACILITY  
 LIQUILLO, PUERTO RICO**

Area	Media/Sample ID	Sample Depth (ft bgs)	Laboratory Based Analysis													Field Based Analysis			Comment		
			TPH-DRO	TPH-GRO	TCLP-VOC	TCLP	BTEX	IRC	Paint Filter	Classification	Atterberg Limit	pH	Organic Matter	Soluble Salt	Standard Proctor	Particle Size	HPC	In-Place Density and Moisture		Oxygen	Carbon Dioxide
<b>Side Wall and Bottom Confirmation Soil Samples</b>																					
Area 1	PE1WL01-00	0.0-5.0	X																		
	PE1WL02-00	0.0-5.0	X																		
	PE1WL03-00	0.0-5.0	X																		
	PE1WL04-00	0.0-5.0	X																		
	PE1WL05-00	0.0-5.0	X																		
	PE1WL06-01	5.0-10.0	X																		
	PE1WL07-01	5.0-10.0	X																		
	PE1WL08-01	5.0-10.0	X																		
	PE1WL09-01	5.0-10.0	X																		
	PE1WL10-01	5.0-10.0	X																		
	PE1WL10-01D	5.0-10.0	X																		Duplicate <sup>1</sup>
	PE1WL10-01MS/MSD	5.0-10.0		X																	Matrix Spike/Matrix Spike Duplicate <sup>2</sup>
	PE1WL11-01	5.0-10.0	X																		
	PE1WL12-01	5.0-10.0	X																		
	PE1WL13-02	10.0-15.0	X																		
	PE1WL14-02	10.0-15.0	X																		
	PE1WL15-02	10.0-15.0	X																		
	PE1WL16-02	10.0-15.0	X																		
	PE1WL17-02	10.0-15.0	X																		
	PE1WL18-02	10.0-15.0	X																		
	PE1WL19-02	10.0-15.0	X																		
	PE1BT01-02	15.0	X																		
PE1BT01-02D	15.0	X																		Duplicate <sup>1</sup>	
PE1BT02-02	15.0	X																			
PE1BT03-02	15.0	X																			
PE1BT04-02	15.0	X																			
PE1BT05-02	15.0	X																			

TABLE 3-1

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SAMPLING AND ANALYSIS PLAN FOR  
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Area	Media/Sample ID	Sample Depth (ft bgs)	Laboratory Based Analysis													Field Based Analysis			Comment			
			TPH-DRO	TPH-GRO	TCLP-VOC	TCLP	BTEX	IRC	Paint Filter	Classification	Atterberg Limit	pH	Organic Matter	Soluble Salt	Standard Proctor	Particle Size	HPC	In-Place Density and Moisture		Oxygen	Carbon Dioxide	Methane
<b>Side Wall and Bottom Confirmation Soil Samples (Continued)</b>																						
Area 1 (continued)	PE1BT06-02	15.0	X																			
	PE1BT07-02	15.0	X																			
Area 2	PE2WL01-00	0.0-5.0	X																			
	PE2WL03-01	5.0-10.0	X																			
	PE2WL04-01	5.0-10.0	X																			
	PE2WL05-02	10.0-11.0	X																			
	PE2WL05-02D	10.0-11.0	X																		Duplicate <sup>1</sup>	
	PE2WL05-02MS/MSD	10.0-11.0	X																			Matrix Spike/Matrix Spike Duplicate <sup>2</sup>
	PE2WL06-02	10.0-11.0	X																			
	PE2WL11-02	10.0-11.0	X																			
Area 3	PE2BT01-02	11.0	X																			
	PE3WL01-00	0.0-5.0	X																			
	PE3WL02-00	0.0-5.0	X																			
	PE3WL02-00D	0.0-5.0	X																			Duplicate <sup>1</sup>
	PE3BT01-00	5.0	X																			
Area 4	PE3BT02-00	5.0	X																			
	PE4WL01-00	0.0-5.0	X																			
	PE4WL02-00	0.0-5.0	X																			
	PE4WL03-00	0.0-5.0	X																			
	PE4WL04-00	0.0-5.0	X																			
	PE4WL05-01	5.0-10.0	X																			
	PE4WL06-01	5.0-10.0	X																			
	PE4WL07-01	5.0-10.0	X																			
	PE4WL08-01	5.0-10.0	X																			
	PE4WL09-02	10.0-13.0	X																			
	PE4WL09-02D	10.0-13.0	X																			Duplicate <sup>1</sup>
	PE4WL09-02MS/MSD	10.0-13.0	X																			Matrix Spike/Matrix Spike Duplicate <sup>2</sup>
	PE4WL10-02	10.0-13.0	X																			
PE4WL11-02	10.0-13.0	X																				

TABLE 3-1

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**CONFIRMATION AND CHARACTERIZATION SAMPLING SUMMARY  
 SAMPLING AND ANALYSIS PLAN FOR  
 CONTAMINATED SOIL REMOVAL  
 PICO DEL ESTE RADAR FACILITY  
 LIQUILLO, PUERTO RICO**

Area	Media/Sample ID	Sample Depth (ft bgs)	Laboratory Based Analysis													Field Based Analysis			Comment		
			TPH-DRO	TPH-GRO	TCLP-VOC	TCLP	BTEX	IRC	Paint Filter	Classification	Atterberg Limit	pH	Organic Matter	Soluble Salt	Standard Proctor	Particle Size	HPC	In-Place Density and Moisture		Oxygen	Carbon Dioxide
<b>Side Wall and Bottom Confirmation Soil Samples (Continued)</b>																					
Area 4 (continued)	PE4WL12-02	10.0-13.0	X																		
	PE4BT01-02	13.0	X																		
Area 5	PE5WL01-00	0.0-3.0	X																		
	PE5WL02-00	0.0-3.0	X																		
	PE5WL03-00	0.0-3.0	X																		
	PE5WL04-00	0.0-3.0	X																		
	PE5BT01-00	3.0	X																		
	PE5BT02-00	3.0	X																		
Area 6	PE6WL01-00	0.0-1.0	X																		
	PE6WL02-00	0.0-1.0	X																		
	PE6WL02-00D	0.0-1.0	X																		Duplicate <sup>1</sup>
	PE6BT01-00	1.0	X																		
Area 7	PE7WL01-00	0.0-1.0	X																		
	PE7WL01-00D	0.0-1.0	X																		Duplicate <sup>1</sup>
	PE7WL01-00MS/MSD	0.0-1.0	X																		Matrix Spike/Matrix Spike Duplicate <sup>2</sup>
	PE7BT01-00	1.0	X																		
<b>Waste Characterization Soil Samples</b>																					
Excavated Soil Stockpile	PEWP01	Composite				X															
Excavated Soil Stockpile	PEWP01	Grab	X		X			X	X												
Incidental Waste	PEIDW01	Composite				X															Decontamination Liquid and Solids
Incidental Waste	PEIDW01	Grab	X		X			X													Decontamination Liquid and Solids

TABLE 3-1

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**CONFIRMATION AND CHARACTERIZATION SAMPLING SUMMARY  
SAMPLING AND ANALYSIS PLAN FOR  
CONTAMINATED SOIL REMOVAL  
PICO DEL ESTE RADAR FACILITY  
LIQUILLO, PUERTO RICO**

Area	Media/Sample ID	Sample Depth (ft bgs)	Laboratory Based Analysis													Field Based Analysis				Comment	
			TPH-DRO	TPH-GRO	TCLP-VOC	TCLP	BTEX	IRC	Paint Filter	Classification	Atterberg Limit	pH	Organic Matter	Soluble Salt	Standard Proctor	Particle Size	HPC	In-Place Density and Moisture	Oxygen		Carbon Dioxide
<b>Off-Site Backfill Sample</b>																					
Offsite Borrow*	PEBF01	Composite	X			X		X		X	X				X	X		X			Common Backfill
	PEBF01	Grab		X	X		X														Common Backfill
	PETP01	Composite	X			X		X		X	X	X		X							Topsoil
	PETP01	Grab		X	X		X														Topsoil
<b>Surface and Subsurface Soil Samples</b>																					
Upgradient of Contamination**	PEHPC01-00	0.0-1.0															X		X	X	
Near Fence-Line**	PEHPC02-02	13.0-15.0															X		X	X	

**Notes:**

ft bgs - feet below ground surface.

TPH-DRO - Total Petroleum Hydrocarbons Diesel Range Organics

TPH-GRO - Total Petroleum Hydrocarbons Gasoline Range Organics

TCLP - Toxicity Characteristic Leaching Procedure

VOC - volatile organic carbon

\*These results should be provided prior to placement of fill on site.

\*\*Exact locations shall be determined in the field.

Confirmation Samples will be Collected as Grab Samples.

Number of Required Samples may Increase Based on Results of Analysis

BTEX - Benzene, Toluene, Ethylbenzene, and Xylenes

IRC - ignitability, reactivity, and corrosivity

NA - Not Applicable.

HPC - Heterotrophic Plate Count

Sample depth may not be achieved due to obstructions.

<sup>1</sup> Quality Assurance samples will be collected at a frequency of 1 duplicate per 10 samples.<sup>2</sup> Quality Assurance samples will be collected at a frequency of 1 matrix spike/matrix spike duplicate per 20 samples.

TABLE 3-2

**METHOD PERFORMANCE LIMITS  
AND CONTRACT REQUIRED QUANTITATION LIMITS (CRQL)  
SAMPLING AND ANALYSIS PLAN FOR  
CONTAMINATED SOIL REMOVAL  
PICO DEL ESTE RADAR FACILITY  
LIQUILLO, PUERTO RICO**

Revised: December 12, 2011

Volatiles	Quantitation Limits*		Method Number	Preparation Methods		Method Description
	Water (µg/L)	Low Soil (µg/kg)		Water	Soil	
Benzene	0.25	1.0	8260B	5030 B	5035/5035A	GC/MS
Ethyl benzene	0.25	1.3	8260B	5030 B	5035/5035A	GC/MS
Toluene	0.33	1.0	8260B	5030 B	5035/5035A	GC/MS
Xylene	0.75	1.1	8260B	5030 B	5035/5035A	GC/MS
Total Petroleum Hydrocarbons	Quantitation Limits*		Method Number	Preparation Methods		Method Description
	Water (mg/L)	Low Soil (mg/kg)		Water	Soil	
TPH DRO	0.05	2.10	8015C	3520C	3550B/3550C	GC
TPH GRO	0.025	0.05	8015C	5030B	5035	GC
TCLP Volatiles	Quantitation Limits*		Method Number	Preparation Methods		Method Description
	Water (µg/L)	Soil (µg/L)		Water	Soil	
1,1-Dichloroethene	N/A	20	1311 / 8260B	5030B	5030B	GC/MS
1,2-Dichloroethane	N/A	20	1311 / 8260B	5030B	5030B	GC/MS
1,4 Dichlorobenzene	N/A	20	1311 / 8260B	5030B	5030B	GC/MS
2-Butanone (MEK)	N/A	200	1311 / 8260B	5030B	5030B	GC/MS
Benzene	N/A	20	1311 / 8260B	5030B	5030B	GC/MS
Carbon tetrachloride	N/A	20	1311 / 8260B	5030B	5030B	GC/MS
Chlorobenzene	N/A	20	1311 / 8260B	5030B	5030B	GC/MS
Chloroform	N/A	20	1311 / 8260B	5030B	5030B	GC/MS
Tetrachloroethene	N/A	20	1311 / 8260B	5030B	5030B	GC/MS
Trichloroethene	N/A	20	1311 / 8260B	5030B	5030B	GC/MS
Vinyl chloride	N/A	20	1311 / 8260B	5030B	5030B	GC/MS
TCLP Semivolatiles	Quantitation Limits*		Method Number	Preparation Methods		Method Description
	Water (µg/L)	Soil (µg/L)		Water	Soil	
2,4 Dinitrotoluene	N/A	50	1311/8270D	3520C	3520C	GC/MS
2,4,5 Trichlorophenol	N/A	50	1311/8270D	3520C	3520C	GC/MS
2,4,6 Trichlorophenol	N/A	50	1311/8270D	3520C	3520C	GC/MS
Cresol	--	--	1311/8270D	3520C	3520C	GC/MS
m-Cresol	N/A	50	1311/8270D	3520C	3520C	GC/MS
o-Cresol	N/A	50	1311/8270D	3520C	3520C	GC/MS
p-Cresol	N/A	50	1311/8270D	3520C	3520C	GC/MS
Hexachlorobenzene	N/A	50	1311/8270D	3520C	3520C	GC/MS
Hexachlorobutadiene	N/A	50	1311/8270D	3520C	3520C	GC/MS
Hexachloroethane	N/A	50	1311/8270D	3520C	3520C	GC/MS
Nitrobenzene	N/A	50	1311/8270D	3520C	3520C	GC/MS
Pentachlorophenol	N/A	250	1311/8270D	3520C	3520C	GC/MS
Pyridine	N/A	250	1311/8270D	3520C	3520C	GC/MS

TABLE 3-2

**METHOD PERFORMANCE LIMITS  
AND CONTRACT REQUIRED QUANTITATION LIMITS (CRQL)  
SAMPLING AND ANALYSIS PLAN FOR  
CONTAMINATED SOIL REMOVAL  
PICO DEL ESTE RADAR FACILITY  
LIQUILLO, PUERTO RICO**

Revised: December 12, 2011

TCLP Organochlorine Pesticides	Quantitation Limits*		Method Number	Preparation Methods		Method Description
	Water (µg/L)	Soil (µg/L)		Water	Soil	
Chlordane	N/A	25	1311/8081B	3520C	3520C	GC
Endrin	N/A	5.0	1311/8081B	3520C	3520C	GC
Heptachlor	N/A	2.5	1311/8081B	3520C	3520C	GC
Heptachlor epoxide	N/A	2.5	1311/8081B	3520C	3520C	GC
Lindane	N/A	2.5	1311/8081B	3520C	3520C	GC
Methoxychlor	N/A	2.5	1311/8081B	3520C	3520C	GC
Toxaphene	N/A	250	1311/8081B	3520C	3520C	GC
TCLP Chlorinated Herbicides	Quantitation Limits*		Method Number	Preparation Methods		Method Description
	Water (µg/L)	Soil (µg/L)		Water	Soil	
2,4 -D	N/A	50	1311/8151A	3520C	3520C	GC
2,4,5 -TP Silvex	N/A	50	1311/8151A	3520C	3520C	GC
TCLP Metals	Quantitation Limits*		Method Number	Preparation Methods		Method Description
	Water (µg/L)	Soil (µg/L)		Water	Soil	
Arsenic	N/A	200	1311/6010C	3010A	3010A	ICP-AES
Barium	N/A	1000	1311/6010C	3010A	3010A	ICP-AES
Cadmium	N/A	100	1311/6010C	3010A	3010A	ICP-AES
Chromium	N/A	200	1311/6010C	3010A	3010A	ICP-AES
Lead	N/A	200	1311/6010C	3010A	3010A	ICP-AES
Mercury	N/A	20	1311/7470A	7470A	7470A	Cold Vapor AA
Selenium	N/A	500	1311/6010C	3010A	3010A	ICP-AES
Silver	N/A	100	1311/6010C	3010A	3010A	ICP-AES
Reactivity, Corrosivity, Ignitability	Quantitation Limits*		Method Number	Preparation Methods		Method Description
	Water (mg/L)	Low Soil (mg/kg)		Water	Soil	
Reactive Cyanide	0.005	0.27	9012/9012	9012	9012	Titrimetric
Flashpoint/Ignitability	N/A	N/A	1010A/1030	N/A	N/A	Pensky-Martens Closed Cup Tester
pH (s.u.)	N/A	N/A	9040B/9045D	N/A	N/A	Electrometric
Reactive Sulfide	10.0	60	9034/9034	9030B	9030B	Titrimetric
Engineering Parameters	Quantitation Limits*		Method Number	Preparation Methods		Method Description
	Water (mg/L)	Low Soil (mg/kg)		Water	Soil	
Classification	N/A	N/A	ASTM D2487	N/A	N/A	--
Atterberg Limits	N/A	N/A	ASTM D4318	N/A	N/A	--
Standard Proctor	N/A	N/A	ASTM D698	N/A	N/A	--
Particle Size	N/A	N/A	ASTM D1140	N/A	N/A	--
Particle Size - Topsoil	N/A	N/A	ASTM D422	N/A	N/A	--
Paint Filter Liquids Test	N/A	N/A	EPA 9095A	N/A	N/A	--
Soluble Salt	N/A	N/A	ASTM D4542	N/A	N/A	--
Organic Matter	N/A	N/A	DOA SSIR 42	N/A	N/A	--
Field Density	N/A	N/A	ASTM D2922, D3017, D1556	N/A	N/A	--

**TABLE 3-2**  
**METHOD PERFORMANCE LIMITS**  
**AND CONTRACT REQUIRED QUANTITATION LIMITS (CRQL)**  
**SAMPLING AND ANALYSIS PLAN FOR**  
**CONTAMINATED SOIL REMOVAL**  
**PICO DEL ESTE RADAR FACILITY**  
**LIQUILLO, PUERTO RICO**

Revised: December 12, 2011

Engineering Parameters	Quantitation Limits*		Method Number	Preparation Methods		Method Description
	Water (mg/L)	Low Soil (mg/kg)		Water	Soil	
Heterotrophic Plate Count	Colony Count per Volume	NA	SM 9215	SM 9215	NA	Pour Plate

**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/L - micrograms per liter.

µg/kg - micrograms per kilogram.

mg/kg - milligrams per kilogram.

mg/L - milligrams per liter

GC - Gas Chromotography

GC/MS - Gas Chromotography/Mass Spectrometry

ICP - Inductively Coupled Plasma

AES - Atomic Emission Spectroscopy

AA - Atomic Adsorption

N/A - Not applicable

TCLP - Toxicity Characteristic Leaching Procedure

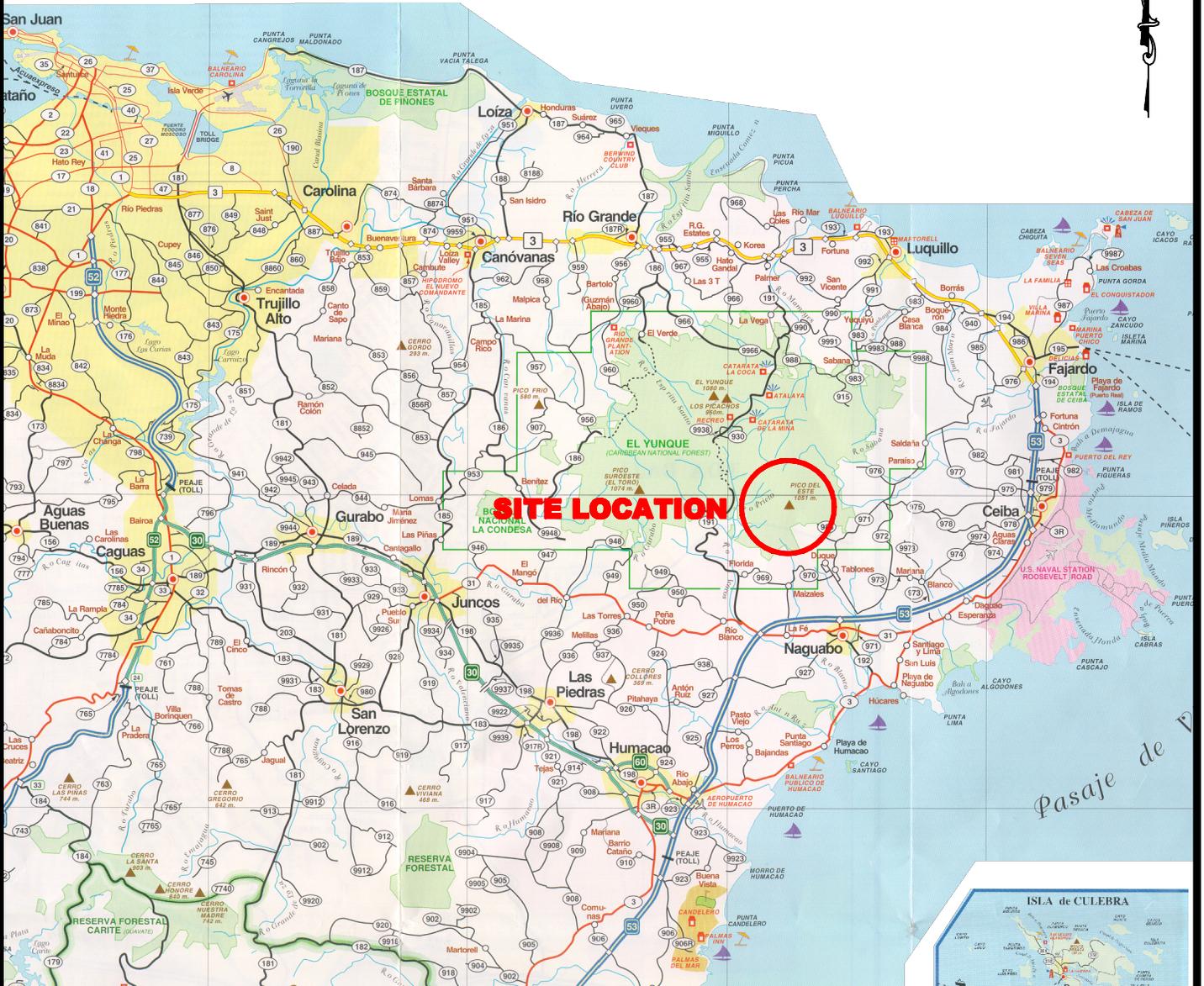
**QUALITY ASSURANCE/QUALITY CONTROL SAMPLING SUMMARY**  
**SAMPLING AND ANALYSIS PLAN FOR**  
**CONTAMINATED SOIL REMOVAL**  
**PICO DEL ESTE RADAR FACILITY**  
**LIQUILLO, PUERTO RICO**

Media/Sample ID	Laboratory Based Analysis				Comment
	BTEX	TCLP-VOC	TPH-DRO	TPH-GRO	
<b>Trip Blank Samples</b> <sup>1</sup>					
PETB101	X	X		X	
PETB102	X	X		X	
PETB103	X	X		X	
PETB104	X	X		X	
<b>Field Blank Samples</b>					
PEFB101			X		Lab Grade Deionized Water
PEFB102			X		Store Bought Distilled Water
<b>Sampling Equipment Quality Assurance</b>					
PEER101			X		Stainless steel spoon, trowel, or excavation bucket
PEER102			X		Stainless steel spoon, trowel, or excavation bucket
PEER103			X		Stainless steel spoon, trowel, or excavation bucket
PEER104			X		Stainless steel spoon, trowel, or excavation bucket
PEER105			X		Stainless steel spoon, trowel, or excavation bucket

**Notes:**

TPH-DRO - Total Petroleum Hydrocarbons Diesel Range Organics  
 TPH-GRO - Total Petroleum Hydrocarbons Gasoline Range Organics  
 BTEX - Benzene, Toluene, Ethylbenzene, and Xylenes  
 TCLP - Toxicity Characteristic Leaching Procedure  
 VOC - volatile organic compound

<sup>1</sup> Trip blank samples to accompany Off-Site Borrow Source and Waste Characterization samples.



1 inch = 4 miles



FIGURE 1-1  
REGIONAL LOCATION MAP  
SAMPLING AND ANALYSIS PLAN  
CONTAMINATED SOIL REMOVAL  
PICO DEL ESTE RADAR FACILITY  
CARRIBEAN NATIONAL FOREST  
PUERTO RICO

SOURCE: METRODATA, INC., 1999.

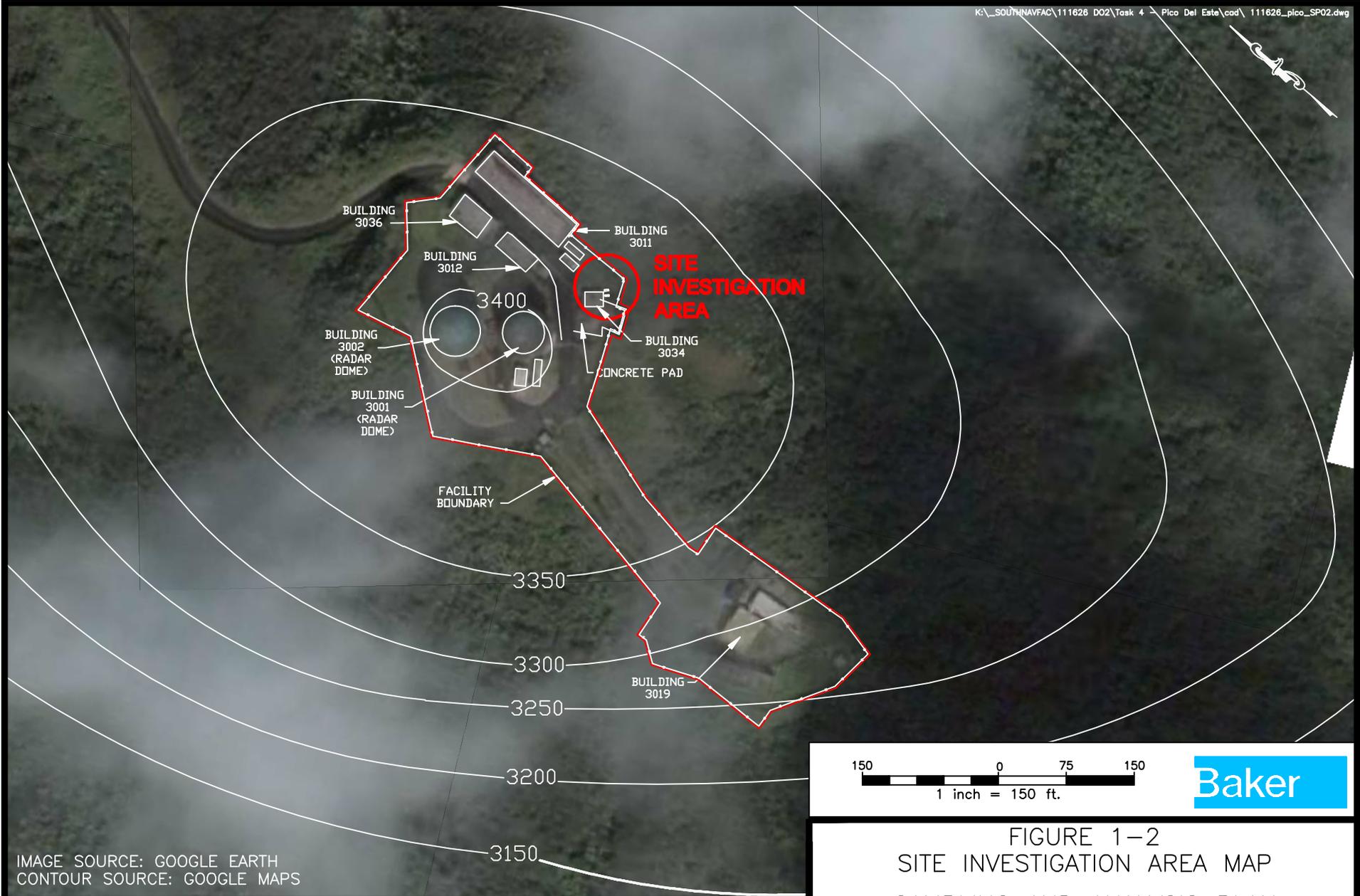
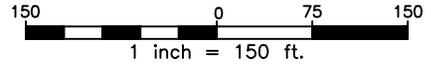


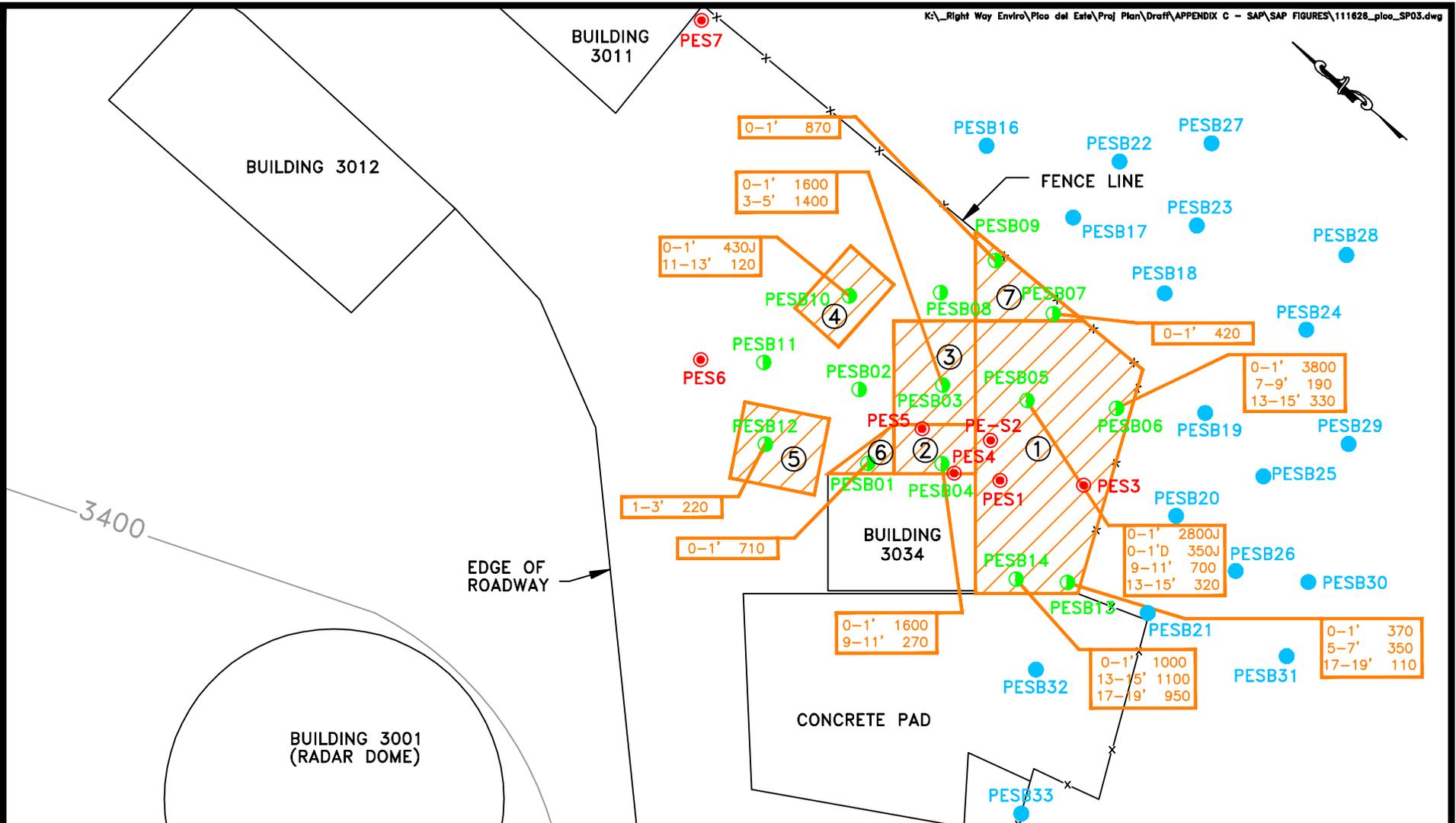
IMAGE SOURCE: GOOGLE EARTH  
CONTOUR SOURCE: GOOGLE MAPS

**LEGEND**

- 3300— TOPOGRAPHIC CONTOUR (ELEVATION IN FEET ABOVE MEAN SEA LEVEL)
- — FACILITY BOUNDARY
- x— FENCE LINE

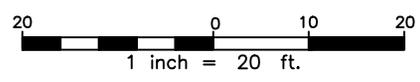


**FIGURE 1-2**  
**SITE INVESTIGATION AREA MAP**  
 SAMPLING AND ANALYSIS PLAN  
 CONTAMINATED SOIL REMOVAL  
 PICO DEL ESTE RADAR FACILITY  
 CARRIBEAN NATIONAL FOREST  
 PUERTO RICO



EXCAVATION AREA	APPROXIMATE AREA TO BE REMOVED (SQUARE FEET)	DEPTH OF REMOVAL (FEET)	APPROXIMATE VOLUME TO BE REMOVED (CUBIC YARDS)
①	699	15	388
②	76	11	31
③	159	5	29
④	92	13	44
⑤	125	3	14
⑥	31	1	1
⑦	92	1	3

- LEGEND**
- (Green) - 2007 SITE INVESTIGATION BORING LOCATIONS
  - (Red) - PREVIOUS EBS BORING LOCATIONS 2003
  - (Blue) - 2008 SITE INVESTIGATION SURFACE SOIL LOCATIONS
  - ▨ (Hatched) - ESTIMATED AREA TO BE REMOVED (TPH-DRO GREATER THAN 100 mg/kg)
  - 1-3' 220 (Box) - SAMPLE VALUE (mg/kg)  
SAMPLE DEPTH (FT)
  - X - - FENCELINE (LIMITS OF WORK)
  - D - DUPLICATE SAMPLE



**FIGURE 3-1**  
**AREAS DESIGNATED FOR CONTAMINATED SOIL REMOVAL**  
**SAMPLING AND ANALYSIS PLAN**  
**CONTAMINATED SOIL REMOVAL**  
**PICO DEL ESTE RADAR FACILITY**  
**CARIBBEAN NATIONAL FOREST**  
**PUERTO RICO**

**APPENDIX D**  
**QUALITY CONTROL FORMS**

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**CQC TEST REPORT LIST**

CQC REPORT # \_\_\_\_\_ SH \_\_\_\_ OF \_\_\_\_\_ DATE \_\_\_\_\_

CONTRACTOR: \_\_\_\_\_ CONTRACT #: \_\_\_\_\_

PROJECT TITLE: \_\_\_\_\_ LOCATION: \_\_\_\_\_

<b>SPEC REF OR DWG#</b>	<b>TYPE OF TEST</b>	<b>DATE PERFORMED</b>	<b>RESULTS</b>	<b>REMARKS</b>

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)

<u>Item</u>	<u>Quantity</u>	<u>Description</u>	<u>Storage Provided</u>	<b>Inspection Results</b>		
				<b>Accept</b>	<b>Reject</b>	<b>Comments</b>

**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



<b>RWEC</b> <b>HC 72 Box 3744</b> <b>Naranjito, P.R. 00719</b> Phone: 787-857-8832 Fax: 787-857-6068	Variance No:	
	Date of Issue:	
	Page 1 of 1	
Project Name:	Contract Number:	
<b>- Field Variance Report -</b>		
I. Type of Variance:		
<input type="checkbox"/>	Differing Site Condition	<input type="checkbox"/>
<input type="checkbox"/>	Change in Regulatory Requirement	<input type="checkbox"/>
<input type="checkbox"/>	Change in Quantity	<input type="checkbox"/>
<input type="checkbox"/>	Other:	<input type="checkbox"/>
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:		
<b>- Signatures -</b>		
Requested by:		Project Manager Approval:
Date		Date
Approved by:		QA Approval:
Date		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:**

	<u>NAME</u>	<u>POSITON</u>	<u>COMPANY</u>
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



### 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:**

<u>NAME</u>	<u>POSITION</u>	<u>COMPANY</u>

**B. SUBMITTALS REQUIRED TO BEGIN WORK:**

<u>ITEM</u>	<u>SUBMITTAL #</u>	<u>ACTION CODE</u>

**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.

**APPENDIX E**  
**SUBMITTAL REGISTER**

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## SUBMITTAL REGISTER

CONTRACT NO.

TITLE AND LOCATION  
CONTAMINATED SOIL REMOVAL - PICO DEL ESTE RADAR FACILITY

CONTRACTOR

ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAGRAPH #	GOVT CLASSIFICATION REVIEW	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION		APPROVING AUTHORITY				REMARKS		
						SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/	DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER		ACTION CODE	DATE OF ACTION
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		01 33 00	SD-01 Preconstruction Submittals														
			Submittal register	1.8													
		01 35 45.00 10	SD-03 Product Data														
			Sampling and Analysis Plan		G												
			SD-06 Test Reports														
			QA Sample Collection and Analysis														
			Chemistry Data Package														
			Chemical Data Final Report		G												
		01 57 19.00 20	SD-01 Preconstruction Submittals														
			Preconstruction Survey	1.5.1	G												
			Solid Waste Management Plan and Permit	3.4	G												
			Regulatory Notifications	1.5.2	G												
			Environmental Management Plan	3.1	G												
			Storm Water Pollution Prevention Plan		G												
			Storm Water Notice of Intent (for NPDES coverage under the general permit for construction activities)		G												
			Contractor Hazardous Material Inventory Log	3.6	G												
			ECATTS list of Contractor and Subcontractor company names	1.4.1	G												
			SD-06 Test Reports														

# SUBMITTAL REGISTER

CONTRACT NO.

TITLE AND LOCATION  
CONTAMINATED SOIL REMOVAL - PICO DEL ESTE RADAR FACILITY

CONTRACTOR

ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAGRAPH	GOVT CLASSIFICATION REVIEW	CONTRACTOR SCHEDULE DATES			CONTRACTOR ACTION		APPROVING AUTHORITY				REMARKS		
						SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE		DATE OF ACTION	MAILED TO CONTR/ DATE RCD FRM APPR AUTH
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		01 57 19.00 20	Laboratory Analysis														
			Disposal Requirements														
			Erosion and Sediment Control														
			Inspection Reports														
			Storm Water Inspection Reports for General Permit														
			Contractor 40 CFR employee training records	1.5.5													
			Solid Waste Management Report	3.4.1	G												
			SD-11 Closeout Submittals														
			Storm Water Pollution Prevention Plan compliance notebook		G												
			Waste Determination Documentation	3.5													
			Disposal Documentation for Regulated Waste														
			Contractor 40 CFR Employee Training Records	1.5.5													
			Solid Waste Management Permit	3.4													
			Solid Waste Management Report	3.4.1													
			Contractor Hazardous Material Inventory Log	3.6	G												
			Debris Management														
			Regulatory Notifications	1.5.2													
		02 61 13	SD-02 Shop Drawings														
			Surveys	3.1	G												

**SUBMITTAL REGISTER**

CONTRACT NO.

TITLE AND LOCATION  
CONTAMINATED SOIL REMOVAL - PICO DEL ESTE RADAR FACILITY

CONTRACTOR

ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAGRAPH #	GOVT OR CLASSIFICATION REVIEW	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION		APPROVING AUTHORITY				MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS	
						SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE			DATE OF ACTION
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		02 61 13	SD-03 Product Data														
			Work Plan		G												
			Closure Report	3.10	G												
			SD-06 Test Reports														
			Backfill	2.2	G												
			Surveys	3.1	G												
			Confirmation Sampling and Analysis	3.5	G												
			Sampling of Stored Material		G												
			Sampling Liquid		G												
			Compaction	3.8.2	G												
		02 81 00	SD-03 Product Data														
			Notices of Non-Compliance and Notices of Violation	3.2													
			Packaging Notifications	2.1.1													
			SD-06 Test Reports														
			Recordkeeping	3.5	G												
			Spill Response	3.6													
			Exception Report	3.5	G												
			SD-07 Certificates														
			Transportation and Disposal Coordinator	1.4.1	G												
			Training	1.4.2	G												
			Certificates of Disposal	3.2.5													
			Shipping Documents and Packagings Certification	3.2.3	G												

# SUBMITTAL REGISTER

CONTRACT NO.

TITLE AND LOCATION  
CONTAMINATED SOIL REMOVAL - PICO DEL ESTE RADAR FACILITY

CONTRACTOR

ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAGRAPH	GOVT CLASSIFICATION REVIEW	CONTRACTOR SCHEDULE DATES			CONTRACTOR ACTION		APPROVING AUTHORITY					REMARKS		
						SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION		MAILED TO CONTR/ DATE RCD FRM APPR AUTH	
																		(a)
		02 81 00	Waste Minimization	3.4	G													
		31 11 00	SD-04 Samples															
			Tree wound paint	2.1														
		31 23 00.00 20	SD-01 Preconstruction Submittals															
			Shoring and Sheeting Plan	1.7.1														
			Dewatering work plan	1.7.2														
			SD-06 Test Reports															
			Borrow Site Testing		G													
			Fill and backfill	3.8.2.1														
			Density tests	3.8.2.2														
		32 92 19	SD-03 Product Data															
			Wood cellulose fiber mulch															
			Fertilizer	2.3														
			SD-06 Test Reports															
			Topsoil composition tests	2.2.3														
			SD-07 Certificates															
			seed	2.1														
			SD-08 Manufacturer's Instructions															
			Erosion Control Materials	2.6														



## 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   | E -- Disapproved (See Attached)  |
| B -- Approved, except as noted on drawings.  | F -- Receipt acknowledged  |
| C -- Approved except as noted on drawings.<br>Refer to attached sheet resubmission required. | FX -- Receipt acknowledged, does not comply<br>as noted with contract requirements |
| D -- Will be returned by separate correspondence.  | G -- Other ( <i>Specify</i> )  |
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**

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**APPENDIX F  
PROJECT SCHEDULE  
CONTAMINATED SOIL REMOVAL  
PICO DEL ESTE RADAR FACILITY  
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO**

ID	Task Name	Duration	Start	Finish	Ap	Ma	Ju	Jul	Au	Se	Oc	No	De	Ja	Fe	Ma	Ap	Ma	Ju	Jul	Au	Se	Oc	No	De	Ja	Fe	Ma	Ap	Ma	Ju	Jul	Au	Se	Oc		
1	<b>PICO DEL ESTE SOIL REMOVAL</b>	<b>624 days</b>	<b>5/3/10</b>	<b>9/23/12</b>	[Summary bar]																																
2	<b>Work Plan for Soil Removal</b>	<b>425 days</b>	<b>5/3/10</b>	<b>12/19/11</b>	[Summary bar]																																
3	Draft Work Plan	53 edays	5/3/10	6/25/10	[Bar]																																
4	EQB Review	63 edays	6/25/10	8/27/10	[Bar]																																
5	Working Draft of Work Plan	214 edays	8/27/10	3/29/11	[Bar]																																
6	EQB Review	14 edays	3/29/11	4/12/11	[Bar]																																
7	Revised Working Draft	196 edays	4/12/11	10/25/11	[Bar]																																
8	EQB Review	15 edays	10/25/11	11/9/11	[Bar]																																
9	Revised Working Draft	19 edays	11/9/11	11/28/11	[Bar]																																
10	Approval of Working Draft	9 edays	11/28/11	12/7/11	[Bar]																																
11	Final Design	5 edays	12/7/11	12/12/11	[Bar]																																
12	Final Design Approval	7 edays	12/12/11	12/19/11	[Bar]																																
13	<b>Soil Removal</b>	<b>61 days</b>	<b>12/19/11</b>	<b>3/13/12</b>	[Summary bar]																																
14	Mobilization	20 edays	12/19/11	1/8/12	[Bar]																																
15	Survey	2 edays	1/8/12	1/10/12	[Bar]																																
16	Excavation and Staging	2 edays	1/10/12	1/12/12	[Bar]																																
17	Confirmation and Characterization Sampling and Analysis	14 edays	1/12/12	1/26/12	[Bar]																																
18	Survey Sample Locations & Final Excavation Limits	2 edays	1/26/12	1/28/12	[Bar]																																
19	Transportation and Off-Site Disposal	2 edays	1/28/12	1/30/12	[Bar]																																
20	Backfill and Revegetation	1 eday	1/30/12	1/31/12	[Bar]																																
21	Demobilization	42 edays	1/31/12	3/13/12	[Bar]																																
22	<b>Soil Removal Final Report</b>	<b>138 days</b>	<b>3/13/12</b>	<b>9/23/12</b>	[Summary bar]																																
23	Draft	44 edays	3/13/12	4/26/12	[Bar]																																
24	Report Review	60 edays	4/26/12	6/25/12	[Bar]																																
25	Final Report	30 edays	6/25/12	7/25/12	[Bar]																																
26	Report Approval	60 edays	7/25/12	9/23/12	[Bar]																																

**APPENDIX G**  
**SITE SPECIFIC HEALTH AND SAFETY PLAN**

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**DRAFT**  
**SITE SPECIFIC HEALTH AND SAFETY PLAN**  
**CONTAMINATED SOIL REMOVAL**  
**PICO DEL ESTE RADAR FACILITY**

**LUQUILLO, PUERTO RICO**

**JUNE 25, 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*

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## LIST OF ACRONYMS AND ABBREVIATIONS

ACM	Asbestos Containing Material
AHA	Activity Hazard Analysis
BAC	Blood Alcohol Concentration
Baker	Michael Baker Jr., Inc.
cc/min	Cubic centimeters/minute
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
EBS	Environmental Baseline Survey
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
LBP	Lead Based Paint
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

## LIST OF ACRONYMS AND ABBREVIATIONS

(continued)

NIOSH	National Institute for Occupational Safety and Health
NRR	Noise Reduction Rating
NTR	Navy Technical Representative
OPIM	Other potentially infectious materials
OSHA	Occupational Safety and Health Administration
PAH	Polynuclear Aromatic Hydrocarbons
PCB	polychlorinated biphenyls
PEL	Permissible Exposure Level
PID	Photoionization Detector
PM	Project Manager
PPE	Personal Protection Equipment
PREQB	Puerto Rico Environmental Quality Board
PRG	Preliminary Remediation Goals
ppm	Parts Per Million
PVC	Polyvinyl Chloride
RWEC	Right Way Environmental Contractors, Inc.
SARA	Superfund Amendments and Reauthorization Act
SHM	Safety and Health Manager
SS	Site Superintendent
SSHO	Site Safety and Health Officer
SSHSP	Site Specific Health and Safety Plan
SZ	Support Zone
TPH	Total Petroleum Hydrocarbons
TLV	Threshold Limit Value
T & D	Transportation and Disposal
TWA	Time Weighted Average
USACE	United States Army Corps of Engineers
USEPA	United States Environmental Protection Agency
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 the Pico del Este Radar Facility site. 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. (RWECE) is to provide a safe and healthful work environment for all employees. RWECE considers no phase of operations or administration to be of greater importance than injury and illness prevention. Safety takes precedence over expediency and shortcuts. RWECE 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 Safety and Health Manager (SHM).

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 (USEPA), and RWECE 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 Health Requirements Manual EM 385-1-1.

### **1.4 Disclaimer**

The enclosed SSHSP has been designed for the methods presently contemplated by RWECE 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 RWECE, 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 on designated contaminated sites on Puerto Rico perform their work under the supervision of their internal health and safety professionals.

## **2.0 SITE HISTORY/SCOPE OF WORK**

### **2.1 Background**

Pico del Este Radar Facility is located within the Caribbean National Forest, Luquillo, Puerto Rico (Figure 1-1). This site was used as a radar/communications complex by the Navy for tracking of various military weapons systems and communications during military training exercises formerly conducted at the Vieques Naval Training Range (VNTR). The Navy leased the property from the U.S. Forestry Service, who owns the property inside and outside the fence line of the radar facility. The radar/communications complex lies at the top of a mountain peak (Pico del Este or “East Peak”) at an approximate elevation of 3,500 feet above sea level, as shown on aerial photograph, Figure 1-2.

An Environmental Baseline Survey (EBS) was conducted in 2003, which identified a petroleum spill near Building 3034, and a spill of polychlorinated biphenyl (PCB) transformer oil in Building 3012, in addition to verification of asbestos containing material (ACM) and lead-based paint (LBP) in numerous buildings located at Pico del Este Radar Facility.

Analytical results from surface and subsurface soil sampling performed in 2007 and 2008 indicate the presence of Total Petroleum Hydrocarbons – Diesel Range Organics (TPH-DRO) due to the release of diesel fuel from the emergency generator formerly housed in Building 3034 at the Pico del Este Radar Facility.

DRO was found at concentrations exceeding the Puerto Rican Environmental Quality Board (PREQB) DRO soil screening criteria in both surface and subsurface soil. The delineation of DRO results indicated subsurface soil with levels higher than the PREQB criteria extend outside the perimeter fence, while the additional sample collection in January 2008 confirms surface soil is not impacted at levels above the EQB screening criteria outside the fence line. Due the extremely sensitive ecosystem in the rainforest, it is not advisable to perform soil removal activities outside the fence line to remove potentially DRO-impacted subsurface soil. No individual volatile organic compounds (VOC) or polynuclear aromatic hydrocarbons (PAH) parameters exceed the United States Environmental Protection Agency (USEPA) Preliminary Remediation Goals (PRGs) and DRO will biodegrade over time, especially if the point source area in the surface soil is removed within the fence line. The Navy proposes the soil removal to be conducted as indicated on Figure 1-3.

### **2.2 Scope of Work**

This SSHSP focuses on work requirement of the removal action to attain the goals at this particular site.

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), Safety and Health Manager (SHM) and the Site Safety and Health Officer (SSHO) 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 and SHM to assure that the work is completed in a manner consistent with the SSHSP. The SS and the SHM are responsible for field implementation of the SSHSP. The SHM will be the main contact in any on-site emergency situation and will ensure off-site emergency agencies have been contacted prior to the start of work. The PM, SS, and SHM 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 SHM 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.

##### **3.1.1 Safety and Health Manager Requirements**

The SHM meets the minimum requirements for an SHM as specified in EM 383 1-1, Nov. 3, 03, Section 1, and includes as a minimum:

- Completion of 10-Hour OSHA Construction Safety Course;
- Completion of 40-Hour Hazardous Waste Site Operations Training per 29 CFR 1919.120 and subsequent annual updates.

##### **3.1.2 Safety and Health Manager Duties**

The SHM duties are as follows:

The SHM is responsible for implementing the SSHSP, which satisfies federal, state, and local regulations and is consistent with site conditions. The SHM may take actions independent of the project group to stop the project, if required, for noncompliance with the SSHSP.

The SS is responsible for the day-to-day implementation of the SSHSP during site activities. In conjunction with the SS, the SHM will oversee the day-to-day implementation of the SSHSP, including the following responsibilities:

- Directing the entrance and exit medical physical requirements, if required.
- Approval of Personal Protective Equipment (PPE) and safety procedures specified in the SSHSP.
- Overseeing the maintenance and use of field monitoring equipment necessary to define on-site hazards associated with remediation.
- Designating appropriate personnel protection level and determining protection level upgrades and downgrades as site conditions permit.

- Providing necessary guidance to the project staff so they can safely perform their functions in accordance with federal and state regulations.

### 3.2 **Key Safety Personnel**

The following individuals share responsibility for health and safety at the site:

Project Manager/ Program Manager	Pedro Tejada (787) 857-8832 (office) (787) 630-9881 (cellular)
Site Superintendent	Luis A. Rios (787) 607-1536 (cellular)
Safety and Health Manager	Felix Gonzalez (787) 857-8832 (office)
Site Safety and Health Officer	Felix Gonzalez (787) 857-8832 (office)

## **4.0 ACTIVITY HAZARDS**

Excavations will be completed as indicated on the project plans generated for RWEC.

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 Pico Del Este Radar Facility are TPH, primarily DRO.

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 SSHSP.

### **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 Physical Hazards**

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/SHM will observe the general work practices of each crew member and equipment operator and will enforce safe procedures. The crew leaders and SS/SHM 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/SHM 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/SHM. 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/SHM 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 ° F	4.0	3.5	2.5	1.5

\*Work above 100° 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/SHM 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 SHM

### **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 minimal or no 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-metoluamide). 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 SHM.

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/SHM 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/](http://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/SHM 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/SHM 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 are 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/SHM 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/SSO 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/SSO. Visitors will attend a site orientation given by the SS/SSO 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/SSO, 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 Code of Federal Regulations (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 SHM 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 SHM, 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/SHM.

## **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 Pico del Este Radar Facility 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**

<b>Monitoring Device</b>	<b>Monitoring Location/ Personnel</b>	<b>Monitoring Frequency</b>	<b>Action Level</b>	<b>Action</b>
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)/O<sub>2</sub> measurements will be taken.

### **8.3 Air Monitoring Log**

The SS/SSO 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/SSO 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/SSO 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  (787)863-0505  The SHM 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
RWEC Personnel:  Project Manager – Pedro Tejada  Site Superintendent – Luis Rios  Health and Safety Officer – 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/SSO 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;
- 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;
- 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 local Police Department and the Office of Emergency Management by dialing “911”.

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/SSO. 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:

1. Make sure all unnecessary persons are removed from the hazard area;
2. Put on protective clothing and equipment;
3. If a flammable material is involved, remove all ignition sources, and use spark and explosion proof equipment for recovery of material;
4. 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;
5. 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;
6. 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;
7. Spray the spill area with foam, if available, if volatile emissions may occur;
8. Apply appropriate spill control media (e.g., clay, sand, lime, etc.) to absorb discharged liquids;
9. 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/SSO will contact the local hospital and inform them of the site hazards and potential emergency situations. A minimum of two first-aid/cardiopulmonary resuscitation (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/SSO. If it is determined that no threat to life is present, the SS/SSO 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

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.

<b>RWEC/SUBCONTRACTORS</b>	<b>VISITOR ORIENTATION</b>
SSHSP sign off Sign in/out procedures Site background Chain of command Rules and regulations Hours of work Absences 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	SSHSP signoff Review of Site map Work Zones in progress Hazard Communication Emergency plan/signals Training/medical requirements Zones/areas open to visitors

## **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**

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1 inch = 4 miles



FIGURE 1-1  
REGIONAL LOCATION MAP

HEALTH AND SAFETY PLAN  
CONTAMINATED SOIL REMOVAL  
PICO DEL ESTE RADAR FACILITY  
CARRIBEAN NATIONAL FOREST  
PUERTO RICO

SOURCE: METRODATA, INC., 1999.

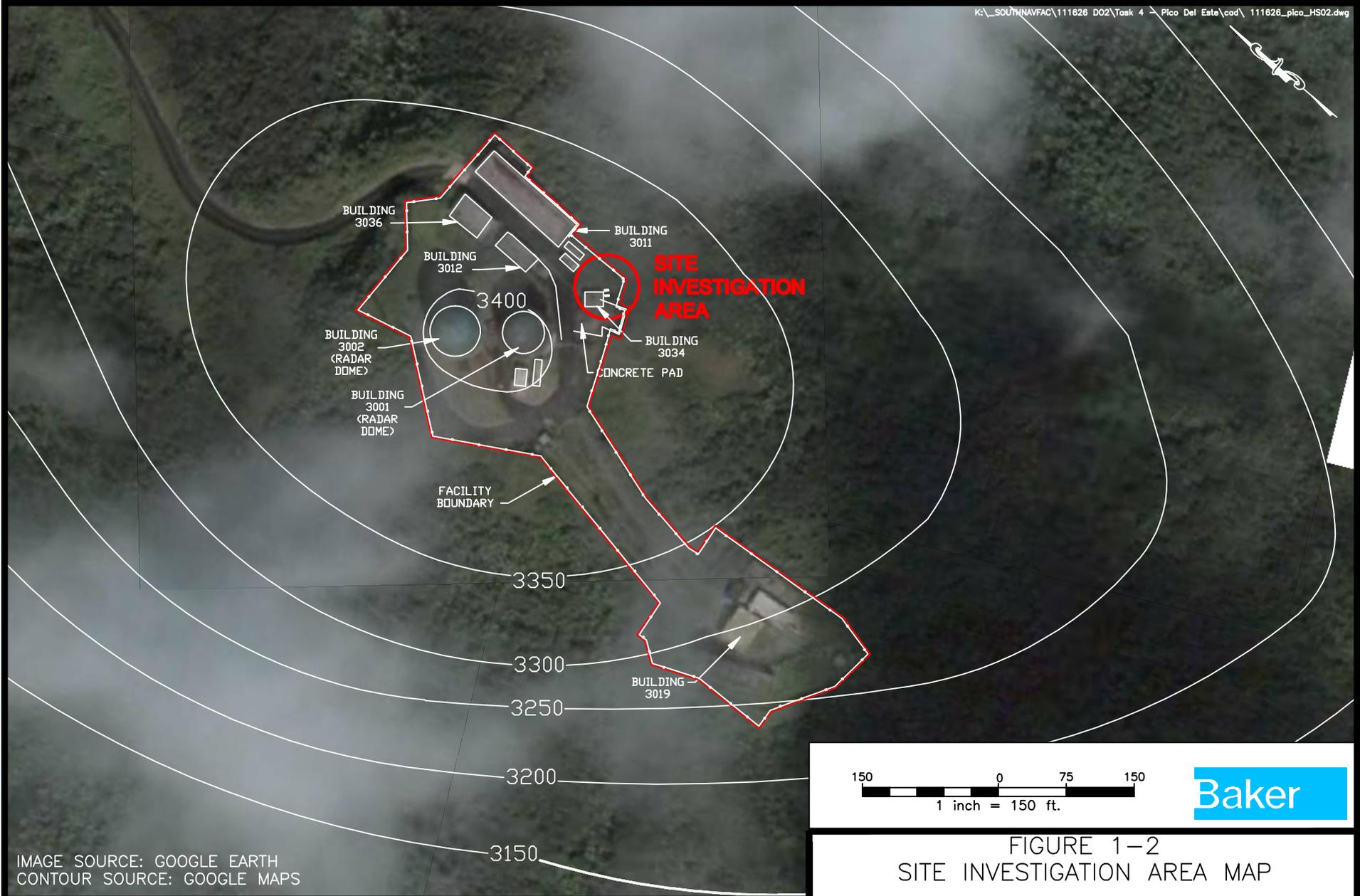
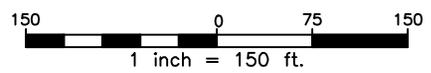


IMAGE SOURCE: GOOGLE EARTH  
CONTOUR SOURCE: GOOGLE MAPS

- LEGEND**
- 3300— TOPOGRAPHIC CONTOUR (ELEVATION IN FEET ABOVE MEAN SEA LEVEL)
  - — FACILITY BOUNDARY
  - x— FENCE LINE



**FIGURE 1-2**  
**SITE INVESTIGATION AREA MAP**  
 HEALTH AND SAFETY PLAN  
 CONTAMINATED SOIL REMOVAL  
 PICO DEL ESTE RADAR FACILITY  
 CARRIBEAN NATIONAL FOREST  
 PUERTO RICO

**APPENDIX A**  
**MATERIAL SAFETY DATA SHEETS**

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# MATERIAL SAFETY DATA SHEET

<b>SECTION 1</b>	<b>PRODUCT AND COMPANY IDENTIFICATION</b>
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**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>

<b>SECTION 2</b>	<b>COMPOSITION / INFORMATION ON INGREDIENTS</b>
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**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)**

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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.

<b>NFPA Hazard ID:</b>	Health: 1	Flammability: 3	Reactivity: 0
<b>HMIS Hazard ID:</b>	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

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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<sub>2</sub>) 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

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### 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.

<b>SECTION 7</b>
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<b>HANDLING AND STORAGE</b>
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### 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.

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## 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.

<b>SECTION 8</b>	<b>EXPOSURE CONTROLS / PERSONAL PROTECTION</b>
------------------	--

## 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/m <sup>3</sup>	1000 ppm	N/A OSHA Z1
ETHYL ALCOHOL		STEL	1000 ppm		N/A ACGIH
ETHYL BENZENE		TWA	435 mg/m <sup>3</sup>	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/m <sup>3</sup>	500 ppm	N/A OSHA Z1
N-HEXANE		TWA	50 ppm		Skin ACGIH
NAPHTHALENE		TWA	50 mg/m <sup>3</sup>	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/m <sup>3</sup>	100 ppm	N/A OSHA Z1
XYLENES		STEL	150 ppm		N/A ACGIH
XYLENES		TWA	100 ppm		N/A ACGIH

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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.

<b>SECTION 9</b>	<b>PHYSICAL AND CHEMICAL PROPERTIES</b>
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Typical physical and chemical properties are given below. Consult the Supplier in Section 1 for additional

Product Name: GASOLINE, UNLEADED AUTOMOTIVE

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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 mm<sup>2</sup>/sec) at 40 C  
**Oxidizing Properties:** See Sections 3, 15, 16.

**OTHER INFORMATION**

**Freezing Point:** N/D  
**Melting Point:** N/A

<b>SECTION 10</b>	<b>STABILITY AND REACTIVITY</b>
-------------------	---------------------------------

**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.

<b>SECTION 11</b>	<b>TOXICOLOGICAL INFORMATION</b>
-------------------	----------------------------------

**ACUTE TOXICITY**

<u>Route of Exposure</u>	<u>Conclusion / Remarks</u>
<b>Inhalation</b>	
Toxicity (Rat): LC50 > 5000 mg/m <sup>3</sup>	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.
<b>Ingestion</b>	
Toxicity (Rat): LD50 > 2000 mg/kg	Minimally Toxic. Based on test data for structurally similar

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	materials.
<b>Skin</b>	
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.
<b>Eye</b>	
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

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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

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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.

<b>SECTION 14</b>	<b>TRANSPORT INFORMATION</b>
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### 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

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**Label(s) / Mark(s):** 3

**Transport Document Name:** UN1203, GASOLINE, 3, PG II

<b>SECTION 15</b>	<b>REGULATORY INFORMATION</b>
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**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

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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

<b>SECTION 16</b>	<b>OTHER INFORMATION</b>
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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

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REGULAR UNLEADED | Gasoline | INDOLINE GASOLINE | MIDGRADE UNLEADED | MOBIL EXTRA UNLEADED | MOBIL REGULAR UNLEADED | MOBIL SPECIAL UNLEADED | MOBIL SUPER UNLEADED | PREMIUM UNLEADED | REGULAR UNLEADED | UNLEADED GASOLINE

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**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<sub>2</sub>) 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.



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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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Internal Use Only

MHC: 1A, 0, 0, 0, 3, 1

PPEC: CF

DGN: 2000316XUS (1011203)

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7419760-00 BEACON 325  
MATERIAL SAFETY DATA BULLETIN

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

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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

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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

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**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.

---

## 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

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### 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.

---

## 9. PHYSICAL AND CHEMICAL PROPERTIES

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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

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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

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---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.

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12. ECOLOGICAL INFORMATION

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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.

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13. DISPOSAL CONSIDERATIONS

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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.

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14. TRANSPORT INFORMATION  
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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

-----  
16. OTHER INFORMATION  
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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  
Ermyrn Way  
KT22 8UX Leatherhead, Surrey  
United Kingdom

**24 Hour Environmental / Health Emergency Telephone e-mail** 01372 222 000 (UK) / +44 1372 222 000 (Ireland)  
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.

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**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

<b>SECTION 4</b>	<b>FIRST AID MEASURES</b>
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**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.

<b>SECTION 5</b>	<b>FIRE FIGHTING MEASURES</b>
------------------	-------------------------------

**EXTINGUISHING MEDIA**

Appropriate Extinguishing Media: Use water fog, foam, dry chemical or carbon dioxide (CO2) to extinguish flames.

Inappropriate Extinguishing Media: Straight streams of water

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## 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°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.

### 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

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## 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/m <sup>3</sup>			ExxonMobil	2007
Fuels, diesel, no. 2	Vapour.	TWA	200 mg/m <sup>3</sup>			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.

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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°C (482°F)

**Boiling Point / Range:** > 180C (356F)

**Vapour Density (Air = 1):** > 2 at 101 kPa

**Vapour Pressure:** < 0.04 kPa (0.3 mm Hg) at 20°C

**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 mm<sup>2</sup>/sec) at 40°C - 4 cSt (4 mm<sup>2</sup>/sec) at 40°C

**Oxidising properties:** See Sections 3, 15, 16.

### OTHER INFORMATION

**Freezing Point:** N/D

**Melting Point:** N/A

<b>SECTION 10</b>	<b>STABILITY AND REACTIVITY</b>
-------------------	---------------------------------

**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.

<b>SECTION 11</b>	<b>TOXICOLOGICAL INFORMATION</b>
-------------------	----------------------------------

**Acute Toxicity**

<u>Route of Exposure</u>	<u>Conclusion / Remarks</u>
<b>INHALATION</b>	
Toxicity: LC50 > 5000 mg/m <sup>3</sup>	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.
<b>INGESTION</b>	
Toxicity: LD50 > 2000 mg/kg	Minimally Toxic. Based on test data for structurally similar materials.
<b>Skin</b>	
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.
<b>Eye</b>	
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.

<b>SECTION 12</b>	<b>ECOLOGICAL INFORMATION</b>
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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

<b>SECTION 13</b>	<b>DISPOSAL CONSIDERATIONS</b>
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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

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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.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]

<b>SECTION 16</b>	<b>OTHER INFORMATION</b>
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**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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The information and recommendations contained herein are, to the best of ExxonMobil's knowledge and belief, accurate and reliable as of the date issued. You can contact ExxonMobil to insure that this document is the most current available from ExxonMobil. The information and recommendations are offered for the user's consideration and examination. It is the user's responsibility to satisfy itself that the product is suitable for the intended use. If buyer repackages this product, it is the user's responsibility to insure proper health, safety and other necessary information is included with and/or on the container. Appropriate warnings and safe-handling procedures should be provided to



Product Name: ESSO DIESEL

Revision Date: 18Dec2007

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handlers and users. Alteration of this document is strictly prohibited. Except to the extent required by law, re-publication or retransmission of this document, in whole or in part, is not permitted. The term, "ExxonMobil" is used for convenience, and may include any one or more of ExxonMobil Chemical Company, Exxon Mobil Corporation, or any affiliates in which they directly or indirectly hold any interest.

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Internal Use Only

MHC: 1A, 0, 0, 0, 1, 1

PPEC: C

DGN: 7081439XGB (1012120)

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7212211-00 2211 DIESEL LUBRICATING OIL  
MATERIAL SAFETY DATA BULLETIN

### 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.

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#### 4. FIRST AID MEASURES

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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.

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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): 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

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#### 6. ACCIDENTAL RELEASE MEASURES

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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

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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

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### OCCUPATIONAL EXPOSURE LIMITS:

When mists/aerosols can occur, the following are recommended: 5 mg/m<sup>3</sup> (as oil mist)- ACGIH Threshold Limit Value (TLV), 10 mg/m<sup>3</sup> (as oil mist) - ACGIH Short Term Exposure Limit (STEL), 5 mg/m<sup>3</sup> (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

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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

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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

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---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  
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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 ectotoxicity 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.

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### 13. DISPOSAL CONSIDERATIONS

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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.

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### 14. TRANSPORT INFORMATION

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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

Product Name: GASOLINE, UNLEADED AUTOMOTIVE  
 Revision Date: 07 Jul 2009  
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# MATERIAL SAFETY DATA SHEET

<b>SECTION 1</b>	<b>PRODUCT AND COMPANY IDENTIFICATION</b>
------------------	---

**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>

<b>SECTION 2</b>	<b>COMPOSITION / INFORMATION ON INGREDIENTS</b>
------------------	---

**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)**

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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

Product Name: GASOLINE, UNLEADED AUTOMOTIVE

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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<sub>2</sub>) 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

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### 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.

<b>SECTION 7</b>
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<b>HANDLING AND STORAGE</b>
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### 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.

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## 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.

<b>SECTION 8</b>	<b>EXPOSURE CONTROLS / PERSONAL PROTECTION</b>
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## 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/m <sup>3</sup>	1000 ppm	N/A OSHA Z1
ETHYL ALCOHOL		STEL	1000 ppm		N/A ACGIH
ETHYL BENZENE		TWA	435 mg/m <sup>3</sup>	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/m <sup>3</sup>	500 ppm	N/A OSHA Z1
N-HEXANE		TWA	50 ppm		Skin ACGIH
NAPHTHALENE		TWA	50 mg/m <sup>3</sup>	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/m <sup>3</sup>	100 ppm	N/A OSHA Z1
XYLENES		STEL	150 ppm		N/A ACGIH
XYLENES		TWA	100 ppm		N/A ACGIH

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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.

<b>SECTION 9</b>	<b>PHYSICAL AND CHEMICAL PROPERTIES</b>
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Typical physical and chemical properties are given below. Consult the Supplier in Section 1 for additional

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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 mm<sup>2</sup>/sec) at 40 C  
**Oxidizing Properties:** See Sections 3, 15, 16.

**OTHER INFORMATION**

**Freezing Point:** N/D  
**Melting Point:** N/A

<b>SECTION 10</b>	<b>STABILITY AND REACTIVITY</b>
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**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.

<b>SECTION 11</b>	<b>TOXICOLOGICAL INFORMATION</b>
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**ACUTE TOXICITY**

<u>Route of Exposure</u>	<u>Conclusion / Remarks</u>
<b>Inhalation</b>	
Toxicity (Rat): LC50 > 5000 mg/m <sup>3</sup>	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.
<b>Ingestion</b>	
Toxicity (Rat): LD50 > 2000 mg/kg	Minimally Toxic. Based on test data for structurally similar

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	materials.
<b>Skin</b>	
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.
<b>Eye</b>	
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

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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

<b>SECTION 12</b>	<b>ECOLOGICAL INFORMATION</b>
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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.

<b>SECTION 13</b>	<b>DISPOSAL CONSIDERATIONS</b>
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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**

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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

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**Label(s) / Mark(s):** 3

**Transport Document Name:** UN1203, GASOLINE, 3, PG II

<b>SECTION 15</b>	<b>REGULATORY INFORMATION</b>
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**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

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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

<b>SECTION 16</b>	<b>OTHER INFORMATION</b>
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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

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REGULAR UNLEADED | Gasoline | INDOLINE GASOLINE | MIDGRADE UNLEADED | MOBIL EXTRA UNLEADED | MOBIL REGULAR UNLEADED | MOBIL SPECIAL UNLEADED | MOBIL SUPER UNLEADED | PREMIUM UNLEADED | REGULAR UNLEADED | UNLEADED GASOLINE

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#### 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<sub>2</sub>) 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.



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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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Internal Use Only

MHC: 1A, 0, 0, 0, 3, 1

PPEC: CF

DGN: 2000316XUS (1011203)

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7419760-00 BEACON 325  
MATERIAL SAFETY DATA BULLETIN

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.

---

## 5. FIRE-FIGHTING MEASURES

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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

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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

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**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

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### 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

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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

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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

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---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.

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12. ECOLOGICAL INFORMATION

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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.

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13. DISPOSAL CONSIDERATIONS

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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.

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14. TRANSPORT INFORMATION  
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USA DOT: NOT REGULATED BY USA DOT.

RID/ADR: NOT REGULATED BY RID/ADR.

IMO: NOT REGULATED BY IMO.

IATA: NOT REGULATED BY IATA.

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15. REGULATORY INFORMATION  
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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

-----  
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  
Ermyrn Way  
KT22 8UX Leatherhead, Surrey  
United Kingdom

**24 Hour Environmental / Health Emergency Telephone e-mail** 01372 222 000 (UK) / +44 1372 222 000 (Ireland)  
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.

Product Name: ESSO DIESEL

Revision Date: 18Dec2007

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**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

<b>SECTION 4</b>	<b>FIRST AID MEASURES</b>
------------------	---------------------------

**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.

<b>SECTION 5</b>	<b>FIRE FIGHTING MEASURES</b>
------------------	-------------------------------

**EXTINGUISHING MEDIA**

Appropriate Extinguishing Media: Use water fog, foam, dry chemical or carbon dioxide (CO2) to extinguish flames.

Inappropriate Extinguishing Media: Straight streams of water

Product Name: ESSO DIESEL

Revision Date: 18Dec2007

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## 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°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.

### 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

Product Name: ESSO DIESEL

Revision Date: 18Dec2007

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## 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/m <sup>3</sup>			ExxonMobil	2007
Fuels, diesel, no. 2	Vapour.	TWA	200 mg/m <sup>3</sup>			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.

Product Name: ESSO DIESEL

Revision Date: 18Dec2007

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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°C (482°F)

**Boiling Point / Range:** > 180C (356F)

**Vapour Density (Air = 1):** > 2 at 101 kPa

**Vapour Pressure:** < 0.04 kPa (0.3 mm Hg) at 20°C

**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 mm<sup>2</sup>/sec) at 40°C - 4 cSt (4 mm<sup>2</sup>/sec) at 40°C

**Oxidising properties:** See Sections 3, 15, 16.

### OTHER INFORMATION

**Freezing Point:** N/D

**Melting Point:** N/A

<b>SECTION 10</b>	<b>STABILITY AND REACTIVITY</b>
-------------------	---------------------------------

**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.

<b>SECTION 11</b>	<b>TOXICOLOGICAL INFORMATION</b>
-------------------	----------------------------------

**Acute Toxicity**

<u>Route of Exposure</u>	<u>Conclusion / Remarks</u>
<b>INHALATION</b>	
Toxicity: LC50 > 5000 mg/m <sup>3</sup>	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.
<b>INGESTION</b>	
Toxicity: LD50 > 2000 mg/kg	Minimally Toxic. Based on test data for structurally similar materials.
<b>Skin</b>	
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.
<b>Eye</b>	
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.

<b>SECTION 12</b>	<b>ECOLOGICAL INFORMATION</b>
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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

<b>SECTION 13</b>	<b>DISPOSAL CONSIDERATIONS</b>
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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

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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.

<b>SECTION 14</b>	<b>TRANSPORT INFORMATION</b>
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**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.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

<b>SECTION 15</b>	<b>REGULATORY INFORMATION</b>
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**Material is dangerous as defined by the EU Dangerous Substances/Preparations Directives.**

**CLASSIFICATION:** Category 3 Carcinogen. Harmful. Dangerous for the environment.

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## 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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The information and recommendations contained herein are, to the best of ExxonMobil's knowledge and belief, accurate and reliable as of the date issued. You can contact ExxonMobil to insure that this document is the most current available from ExxonMobil. The information and recommendations are offered for the user's consideration and examination. It is the user's responsibility to satisfy itself that the product is suitable for the intended use. If buyer repackages this product, it is the user's responsibility to insure proper health, safety and other necessary information is included with and/or on the container. Appropriate warnings and safe-handling procedures should be provided to



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Internal Use Only

MHC: 1A, 0, 0, 0, 1, 1

PPEC: C

DGN: 7081439XGB (1012120)

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7212211-00 2211 DIESEL LUBRICATING OIL  
MATERIAL SAFETY DATA BULLETIN

### 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.

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#### 4. FIRST AID MEASURES

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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

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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

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#### 6. ACCIDENTAL RELEASE MEASURES

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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

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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

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### OCCUPATIONAL EXPOSURE LIMITS:

When mists/aerosols can occur, the following are recommended: 5 mg/m<sup>3</sup> (as oil mist)- ACGIH Threshold Limit Value (TLV), 10 mg/m<sup>3</sup> (as oil mist) - ACGIH Short Term Exposure Limit (STEL), 5 mg/m<sup>3</sup> (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

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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

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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

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---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  
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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 ectotoxicity 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.

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### 13. DISPOSAL CONSIDERATIONS

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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.

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### 14. TRANSPORT INFORMATION

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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

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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  
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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**

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## **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 SSO (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 SSHA 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 Buddy System**

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 repellent 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 SSO 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**

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## **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**

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## **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**

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# 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 1904.35, 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)			
Injury	0	(4) Poisoning	0
Skin 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-08  
Date

**APPENDIX F**  
**ADVERSE WEATHER CONDITIONS PLAN**

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## 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**

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## **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**

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**APPENDIX I**  
**HEALTH AND SAFETY PLAN AMENDMENT**  
**DOCUMENTATION FORM**

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**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:**

**APPENDIX H**  
**TECHNICAL SPECIFICATIONS**

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**TECHNICAL SPECIFICATIONS FOR  
CONTAMINATED SOIL REMOVAL  
PICO DEL ESTE RADAR FACILITY**

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*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

December 12, 2011

*Prepared by:*

Right Way Environmental  
Contractors, Inc.  
Naranjito, Puerto Rico

**Corrective Action for Pico del Este Radar Facility  
Naval Activity Puerto Rico, Ceiba, Puerto Rico**

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**FINAL  
TECHNICAL SPECIFICATIONS  
CONTAMINATED SOIL REMOVAL  
PICO DEL ESTE**

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

**December 12, 2011**

*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***

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## 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 **may be** required prior to a notice to proceed commencing work on site. Submittals **which may be** 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  
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-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

- 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 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 to 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  
04/06

## PART 1 GENERAL

## 1.1 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.

## 1.2 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.

## 1.3 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.

## 1.3.1 Site History

## 1.3.1.1 Pico Del Este

The objective of this project is to remove TPH-DRO contaminated soil within the radar facility site to below 100 mg/kg, the established Corrective Action Objective (CAO) for the Pico Del Este Radar Facility. All work to be conducted as part of this project will be in accordance with the remedial design for the contaminated soil removal developed for the Pico del Este Radar Facility site. The overall objective of the soil removal is the protection of human health and the environment by removal of contaminated soil to established remedial goals.

## 1.3.2 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.

## 1.3.3 Sampling, Analysis and Measurement

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

#### 1.3.3.1 Soil Samples

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

#### 1.3.3.2 Borrow or Fill Material Samples

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

#### 1.3.3.3 Investigation Derived Waste Samples

Investigation derived waste (IDW) samples shall be collected and analyzed as incidental waste samples according to Sections 3.1.3 of these specifications. Decontamination liquids and solids are considered incidental waste for this work.

#### 1.3.3.4 Confirmation Samples

Samples collected from the sidewall and bottom of excavations will be analyzed in accordance with specification 01 35 45.00 10 Section 3.1.1.

#### 1.3.3.5 Excavated Soil or Waste Samples

Excavated soils shall be stockpiled on site prior to transport to off site disposal facility. The samples will be collected and analyzed as waste in accordance with specification 01 35 45.00 10 Section 3.1.2.

#### 1.3.3.6 Sampling Equipment Quality Assurance

To verify the decontamination methods and procedures are effective a quality assurance (QA) sample or rinsate sample will be collect from a randomly selected decontaminated reusable sampling equipment. The rinsate liquid collected from pouring DI water over the sampling equipment will be analyzed for the contaminant of concern TPH-DRO in accordance with Method 3550B/8015C. If any rinsate liquid remains after collecting the QA sample it will be containerized separate from the incidental waste.

#### 1.3.3.7 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.

#### 1.3.3.8 Real-Time Instrumental Measurement Samples

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

#### 1.3.3.9 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.

#### 1.3.3.10 Demolition Samples

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

#### 1.4 SUBMITTALS

The following submittals, if applicable, 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), 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.

#### 1.5 QUALITY ASSURANCE ELEMENTS

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

##### 1.5.1 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 QUALIFICATIONS

##### 1.6.1 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.

#### 1.6.2 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.

#### 1.7 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. For excavation greater than 4 foot deep samples will be collected directly from excavator bucket to avoid confined space entry situation.

Soil samples from the bottom of each open excavation area at Pico Del Este and one sample every 25 linear feet, or fraction thereof, of soil along the outside walls of the excavations. In addition, confirmation samples will be taken from the outside walls along the fence line, Building 3034, and concrete pad.

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

TPH-DRO (Method 3550B/8015C)

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 one waste characterization sample from excavation soil stockpile area.

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

TPH-DRO (Method 3550B/8015C)

IRC (Method 9014/9014, 9034/9034, 1010A/1030, 9040B/9045D)

TCLP (Method 3010A/1311)

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:

TPH-DRO Method	3550B/8015C
IRC Method	9014/9014, 9034/9034, 1010A/1030, 9040B/9045D
TCLP Method	3010A/1311

#### 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. 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

## 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)  
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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 **submittals, if applicable**, 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

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 Regulated Waste

Contractor 40 CFR Employee Training Records

Solid Waste Management Permit

Solid Waste Management Report

Contractor Hazardous Material Inventory Log; G

## 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

##### 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

#### 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/graphdoc\\_log.pdf](http://www.wbdg.org/ccb/NAVGRAPH/graphdoc_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 Resource 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 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.

### 3.8 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.

### 3.9 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.

#### 3.9.1 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.

#### 3.9.2 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.

### 3.10 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.

### 3.11 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.

### 3.12 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.

-- End of Section --

## SECTION 02 61 13

## EXCAVATION AND HANDLING OF CONTAMINATED MATERIAL

02/10

## PART 1 GENERAL

## 1.1 MEASUREMENT AND PAYMENT

## 1.1.1 Measurement

Measurement for excavation and onsite 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 liner materials and all other items incidental to construction of stockpiles.

## 1.2 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 1556 (2007) Density and Unit Weight of Soil in Place by the Sand-Cone Method

ASTM D 1557 (2009) Standard Test Methods for Laboratory Compaction Characteristics of

- Soil Using Modified Effort (56,000 ft-lbf/ft<sup>3</sup>) (2700 kN-m/m<sup>3</sup>)
- ASTM D 2167 (2008) Density and Unit Weight of Soil in Place by the Rubber Balloon Method
- ASTM D 2487 (2006e1) Soils for Engineering Purposes (Unified Soil Classification System)
- ASTM D 5434 (2009) Field Logging of Subsurface Explorations of Soil and Rock
- ASTM D 6938 (2007a) Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate 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. ARMY CORPS OF ENGINEERS (USACE)
- EM 385-1-1 (2008) Safety and Health Requirements Manual
- U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)
- 29 CFR 1926 Safety and Health Regulations for Construction
- 40 CFR 302 Designation, Reportable Quantities, and Notification

### 1.3 DESCRIPTION OF WORK

The work consists of excavation and temporary storage of approximately 510 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 in the Work Plan. Notify the Contracting Officer 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 more than 20 feet below ground surface. Required sampling and chemical analysis shall be conducted in accordance with Section 01 35 45.00 10 CHEMICAL DATA QUALITY CONTROL.

#### 1.3.1 Scheduling

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

#### 1.3.2 Work Plan

Submit a 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. 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.

#### 1.3.3 Other Submittal Requirements

Submit separate cross-sections of each area before and after excavation and after backfilling, test results, and 5 copies of the Closure Report within 14 calendar days of work completion at the site.

#### 1.4 SUBMITTALS

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

##### SD-02 Shop Drawings

Surveys; G

##### SD-03 Product Data

Work Plan; G  
Closure Report; G

##### SD-06 Test Reports

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

## 1.5 REGULATORY REQUIREMENTS

### 1.5.1 Permits and Licenses

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.

## PART 2 PRODUCTS

### 2.1 SPILL RESPONSE MATERIALS

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.

### 2.2 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, ML, MH, CL, or CH 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 borrow source. A minimum of one set of classification tests shall be performed per borrow source. The material shall have 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 1140 No. 200 Sieve.

Chemical Parameter	Test Method
TPH-DRO	3550B/8015C
TPH-GRO	5035/8015C
BTEX	5035A/8260B
IRC	9014/9014, 9034/9034, 1010A/1030, 9040B/9045D
Full TCLP	3010A/1311

Backfill shall not be used until borrow source chemical and physical test results have been submitted and approved. Additional requirements for topsoil backfill testing are specified in Section 32 92 19 Part 2.2.3. Sample collection requirements are addressed in Specification 31 23 00.00 20 Part 1.6.

## PART 3 EXECUTION

### 3.1 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. Locations of confirmation samples shall also be surveyed and shown on the drawings.

### 3.2 EXISTING STRUCTURES AND UTILITIES

No excavation shall be performed until site utilities have been field located. Take the necessary precautions to ensure no damage occurs to existing structures, buildings, fence 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.

### 3.3 CLEARING

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

### 3.4 CONTAMINATED MATERIAL REMOVAL

#### 3.4.1 Excavation

Areas of contamination shall be excavated to the depth and extent shown on the drawings and not more than 0.2 ft beyond the depth and extent shown on the drawings unless directed by the Contracting Officer. 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.

#### 3.4.2 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.

#### 3.4.3 Dewatering

Surface water shall be diverted to prevent entry into the excavation. No dewatering shall be performed without prior approval of the Contracting Officer.

### 3.5 CONFIRMATION SAMPLING AND ANALYSIS

After all suspected contaminated material is removed, confirmation samples shall be collected and analyzed for the following contaminants:

Chemical Parameter	Action Level
TPH-DRO	100 mg/kg

Collect bottom grab samples at a frequency of one sample per 100 square feet (10 ft by 10 ft) with a minimum of one sample per excavation area. Sidewall grab samples will be collected at a minimum frequency of one sample per every 25 feet horizontally along the sidewall and at every five foot vertical interval measured from the bottom of excavation. 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. Locations of samples shall be marked in the field and documented on the as-built drawings.

### 3.6 CONTAMINATED MATERIAL STORAGE

Material shall be placed in temporary storage, stockpiled, or placed in roll-off units immediately after excavation. The following paragraphs describe acceptable methods of material storage. Storage units shall be in good condition and constructed of materials that are compatible with the material or liquid to be stored. If multiple storage units are required, each unit shall be clearly labeled with an identification number and a written log shall be kept to track the source of contaminated material in each temporary storage unit.

#### 3.6.1 Stockpiles

Stockpiles shall be constructed to isolate stored contaminated material from the environment. The maximum stockpile size shall be 1000 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/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. Geomembrane cover free of holes or other damage to prevent precipitation from entering the stockpile. Non-reinforced geomembrane covers shall have a minimum thickness of 10 mils. Scrim reinforced geomembrane covers shall have a minimum weight of 26 lbs/1000 square feet. The cover material shall be extended over the berms and anchored or ballasted to prevent it from being removed or damaged by wind.
- c. Berms surrounding the stockpile, a minimum of 12 inches in height. Vehicle access points shall also be bermed.
- d. 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.

#### 3.6.2 Roll-Off Units

Roll-off units used to temporarily store contaminated material shall be water tight. A cover shall be placed over the units to prevent precipitation from contacting the stored material. The units shall be located in the soil stockpile area designated as shown on the drawings. Liquid which collects inside the units shall be removed and stored in accordance with paragraph Liquid Storage.

#### 3.6.3 Liquid Storage

Liquid collected from excavations and stockpiles shall be temporarily stored in 55 gallon barrels or 500 gallon tanks. Liquid storage containers shall be water-tight and shall be located as shown on the drawings.

### 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.), notify the Contracting Officer immediately. If the spill exceeds the reporting threshold, follow the pre-established procedures as described in the Spill Control Plan. 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 8 inches. Soil shall be compacted to 90 percent of ASTM D 698, ASTM D 1557 maximum dry density. 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 Specification 31 22 00.00 20. If ASTM D 6938 is used, a minimum of one in ten tests shall be checked using ASTM D 1556 or ASTM D 2167. Test results from ASTM D 1556 or ASTM D 2167 shall govern if there is a discrepancy with the ASTM D 6938 test results.

### 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 Closure Report shall be prepared and submitted within 14 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 certifying 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 by 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:  
Location:  
Photograph No.:

Direction of View:  
Date/Time:  
Description of View:

-- End of Section --

## SECTION 02 81 00

TRANSPORTATION AND DISPOSAL OF HAZARDOUS MATERIALS  
02/10

## 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. ations 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 266	Standards for the Management of Specific Hazardous Wastes and Specific Types of Hazardous Waste Management 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
40 CFR 61	National Emission Standards for Hazardous Air Pollutants

40 CFR 761	Polychlorinated Biphenyls (PCBs) Manufacturing, Processing, Distribution in Commerce, and Use Prohibitions
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

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

#### SD-03 Product Data

Notices of Non-Compliance and Notices of Violation  
Packaging Notifications

#### SD-06 Test Reports

Recordkeeping; G  
Spill Response  
Exception Report; G

#### SD-07 Certificates

Transportation and Disposal Coordinator; G  
Training; G  
Certificates of Disposal

Shipping Documents and Packagings Certification; G  
Waste Minimization; G

#### 1.4 QUALITY ASSURANCE

##### 1.4.1 Transportation and Disposal Coordinator

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 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 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, notify the Contracting Officer immediately.

## PART 2 PRODUCTS

### 2.1 MATERIALS

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

#### 2.1.1 Packagings

Provide 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. Also provide other packaging related materials such as materials used to cushion or fill voids in overpacked containers, etc. Sorbent materials shall not be capable of reacting dangerously with, being decomposed by, or being ignited by the hazardous materials being packaged. Additionally, sorbents used to treat free liquids to be disposed of in landfills shall be non-biodegradable as specified in 40 CFR 264, Section .314. In addition, packaging notifications will be provided to the Government in accordance with 49 CFR 172, Section .178.2(c) regarding type and dimensions of closures, including gaskets, needed to satisfy performance test requirements.

#### 2.1.2 Markings

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

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 offsite shipment of hazardous material/waste, 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

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

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 ONSITE 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 onsite for any length of time. The Contractor is 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. 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 onsite, comply with generator requirements in 40 CFR 262 and any applicable state or local law or regulations. Onsite 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). 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, and 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 for responding to any spills or leaks. Inspect all hazardous waste areas weekly and 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

Identify, in consultation with the waste generator, 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. Also identify all applicable treatment standards in 40 CFR 268 and state land disposal restrictions and 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

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 onsite where hazardous wastes are to be handled; and shall identify whether transfer facilities are to be utilized; and if so, how the wastes will be tracked to ultimate disposal. Submit the plan prior to start of work.

### 3.2 OFFSITE HAZARDOUS WASTE MANAGEMENT

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](#). Offsite 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. 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. Immediately provide copies of such notices to the Contracting Officer. Also furnish all relevant documents regarding the incident and any information requested by the Contracting Officer, and coordinate its response to the notice with the Contracting Officer or the designated representative prior to submission to the notifying authority. 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

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 shall be permitted in accordance with [40 CFR 270](#) or operating under interim status in accordance with [40 CFR 265](#) requirements, or permitted by a state authorized by the Environmental Protection Agency to administer the RCRA permit program. Additionally, prior to using a TSD Facility, contact the EPA Regional Offsite 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 Offsite policy](#) and submit this information to the Contracting Officer.

#### 3.2.3 Shipping Documents and Packagings Certification

Prior to shipment of any hazardous material offsite and a minimum of 14 days prior to anticipated pickup, the Contractor's TDC shall provide for review 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. Packaging assurances shall be furnished by the designated disposal facility not later than 35 days after acceptance of the shipment. 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. 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. Prepare hazardous waste manifests for each shipment of hazardous waste shipped offsite. Manifests shall be completed using instructions in 40 CFR 262, Subpart B and any applicable state or local law or regulation. Submit manifests and waste profiles to Contracting Officer for review and approval. 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. Submit notifications 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 storage area. Ship hazardous wastes only to facilities which are properly permitted to accept the hazardous waste or operating under interim status. Ensure wastes are treated to meet land disposal treatment standards in 40 CFR 268 prior to land disposal. Propose TSD facilities via submission of the Hazardous Waste Management Plan, subject to the approval of the Contracting Officer. Submit Certificates of Disposal documenting the ultimate disposal, destruction or placement of hazardous wastes. Receipt of these certificates will be required for final payment.

### 3.2.6 Identification of Proper Shipping Names

Use 49 CFR 172, Section .101 to identify proper shipping names for each hazardous material (including hazardous wastes) to be shipped offsite. Submit proper shipping names to the Contracting Officer in the form of draft shipping documents for review and approval.

### 3.2.7 Packaging, Labeling, and Marking

Package, label, and mark hazardous materials/wastes using the specified materials and in accordance with the referenced authorizations. 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 \_\_\_\_\_".

### 3.2.8 Shipping Documents

Ensure that each shipment of hazardous material sent offsite 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.

#### 3.2.8.1 PCB Waste Shipment Documents

Prepare hazardous waste manifests for each shipment of PCB waste shipped offsite. Complete manifests using instructions in 40 CFR 761, Sections .207 and .208 and all other applicable requirements. Submit documents to Contracting Officer for review and approval.

### 3.2.8.2 Asbestos Waste Shipment Documents

Prepare waste shipment records, as required by 40 CFR 61, for shipments of asbestos. Submit waste shipment records to the Contracting Officer for review and approval. Waste shipment records shall be signed by the Contractor.

### 3.2.9 Other Hazardous Material Shipment Documents

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, 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 shall be signed by the Contractor.

### 3.3 OBTAINING EPA ID NUMBERS

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.

### 3.4 WASTE MINIMIZATION

Minimize the generation of hazardous waste to the maximum extent practicable and take all necessary precautions to avoid mixing clean and contaminated wastes. Identify and evaluate recycling and reclamation options as alternatives to land disposal. Requirements of 40 CFR 266 shall apply to: hazardous wastes recycled in a manner constituting disposal; hazardous waste burned for energy recovery; lead-acid battery recycling; and hazardous wastes with economically recoverable precious metals. Submit 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.

### 3.5 RECORDKEEPING

The Contractor is responsible for maintaining adequate records to support information provided to the Contracting Officer regarding exception reports, annual reports, and biennial reports; maintaining asbestos waste shipment records for a minimum of 3 years from the date of shipment or any longer period required by any applicable law or regulation or any other provision of this contract; and maintaining bill of ladings for a minimum of 375 days from the date of shipment or any longer period required by any applicable law or regulation or any other provision of this contract. Submit information necessary to file state annual or EPA biennial reports for all hazardous waste transported, treated, stored, or disposed of under this contract. Do 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. In the events 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, or that a manifest copy documenting receipt of PCB waste at the designated facility is not received within 35 days of shipment initiation, prepare and submit an [exception report](#) to the Contracting Officer within 37 days of shipment initiation.

### 3.6 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.), notify the Contracting Officer immediately. Any direction from the Contracting Officer concerning a spill or release shall not be considered a change under the contract. If the spill exceeds a reporting threshold, follow the pre-established procedures for immediate reporting to the Contracting Officer. The Contractor shall comply with all applicable requirements of Federal, state, or local laws or regulations regarding any spill incident.

### 3.7 EMERGENCY CONTACTS

The Contractor is responsible for complying with the emergency contact provisions in [49 CFR 172](#), Section .604. Whenever the Contractor ships hazardous materials, 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 shall be monitored on a 24 hour basis at all times when the hazardous materials are in transportation, including during storage incidental to transportation. Ensure that information regarding this emergency contact and phone number are placed on all hazardous material shipping documents. 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
I	(617) 918-1752
II	(212) 637-4130
III	(214) 814-5267
IV	(404) 562-8591
V	(312) 353-8207
VI	(214) 665-2282
VII	(913) 551-7154
VIII	(303) 312-6419
IX	(415) 972-3304
X	(206) 553-2859

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  
08/08

## PART 1 GENERAL

## 1.1 SUBMITTALS

Submit, *if necessary*, the following in accordance with Section 01 33 00  
SUBMITTAL PROCEDURES:

## SD-04 Samples

## Tree wound paint

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. Trees and vegetation to be left standing shall be protected from damage incident to clearing, grubbing, and construction operations by the erection of barriers or by such other means as the circumstances require.

## 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, 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 obstruct, 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

**No tree or stump may be removed without authorization of the Navy Technical Representative.** This work shall include the felling of such trees and the removal of their stumps and roots as specified in paragraph GRUBBING. Trees shall be disposed of as specified in paragraph DISPOSAL OF MATERIALS.

### 3.4 PRUNING

Prune trees designated to be left standing within the cleared areas of dead branches **1 1/2 inches** or more in diameter; and trim branches to heights and in a manner as indicated. Neatly cut limbs and branches to be trimmed close to the bole of the tree or main branches. Paint cuts more than **1 1/4 inches** in diameter with an approved tree wound paint.

### 3.5 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.

### 3.6 DISPOSAL OF MATERIALS

#### 3.6.1 Disposal of Waste Materials

The Contractor shall be responsible for compliance with all Federal and State laws and regulations and with reasonable practice relative to the disposal of waste materials.

-- 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 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	(2009) Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft <sup>3</sup> ) (2700 kN-m/m <sup>3</sup> )
ASTM D 2487	(2006e1) 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.))

## 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 1557, 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 **submittals, if applicable**, shall be submitted in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

#### SD-01 Preconstruction Submittals

Shoring and Sheeting Plan

Dewatering work plan

#### SD-06 Test Reports

Borrow Site Testing; G

Fill and backfill 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 WORK PLANS

Base **work plan** 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 at least 20 feet below existing surface elevation. Previous site investigations did not identify water in the subsurface soils at depths less than 20 feet.
- 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 and topsoil shall be tested for TPH, BTEX and full TCLP including ignitability, corrosivity and reactivity (IRC). Backfill shall contain less than 100 parts per million (ppm) of total petroleum hydrocarbons (TPH) and less than 5 ppm of the sum of Benzene, Toluene, Ethyl Benzene, and Xylene (BTEX) and shall not fail the TCLP test. Soils brought in from off site for use as backfill and topsoil shall be analyzed using the methods listed in Specification 02 61 13 Part 2.2. Samples will be collected from the borrow source area at a frequency of one sample per 500 cubic yards per borrow source. TPH-GRO, TCLP VOC, and BTEX analysis require grab sample collection. The remaining TCLP suite, TPH-DRO and IRC analysis will be performed on a composite sample. 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 Sheet piling Plan

Provide shoring, bracing, cribbing, underpinning, and sheet piling in accordance with USACE EM-385-1-1, and 29 CFR 1926 Section 650, 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 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.

#### 2.1.4 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.

##### 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 in 8 inch lifts and compact to 90 percent of ASTM D 698 maximum density in accordance with Specification 02 61 13 Part 3.8.

### 3.4 FILLING AND BACKFILLING

Fill and backfill to contours, elevations, and dimensions indicated. Compact each lift before placing overlaying lift. Execute as specified in Specification 02 61 13 Part 3.8.

#### 3.4.1 Backfill & Fill Placement

Provide for general site. Place in 8 inch lifts. Compact areas not accessible to rollers or compactors with mechanical 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.

### 3.5 COMPACTION

#### 3.5.1 General Site

Execute compaction as specified in Specification 02 61 13 Part 3.8.

#### 3.5.2 Adjacent Area

Compact areas within 5 feet of structures to 90 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. **Topsoil not subjected to this backfill testing. Topsoil testing is presented in Specification 32 92 19 Part 2.2.**

##### 3.8.2.1 **Fill and Backfill** Material Testing

Test fill and backfill material in accordance with **Specification 02 61 13 Part 2.2** 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 **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.

##### 3.8.2.3 **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 **submittals, if applicable** 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

<u>Planting Season</u>	<u>Variety</u>	<u>Percent (by Weight)</u>
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 Specification 02 61 13 Part 2.2 and 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. Apply seed at a minimum application rate of 1 pound per 1000 square feet. 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 or 1500 pounds per acre of wood cellulose mulch if hydroseeded. 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 --