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FINAL WORK PLAN FOR SITE 83 RESTORATION OPERABLE UNIT 1 (OU1) MCAS  
CHERRY POINT NC  
4/1/2012  
RHEA ENGINEERS & CONSULTANTS, INC

**FINAL  
WORK PLAN  
OPERABLE UNIT 1 – SITE 83 RESTORATION  
MARINE CORPS AIR STATION  
CHERRY POINT, NORTH CAROLINA**



**Contract No. N40085-09-D-3214  
CTO: 0002**

**Rhēa Project No. 431**

**April 2012**

**Prepared for:**



NAVFAC Mid-Atlantic  
NC IPT, Code OPCEV  
6506 Hampton Boulevard  
C/O LRA Building C  
Norfolk, Virginia 23508-1278

**Prepared by:**



Rhēa Engineers & Consultants, Inc.  
4975 William Flynn Highway  
Suite 14  
Gibsonia, Pennsylvania 15044

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## ACRONYMS AND ABBREVIATIONS

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AASHTO	American Association of State Highway and Transportation Officials
APP	Accident Prevention Plan
bgs	Below Ground Surface
B&R	Brown & Root Environmental
CFR	Code of Federal Regulations
CSS	Coastal Stormwater Services, Inc.
CQCR	Contractor Quality Control Report
EAD	Environmental Affairs Department
E&S	Erosion and Sediment
HHRA	Human Health Risk Assessment
IQCA	Invoice Quality Control Administrator
MCAS	Marine Corps Air Station
NAVFAC	Naval Facilities Engineering Command
NCDENR	North Carolina Department of Environment and Natural Resources
NCDOT	North Carolina Department of Transportation
OU	Operable Unit
OSHA	Occupational Safety and Health Administration
PAH	Polycyclic Aromatic Hydrocarbons
PLS	Professional Locating Service, Inc.
PRB	Permeable Reactive Barrier
Precon	Pre-Construction Conference
QC	Quality Control
Rhēa	Rhēa Engineers & Consultants, Inc.
RPM	Remedial Project Manager
SQA	Site Quality Administrator
SWMU	Solid Waste Management Unit

UFP-SAP  
USEPA

Uniform Federal Policy-Sampling and Analysis Plan  
United States Environmental Protection Agency

# 1.0 INTRODUCTION

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Rhēa Engineers & Consultants, Inc. (Rhēa) is pleased to submit this Work Plan for the site restoration of Operable Unit 1 (OU1), Site 83 at Marine Corps Air Station (MCAS) Cherry Point, North Carolina (Figure 1). Activities associated with soil sampling conducted in 2009 resulted in the removal of most of the trees on the sloped areas of Site 83. This Work Plan describes the field activities associated with vegetation restoration and erosion control installation at Site 83, and provides necessary supporting documentation to complete the work safely, in accordance with applicable standards, rules, and regulations. Sections of the Work Plan include the following:

- + **Section 1.0** – Introduction
- + **Section 2.0** – Restoration Plan
- + **Section 3.0** – Waste Stream Management Plan
- + **Section 4.0** – Environmental Protection Plan
- + **Section 5.0** – Quality Control (QC) Plan
- + **Section 6.0** – References
- + **Appendix A** – Product Cut Sheets
- + **Appendix B** – Forms
- + **Appendix C** – Accident Prevention Plan

## 1.1 Site Location and History

Site 83 is a former pesticide mixing area, approximately one acre in size, located in the southwest portion of OU1, near Site 16 and East Prong Slocum Creek (Figure 2). The former pesticide shop (Building 96) was constructed before 1948 and was used as a pesticide mixing and storage area from 1965 to 1981. From 1981 until it was demolished in 1997, Building 96 was used for storage of equipment and hazardous materials. The building's concrete foundation was removed during a demolition project in early 2006.

A Solid Waste Management Unit (SWMU) Assessment Report (Brown & Root Environmental [B&R], 1998) was conducted and included the collection of soil, groundwater, and sediment samples. Groundwater and soil contamination was identified, and an additional investigation of Site 83 was recommended as part of the comprehensive evaluation of OU1. Soil contamination was also identified outside of the Site 83 boundary in the downslope wetland area. This area of contamination was considered to be associated with Site 83. Several site investigations and removal activities occurred between 1997 and 2009.

Historical soil sampling analytical data indicated that polycyclic aromatic hydrocarbons (PAHs), pesticides, and lead concentrations exceeded various screening criteria within the Site 83 boundary and in soil located west/southwest of the site adjacent to East Prong Slocum Creek. These exceedances were the basis for additional soil sampling detailed in the *Final Sampling and Analysis Plan, Operable Unit 1, Site 83, Soil Delineation Sampling, MCAS Cherry Point, North Carolina* (Rhēa, 2009) (Uniform Federal Policy-Sampling and Analysis Plan [UFP-SAP]). The UFP-SAP states the following:

“The objective of the soil sampling is to confirm residual contamination of polycyclic aromatic hydrocarbons (PAHs), pesticides, and lead at the site, characterize portions of the site where historical information is limited or suspect, and delineate the vertical and horizontal extent of impacted site soils. This information will be incorporated into future site documents and will be used to develop feasible remedial alternatives. These investigative soil samples will be utilized as pre-confirmatory samples in the event that an excavation remedial alternative is selected.”

Efforts were initially made to minimize the clearing of large, established trees along the Site 83 embankment and in the lowland area west of the embankment. During the initial clearing of underbrush and small trees, it was determined that the larger trees in these areas would have to be removed to accurately locate and access the sampling locations identified in the UFP-SAP. Rhēa met with the Environmental Affairs Department (EAD) prior to clearing any large trees, and subsequently received permission to clear the area.

Approximately 0.6 acres of trees and brush were cleared between July 21 and 24, 2009, from the slope and lowland area west of the embankment using a combination of wide-tracked grinding equipment and chain saws. Trees were cut flush with the ground surface, and chipped to provide a mulch layer over the ground surface. Wetlands & Woodlands Management, LLC, of Elizabethtown, North Carolina, provided clearing services. The approximate area of clearing is shown on Figure 3.

Rhēa performed soil sample collection activities between July 28 and August 21, 2009, in accordance with the UFP-SAP. Laboratory analysis of soil samples included 183 analyses for pesticides, 158 analyses for PAHs, and 15 analyses for lead. The results of the soil sampling were summarized in the *Final Site Soil Investigation Report* (Rhēa, 2010).

A Human Health Risk Assessment (HHRA) was completed in 2011 based on the soil samples collected in 2009 (CH2M HILL, 2011). The HHRA did not identify any unacceptable risk to human health; therefore, a No Further Action Record of Decision has been proposed, and the site will be restored to its condition prior to the 2009 soil sampling event.

## 1.2 Physical Characteristics

Site 83 consists of the former Building 96 area, asphalt pavement, gravel, and grass areas. The site is relatively flat; however, further to the west, the ground surface slopes significantly downward in a westerly direction toward East Prong Slocum Creek. The area west of Site 83 consists of dense woods. The uppermost soil consists predominantly of fill material composed of sands, silts, and clays mixed with wood fragments that may extend to a depth of 10 feet below ground surface (bgs). Groundwater is approximately seven feet bgs and flows west, toward East Prong Slocum Creek.

The clearing of vegetation in 2009 exposed significant erosion on the existing slope. Runoff from the elevated flat area became concentrated prior to flowing over the slope, resulting in subsequent erosion. Dense vegetation had obstructed the view of this erosion for years. It was evident that attempts had been made to remedy this erosion by filling in the gullies or obstructing the concentrated stormwater discharge points. These attempts caused other gullies to erode into the hillside. In 2009, concrete riprap was placed in two of the gullies and at the discharge point at the top of the slope. This caused the concentrated stormwater to move to a different area of the slope.

## 2.0 RESTORATION PLAN

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### 2.1 Project Objectives

The project objectives are to restore the vegetation that was impacted during clearing activities conducted in July 2009, and to improve drainage conditions along the sloped area in the western portion of the site.

### 2.2 Rhēa Project Team

Rhēa will lead the drainage improvement and vegetation restoration activities and provide site supervision. Rhēa will subcontract with the following contractors to assist with the project objectives:

- + Professional Locating Services, Inc. (PLS) will locate site utilities before drainage improvement and vegetation installation activities begin; and
- + Coastal Stormwater Services, Inc. (CSS) will install drainage features, conduct grading activities, and complete vegetation installation. CSS on-site employees are 40-hour Occupational Safety and Health Administration (OSHA) certified.

### 2.3 Scope of Work

#### 2.3.1 Pre-Construction Coordination

Rhēa will provide the approved construction schedule to MCAS EAD, and the Naval Facilities Engineering Command (NAVFAC) Remedial Project Manager (RPM). Prior to the proposed mobilization date, Rhēa will coordinate with MCAS EAD to identify the date, time, and location for a pre-construction conference (Precon). A representative from Rhēa will attend the Precon along with representatives from EAD, NAVFAC, and any additional MCAS Cherry Point representatives deemed necessary. Rhēa will be prepared to present an overview of the project scope and schedule, discuss logistics, roles, and responsibilities, and respond to questions.

The Accident Prevention Plan (APP), located in Appendix C, will be given to each subcontractor, for their review, prior to the beginning of construction activities. They will be required to sign the APP Acceptance Form (Appendix

C, Figure 1) acknowledging that they have read and understand the contents of the APP. Safety tailgate meetings will be held at the beginning of each work day to discuss site-specific or activity-specific hazards.

### **2.3.2 Mobilization and Site Setup**

This task will consist of the mobilization of personnel and equipment to the work site, the installation of temporary site controls, and the verification of utilities. All necessary paperwork and documentation will be kept with the Rhēa representative on site.

CSS will be prepared to install silt fence or other temporary erosion and sediment (E&S) controls as determined by Rhēa's on-site representative.

### **2.3.3 Drainage and Grading Improvements**

The drainage improvements will include backfilling and grading activities along the top and the slope of the embankment to reduce concentrated flow and to eliminate washouts along the embankment. A vegetated soil berm will be installed along the length of the slope to divert runoff to three grass-lined swales.

The slope of the embankment will be cleared of existing vegetation and overgrowth, allowing for visual assessment and site access. There are two existing concrete flumes located on the southern half of the slope (Figure 4), and a gully in the northern portion. The flumes and their respective concrete aprons at the top of the slope will be removed and broken into manageable pieces that will be used as energy dissipaters to be placed at the base of the proposed swales. Previously placed riprap along the slope and at the bottom of the flumes will be separated from accumulated depositional fines, and will be reused as part of the energy dissipaters. During backfilling activities, the former location of the two flumes and the gully will be graded for use as swales.

Fill soil will be placed along the slope to fill in low-lying portions and even out the contour of the slope. The fill soil will be transferred from the soil stockpile at OU1 Site 16, generated from the installation of a permeable reactive barrier (PRB). Prior to placement, this soil will be sampled and analyzed to confirm that it is appropriate for placement within OU1. If the soil generated from the PRB installation is determined to be appropriate, then it will be used as backfill for Site 83. If the soil generated from the PRB is determined to be unsatisfactory for placement within OU1, then fill

material will be brought in from a clean off-site location and used to fill in only low-lying portions of the slope.

The top of the embankment will be backfilled and graded to divert overland flow to the three proposed grass-lined swales. A soil berm will extend the length of the slope between the swales. The swales will be designed to receive diverted runoff from the top of the embankment. A cellular confinement material will be installed over the soil berm and along the proposed grass-lined swales to reinforce the soil. A cut sheet and installation detail of the cellular confinement material is included in Appendix A.

The cellular confinement material on the slope and berm will be backfilled with a topsoil and American Association of State Highway and Transportation Officials (AASHTO) #78 Stone mixture to encourage vegetation growth and provide resistance to erosion. The cellular confinement material in the center of the swales and at the end of the swales will be backfilled with AASHTO #57 Stone to resist erosion and provide a load bearing base for the energy dissipater material.

After placement and backfill of the cellular confinement material, the removed riprap and broken concrete from the flumes will be placed at the end of the proposed swales to dissipate energy from the channeled flows. The layout and details of the proposed improvements are included in Figures 4 and 5.

The existing mulch piles from the 2009 clearing will be spread evenly throughout the western portion of the site to improve conditions for vegetation establishment.

The vegetated berm and improved slope should decrease surface run-off velocity, reduce the soil washouts, and assist with restoration of the vegetation and proposed planted trees.

#### **2.3.4 Revegetation**

Once clearing and grading activities are completed, activities to restore the site to its former vegetated condition will begin. The vegetated drainage structures and disturbed portions of the site will initially be seeded with a native seed mixture (Table 1). This seed mixture will be applied via hydroseed at a rate of 22 pounds per acre. Winter rye will also be planted at a rate of 150 pounds per acre to act as a stabilization cover during the native vegetation's dormant months for the site.

Rhēa will also plant three species of trees at the site, including loblolly pine, red maple, and bald cypress (Table 2). The trees will be saplings three to four feet in height. Rhēa recommends planting the loblolly pine, bald cypress, and red maple in the fall, winter, or spring, from September through late April. Because construction will likely take place in May and June, Rhēa will plant the trees in late fall. The trees will be planted approximately 20 feet apart, as shown on Figure 3.

### **2.3.5 Vegetation Monitoring**

A site visit to inspect the health of the restored habitat and assess the success of the restoration will be scheduled after the first growing season of the initial restoration event. Findings will be recorded on the monitoring forms in Appendix B. If more than 25 percent of the restored area does not retain vegetation, Rhēa will assess the barren portion of the site and recommend additional revegetation and monitoring strategies. Additional revegetation activities will be implemented, if required.

### **2.3.6 Construction Closeout Report**

A Construction Closeout Report will be prepared and submitted following the site restoration phase of the project. Refer to Section 5.5 for additional information on the contents of this report. A Pre-Draft will be submitted to NAVFAC and EAD for review and comment. Once the comments are incorporated, the Construction Closeout Report will be submitted to the North Carolina Department of Environment and Natural Resources (NCDENR).

## **2.4 Schedule**

The detailed construction schedule is shown on Figure 6. The start of construction is dependent on the completion of the PRB and sampling results from the PRB soils. Rhēa will contact EAD, NAVFAC, and NCDENR if the construction schedule changes.

## 3.0 WASTE STREAM MANAGEMENT PLAN

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The proposed site work for Site 83 does not include soil removal from the site. It is anticipated that the waste streams associated with the proposed Site 83 vegetation restoration will be limited to construction debris, such as packaging materials and/or temporary erosion and sedimentation materials. This Waste Stream Management Plan will be implemented if waste is removed from site.

### 3.1 Waste Streams

Wastes will be handled and disposed of in accordance with regulations established by the NCDENR, Division of Solid Waste Management. The regulations are summarized in the publication *Groundwater Section Guidelines for the Investigation and Remediation of Soils and Groundwater* (NCDENR, 2000). It should be noted that North Carolina regulations and programs for non-hazardous and hazardous wastes are compliant with pertinent federal regulations established by the United States Environmental Protection Agency (USEPA).

In the event that generated waste is suspected of being contaminated, the waste will be segregated and sampled. The MCAS EAD will be notified immediately, should analysis show waste to be hazardous.

### 3.2 Waste Characterization

Generated waste streams should be common solid waste streams, and as such, will not require waste characterization; however, if waste stream characterization is required, it will be performed in accordance with regulations and disposal facility requirements.

Waste characterization will involve completion of written documentation describing the wastes. At a minimum, written documentation for waste characterization should include the following:

- + Generator information (name, address, contact, and phone number).
- + Site name (include street/ mailing address).
- + Sampling activity generating waste (i.e., treatment system operation).
- + Source of contamination (e.g., excavated soil).
- + Historical chemical use for area (e.g., pesticides).
- + Physical state of waste (i.e., solid, liquid, solid with free liquids).

- + Copies of analytical data for waste.

Waste characterization data will typically be completed on a form (e.g., waste profile) provided by the disposal facility. At a minimum, supporting analytical data will be from sampling completed in accordance with USEPA requirements for non-hazardous wastes. In some cases, specific disposal facilities may require additional sampling and analysis. MCAS EAD personnel, if required, will provide generator certification and signature. An approved (and signed by a representative of the disposal facility) copy of the waste characterization form will be received prior to transportation of any waste to the disposal facility.

### 3.3 Disposal of Waste Streams

The preferred disposal method, whenever feasible, will be by a material recovery facility (i.e., recycling, bioremediation, thermal treatment) instead of landfilling. Off-site disposal of solid wastes will be completed by facilities permitted in accordance with applicable requirements. Documentation indicating permitted status for receiving wastes will be received from the facility prior to transporting any waste as follows:

- + Off-site disposal facilities for non-hazardous solids: A copy of documentation indicating a permitted facility for the disposal/recovery of petroleum-contaminated special waste.
- + Hazardous wastes: A copy of documentation indicating a permit in accordance with 40 Code of Federal Regulations (CFR) 264.

The disposal facility will be responsible for providing a copy of the final waste manifest and for providing a certificate of disposal for each load of waste received. The contractor will be responsible for returning the disposal facility hazardous waste documentation to Rhēa in a timely manner per 40 CFR 264.71.

### 3.4 Handling and Transportation of Waste Streams

#### 3.4.1 Temporary Storage

Wastes will be securely stored prior to transportation and disposal. Waste containers should be securely closed except when adding or removing contents. Storage containers will be clearly labeled prior to placement of waste. Labels should indicate the material to be “non-hazardous waste”

(unless analytical data indicate hazardous) and include the site name, media (soil/groundwater), date, and contractor name. Empty containers will be labeled as such. Wastes will typically be stored as follows:

- + Roll-offs for solids and debris will be provided with covers and disposable liners. Roll-offs will be inspected upon arrival on site; any roll-off arriving on site with contents will be rejected. Roll-offs will be maintained with covers in place and with all covers securely fastened at the end of each workday. Liners will be disposed of as contaminated debris. Roll-offs will be inspected by the transporter after removal of the liner and decontaminated (either by the transporter at the point of disposal or by designated on-site personnel following return to the site) in the event of evidence of liner failure.
- + Drums for solids and liquids will be arranged in an orderly fashion and stored in a single on-site area whenever possible. Each drum will be provided with its own label. Drums will be maintained with all covers secured at the end of each workday. Drums containing liquid will be stored with secondary containment. Drums will be disposed of with contents. If contents are bulked for transportation and disposal, drums will be decontaminated prior to reuse or site departure.

Containers and stockpiles will be visually inspected on a daily basis during the work week, with prompt response taken in the event of any evidence of failure to contain the wastes. Decontamination of containers/vehicles completed at the point of disposal will be documented by the transporter on the final manifest for the waste. Decontamination of containers/vehicles completed by designated on-site personnel following off-site disposal and return will be documented on the Daily Contractor Production Report. Daily Contractor Production Reports will be forwarded to the NAVFAC RPM on a weekly basis.

Containers and stockpiles will typically be managed so that wastes are stored on site for less than 45 days. If hazardous, wastes will be stored on site for no longer than 45 days, as required by 40 CFR 262 or per MCAS EAD direction. Trucks or roll-off containers used to transport wet soil waste shall be liquid-tight or lined with 10-mil plastic sheeting. All trucks transporting waste must be covered before leaving the site.

### **3.4.2 Transportation of Waste Stream**

Each load of waste will be manifested prior to leaving the site. The manifest form (with multiple carbon copies) will typically be provided by the

transporter for the waste, and will accompany the waste to its final destination. The manifest form will typically identify the waste as non-hazardous. If the waste is hazardous, manifesting will be completed in accordance with 40 CFR 262. Manifesting of hazardous wastes will be completed by personnel certified with the North Carolina Department of Transportation (NCDOT) for manifesting hazardous materials. Manifests will be signed by an EAD representative, who is trained in the NCDOT regulations regarding waste manifests. At a minimum, the manifest form will include the following information:

- + Transporter information (including name, address, contact, and phone number).
- + Generator information (including name, address, contact, and phone number).
- + Site name (including street/ mailing address).
- + Description of waste (including reference to characterization form if available).
- + Type of container.
- + Quantity of wastes (volumetric estimate).

A transporter licensed with the NCDOT commercial transportation will complete transportation of non-hazardous wastes. If wastes are hazardous, transportation will be completed by a transporter licensed in accordance with 40 CFR 263 and 49 CFR 171-179. A copy of documentation indicating that the transporter has appropriate licenses will be received from the transporter prior to transport of any waste by the transporter. The transporter will be responsible for weighing loads on a scale certified by the North Carolina Department of Commerce, Bureau of Weights and Measures. Weights will be taken for the full and empty containers (or dump truck or tanker truck) for each load. Trucks transporting waste material shall be weighed before leaving MCAS Cherry Point. Disposal quantities will be based on the difference in weights between the full and empty containers (or dump truck or tanker truck). Weights will be denoted on the waste manifest. The transporter with the final manifest will provide copies of weight tickets. Trucks transporting waste will be covered before leaving MCAS Cherry Point, and may require bed liners if waste soil contains liquids or if the dump body could allow waste to escape during transport.

Transportation of wastes will be inventoried the day of transportation from the site using a Transportation and Disposal Log (Appendix B). A carbon copy of the initial manifest form for each load will be retained on site and attached to the Daily Production Report. Manifests for shipments of

hazardous wastes must be returned to EAD indicating receipt of waste. Copies of the manifests will be included in the Closeout Report.

## **4.0 ENVIRONMENTAL PROTECTION PLAN**

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The work to be performed at the site will incorporate features to protect the environment during site restoration activities. All work will be performed in a manner that meets the intent of federal, state, and local regulations designed to protect the environment.

### **4.1 Erosion and Sediment Control**

Site 83 restoration activities are non-intrusive; therefore, it is anticipated that minimal controls will be installed. Silt fence will be installed along the western boundary of the site as shown in Figure 4. Cleared areas within the site limits will be graded, seeded, and mulched to provide permanent erosion control. E&S controls installed during site work will comply with the State of North Carolina Erosion and Sediment Control Regulations. The NCDENR RPM will be notified when each of these measures are started and completed, if different from the approved schedule.

### **4.2 Construction Debris**

Site restoration activities will generate debris including wood pallets, metal banding, and plastic tree potting. These materials will be collected during restoration activities and either disposed of at facilities licensed to accept construction debris, or recycled through a material recovery facility.

### **4.3 Water Pollution Control**

No wastewater will be generated during site restoration activities.

### **4.4 Dust Control**

Site restoration activities will be performed in a manner that limits blowing dust and tracking of mud onto roads and vehicle parking areas. Dust control measures to be employed will include water spray, or sweeping. Access roads will be swept or hose-washed when site restoration activities track mud and dust producing materials onto the road surfaces. Water will only be used when it will not result in objectionable conditions such as, but not limited to, flooding or pollutant discharge.

## 4.5 Spill Containment

Facilities and equipment will be provided and stored at the site to minimize the environmental impact of accidental fuel or oil spills during restoration activities. Fuel for the construction equipment will be brought in as needed, and will not be stored at the site. Sacks of petroleum/oil absorbent material will be provided and will be stored at the site for accidental spills of fuel oil or hydraulic line failures.

In the event of a spill, the MCAS Cherry Point Fire Department will be notified by dialing 911 (from an MCAS Cherry Point landline phone only) or 252-466-2241; MCAS Cherry Point EAD will be contacted, and the cleanup will commence immediately. All contaminated materials generated by the cleanup efforts will be packaged and disposed of in accordance with applicable federal, state, and local regulations. A Spill Report Form (Appendix B) will be completed by the Site Superintendent, and will be submitted to MCAS Cherry Point's EAD within 24 hours of the spill occurrence.

## 4.6 Hazardous Materials

No hazardous materials will be brought on site or generated during site restoration activities.

## 5.0 QUALITY CONTROL PLAN

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### 5.1 Site Quality Administrator

Mr. Kenneth Robitaille is the Rhēa Site Quality Administrator (SQA) for this site restoration project. As the Rhēa Quality QC person assigned to this job, Mr. Robitaille has the authority to perform and accept/reject those QC activities required by the project.

The SQA is responsible for the following:

- + Attending the coordination and mutual understanding meeting prior to the start of field activities, and preparing minutes of that meeting.
- + Maintaining current and complete records of site QC operations and activities including the following:
  - o Updated Project Schedule.
  - o Contractor Production Reports. This report form is included in this Work Plan as Appendix B.
  - o Contractor Quality Control Report that identifies the appropriate quality control phase. This report form is included in Appendix B of this Work Plan.
- + Performing the three phases of control to determine that work performed complies with the project requirements.
- + Participation in the development, review, and approval (as appropriate) of contractually required submittals.
- + Reviewing the performance of subcontractor activities.

In addition to the SQA, Rhēa professional personnel will be on site to support the QC effort, as required. The Rhēa support persons will possess the necessary training and experience in the relevant area of construction to assist in on-site QC.

## 5.2 Invoice Quality Administrator

Mr. R. Scott Powell is the Rhēa Invoice Quality Control Administrator (IQCA) for this project. As the IQCA assigned, Mr. Powell has the responsibility to review the cost schedule and cost allocations for this project.

## 5.3 Quality Control Inspections

Quality control inspections will be performed by the SQA. The types of inspections to be performed include preparatory, initial, follow-up, and completion inspections. Inspections will be documented in the Contractor Quality Control Report (CQCR, Appendix B). The details of each of these types of inspections are as follows:

**Preparatory Phase:** Prior to beginning a particular definable feature of work, drawings, specification requirements, submittal status, material requirements, and on-site condition of materials, work methods, and schedule will be reviewed by the SQA. The EAD will be notified at least two business days in advance of a preparatory inspection, and this notification will be made part of the written record.

**Initial Phase:** This phase of inspection will document the completeness and acceptability of the particular definable feature of work after a representative portion of the work has been completed.

Deficiency Reports and Rework Items Lists will be completed as necessary. The EAD will be notified at least two business days in advance of an initial inspection, and this notification will be made part of the written record.

**Follow-up Phase:** This phase of inspection involves daily surveillance of the definable feature of work to verify conformance to the drawings and specifications. The inspection information will be documented on the daily CQCR. Any noncompliance will be documented on a Rework Items List.

**Completion:** At the completion of a definable feature of work, the SQA will conduct a completion inspection to make sure all work and rework items are complete and in conformance with the drawings and specifications. The results of this inspection will be documented on the daily CQCR. The EAD and NCDENR will be invited to participate in each of these levels of inspection.

## 5.4 Definable Features of Work

The following is a list of the Definable Features of Work for the restoration of Site 83:

- + Pre-Construction Coordination.
- + Mobilization and Site Setup.
- + Drainage and Grading Improvements.
- + Revegetation.
- + Vegetation Monitoring.

## 5.5 Construction Closeout Report

A Construction Closeout Report will be prepared by Rhēa and may include the following sections:

- + Introduction.
- + Summary of Action.
- + Health and Safety Summary.
- + Summary of Field Changes.
- + Contract Modifications.
- + Final Documents.
- + Off-Site Transportation and Treatment of Materials.
- + QC Summary Report.

Following the vegetation monitoring phase, the Construction Closeout Report will be submitted to the NAVFAC RPM, and the EAD. The NCDENR RPM will receive two digital copies of the final document.

## 6.0 REFERENCES

---

Brown and Root Environmental, 1998. *SWMU Assessment Report for Site 83, Building 96 Former Pesticide Mixing Area, Marine Corps Air Station, Cherry Point, North Carolina*. March.

CH2M HILL, 2010. *Summary of the Updated Human Health Risk Assessment, Site 83, Operable Unit 1, Marine Corps Air Station, Cherry Point, North Carolina*. July.

CH2M HILL, 2011. *Supplemental Remedial Investigation, Site 83, Operable Unit 1, Marine Corps Air Station, Cherry Point, North Carolina*. May.

NCDENR, 2000. *Groundwater Section Guidelines for the Investigation and Remediation of Soils and Groundwater*. July.

Rhēa, 2009. *Final Sampling and Analysis Plan, Operable Unit 1, Site 83, Soil Delineation Sampling, MCAS Cherry Point, North Carolina*. July.

Rhēa, 2010. *Final Site Soil Investigation Report, Operable Unit 1 – Site 83, MCAS Cherry Point, North Carolina*. June.

## TABLES



**TABLE 1  
 NATIVE SEED MIX  
 OU 1 – Site 83 Restoration  
 MCAS Cherry Point, North Carolina  
 Contract No. N40085-09-D-3214, CTO: 0002  
 Rhēa Engineers & Consultants Project No. 431**

<b>Table 1 Native Seed Mix</b>		
<b>Scientific Name</b>	<b>Common Name</b>	<b>Percent</b>
<i>Carex vulpinoidea</i>	Fox Sedge	17
<i>Juncus effusus</i>	Soft Rush	15
<i>Sorghastrum nutans</i>	Indiangrass	45
<i>Panicum virgatum</i>	Switchgrass	23
	Total	100

**Notes:**

1. All percentages refer to the pounds of pure live seed (PLS) per 100 pounds of seed.
2. Seeding rate is 1/2 pounds per 1000 square feet or 22 pounds per acre.



**TABLE 2**  
**TREE SPECIES LIST**  
 OU 1 – Site 83 Restoration  
 MCAS Cherry Point, North Carolina  
 Contract No. N40085-09-D-3214, CTO: 0002  
 Rhêa Engineers & Consultants Project No. 431

Table 2 Tree Species List					
Scientific Name	Common Name	Planting Size	Plant Spacing	Total Plants	Recommended Planting Time
<i>Acer rubrum</i>	Red Maple	3 Gallon	20' oc	17	Early Spring (Late March/Early April)
<i>Taxodium distichum</i>	Bald Cypress	3 Gallon	20' oc	8	Late Fall (Early November)
<i>Pinus taeda</i>	Loblolly Pine	3 Gallon	20' oc	53	Late Fall (Early November)

**Note:**

1. Approximate height of a 3 gallon tree is 3-4'.

## FIGURES



**Legend**

- MCAS Cherry Point
- Water Body



**FIGURE No. 1**

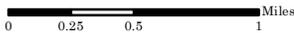
**MCAS Cherry Point  
Location Map  
MCAS Cherry Point, NC**

Drawn By	Checked By	Date	Project	Sheet No.
ZDW	TTP	7-5-11	431	1



**Legend**

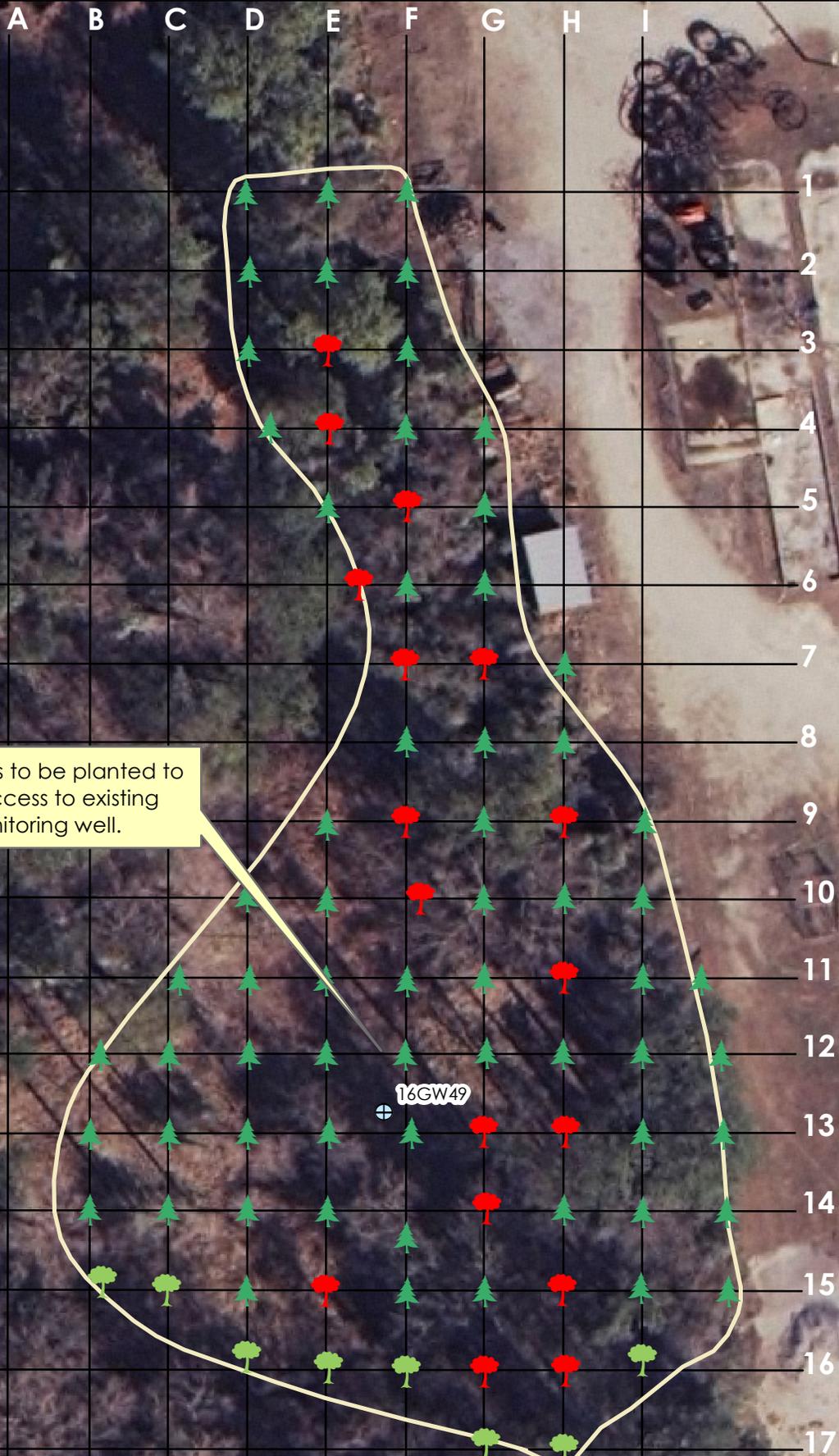
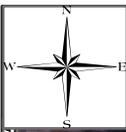
- Operable Unit 1
- Site 83
- Water Bodies
- Buildings
- Airfield Surface Areas
- Road Surfaces
- Base Boundary



**FIGURE No. 2**

**OU1 Site 83  
Location Map  
MCAS Cherry Point, NC**

Drawn By	Checked By	Date	Project	Sheet No.
ZDW	TTP	7-5-11	431	2



Note: Trees to be planted to allow access to existing monitoring well.

SLOCUM CREEK

Legend

- Loblolly Pine Tree
- Red Maple Trees
- Bald Cypress Trees
- Cleared Area
- Streams
- Monitoring Well
- 20 ft Planting Grid

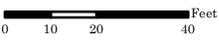


FIGURE No. 3

**Site 83 Revegetation Plan  
MCAS Cherry Point, NC**

Drawn By	Checked By	Date	Project	Sheet No.
TTP	ED/ZDW	9-27-11	431	3



**Legend**

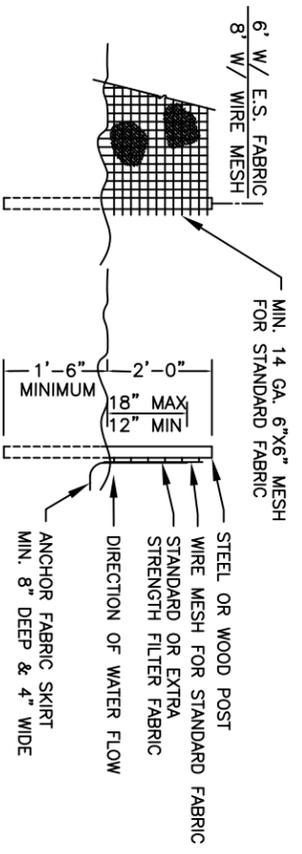
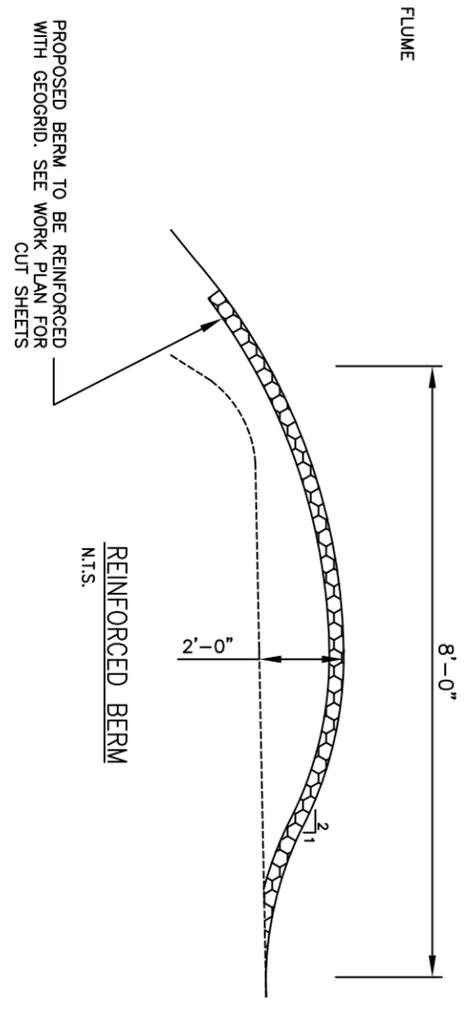
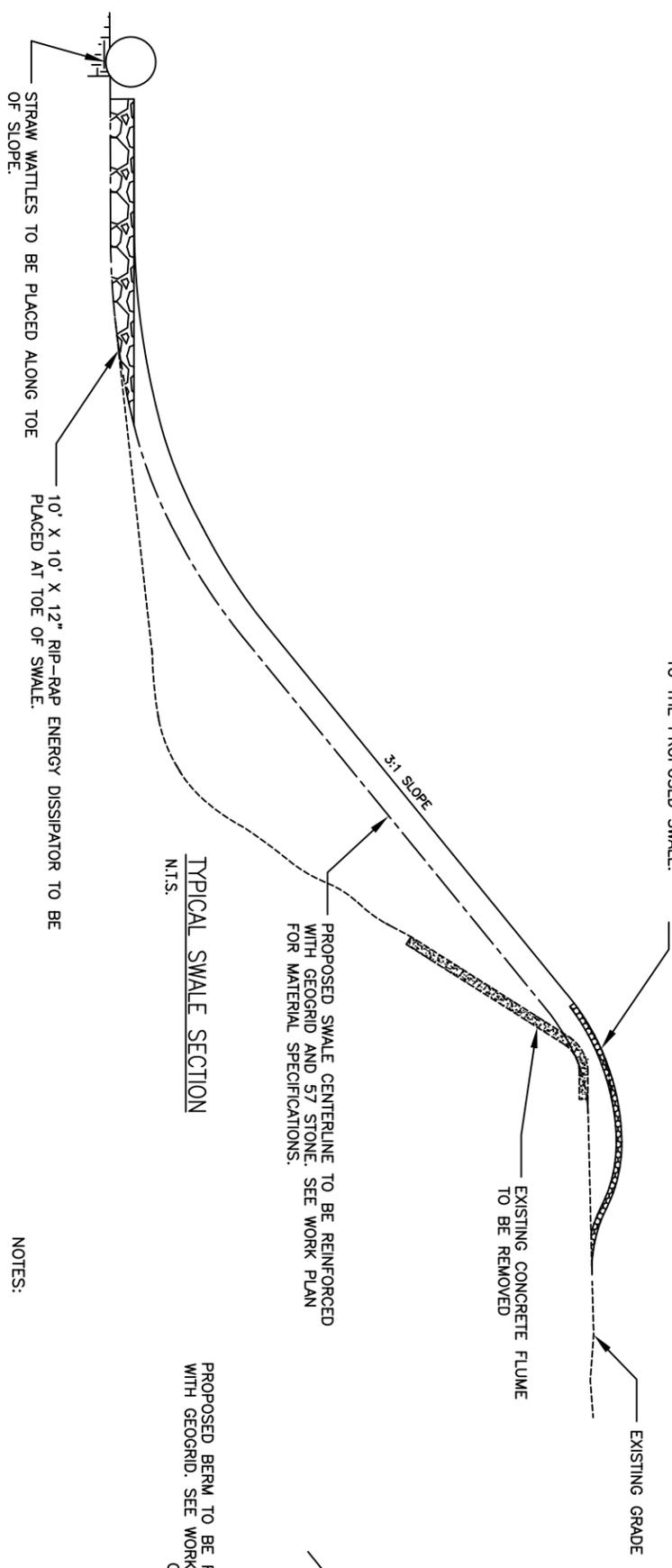
- Reinforced Swale
- Cleared Area
- Silt Fence
- Existing Concrete Flume
- Energy Dissipaters
- Top of Bank
- Slope

Feet  
0 15 30 60

**FIGURE No. 4**  
**Grading and Storm Water  
 Drainage Repair Plan  
 MCAS Cherry Point, NC**

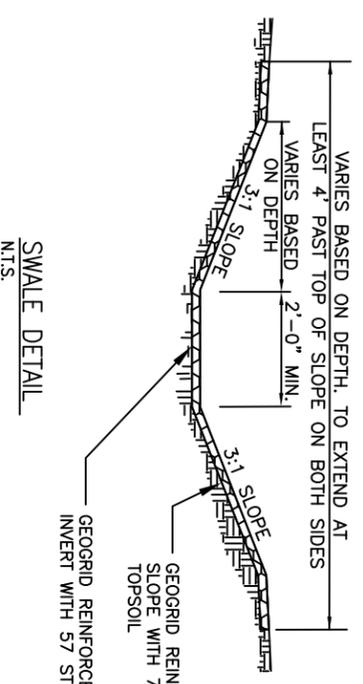
Drawn By	Checked By	Date	Project	Sheet No.
TTP	ED/ZDW	12-21-11	431	4

PROPOSED REINFORCED BERM TO BE PLACED ALONG TOP OF SLOPE. TOP OF SLOPE AND BERM TO BE GRADED TO ALLOW SURFICIAL RUNOFF FLOW TO THE PROPOSED SWALE.

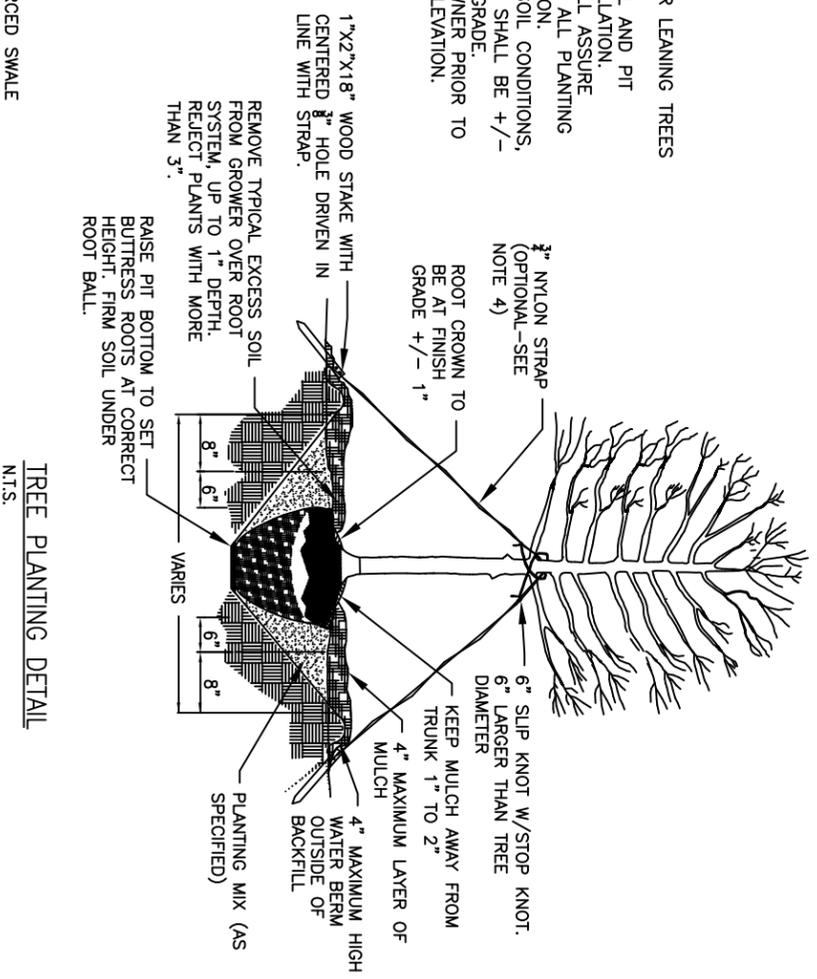


- NOTES:
1. SYN. FENCE FABRIC SHALL BE MIN. OF 30" IN WIDTH WITH 30 LB/IN TENSILE STRENGTH FOR STANDARD FABRIC AND 50 LB/IN FOR EXTRA STRENGTH.
  2. FABRIC SHALL BE CONTINUOUS LENGTH. IF JOINTS ARE NECESSARY, LAP FABRIC POST TO POST.
  3. STEEL POST SHALL BE MIN 4" IN HEIGHT AND BE OF THE SELF-FASTENER STEEL ANGLE TYPE.
  4. WOOD POST SHALL BE A MIN. OF 4" IN HEIGHT AND 4" IN DIAMETER. FABRIC SHALL BE FASTENED TO WOODEN POST WITH NOT LESS THAN #9 WIRE STAPLE 1" LONG OR THE WIRES.

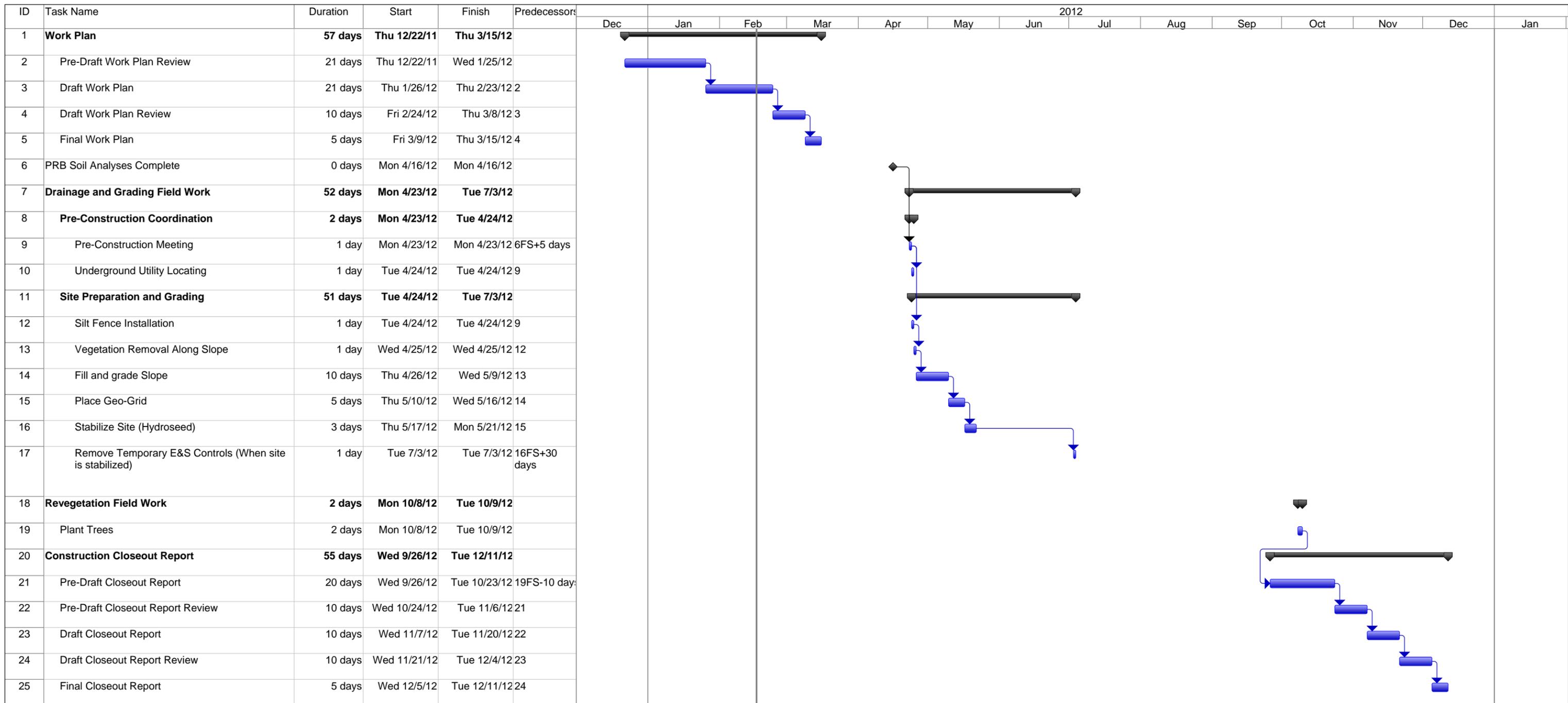
TEMPORARY SILT FENCE  
N.T.S.



- NOTES:
1. STAKING REQUIRED FOR LEANING TREES OR AS NECESSARY.
  2. SOAK EACH ROOT BALL AND PIT IMMEDIATELY AFTER INSTALLATION.
  3. THE CONTRACTOR SHALL ASSURE PROPER PERCOLATION OF ALL PLANTING PITS PRIOR TO INSTALLATION.
  4. IN SEMI-IMPERVIOUS SOIL CONDITIONS, THE ROOTBALL ELEVATION SHALL BE +/- 2" ABOVE THE FINISHED GRADE. COORDINATE WITH THE OWNER PRIOR TO SETTING THE ROOTBALL ELEVATION.

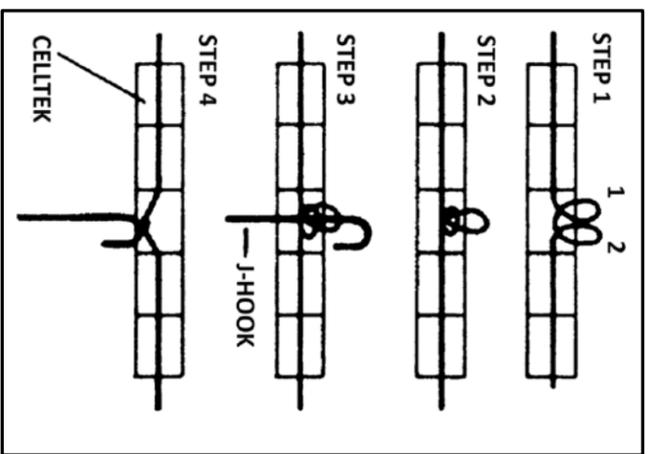


DEPARTMENT OF THE NAVY MIDLANTIC DIVISION MCB CAMP LEJEUNE SITE RESTORATION DETAILS SITE 83 RESTORATION		MAW FACILITIES ENGINEERING COMMAND ENGINEERS & CONSULTANTS, INC. APPROVED _____ DATE _____ SEAL FOR EFD FOR COMMANDER MAWFC		CONTRACTOR EFD DESIGN _____ DRAWN _____ REVIEW _____ CHECK ARCH/ENR _____ PROJECT MANAGER _____ FIRE PROTECTION _____ QUALITY CONTROL _____ BRANCH MANAGER _____ DESIGN DIRECTOR _____		REVISIONS <table border="1"> <thead> <tr> <th>SYL</th> <th>DESCRIPTION</th> <th>DATE</th> <th>APPROVED</th> </tr> </thead> <tbody> <tr><td> </td><td> </td><td> </td><td> </td></tr> </tbody> </table>		SYL	DESCRIPTION	DATE	APPROVED																
SYL	DESCRIPTION	DATE	APPROVED																								
CODE NO. N/A SCALE N/A EFD NO. 431 SPEC. NO. CONTRACTOR NO. N40085-09-D-3214 MAFAC DRAWING NO.	SHEET 1 OF 1	<b>FIGURE 5</b>																									



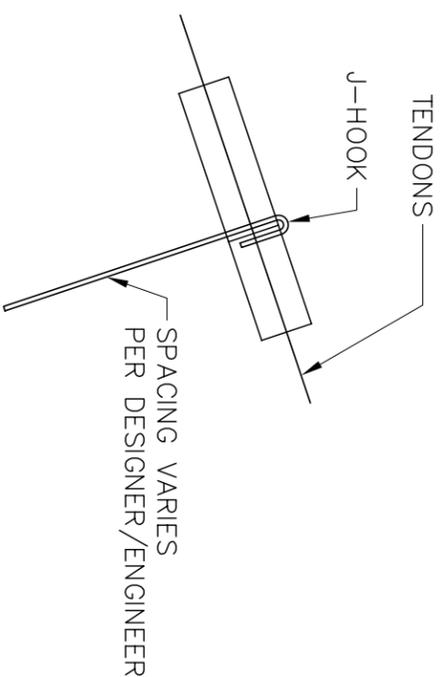
Task		Rolled Up Milestone		Project Summary		Inactive Summary		Manual Summary		Deadline	
Milestone		Rolled Up Progress		Group By Summary		Manual Task		Start-only			
Summary		Split		Inactive Task		Duration-only		Finish-only			
Rolled Up Task		External Tasks		Inactive Milestone		Manual Summary Rollup		Progress			

**APPENDIX A**  
**Product Cut Sheets**



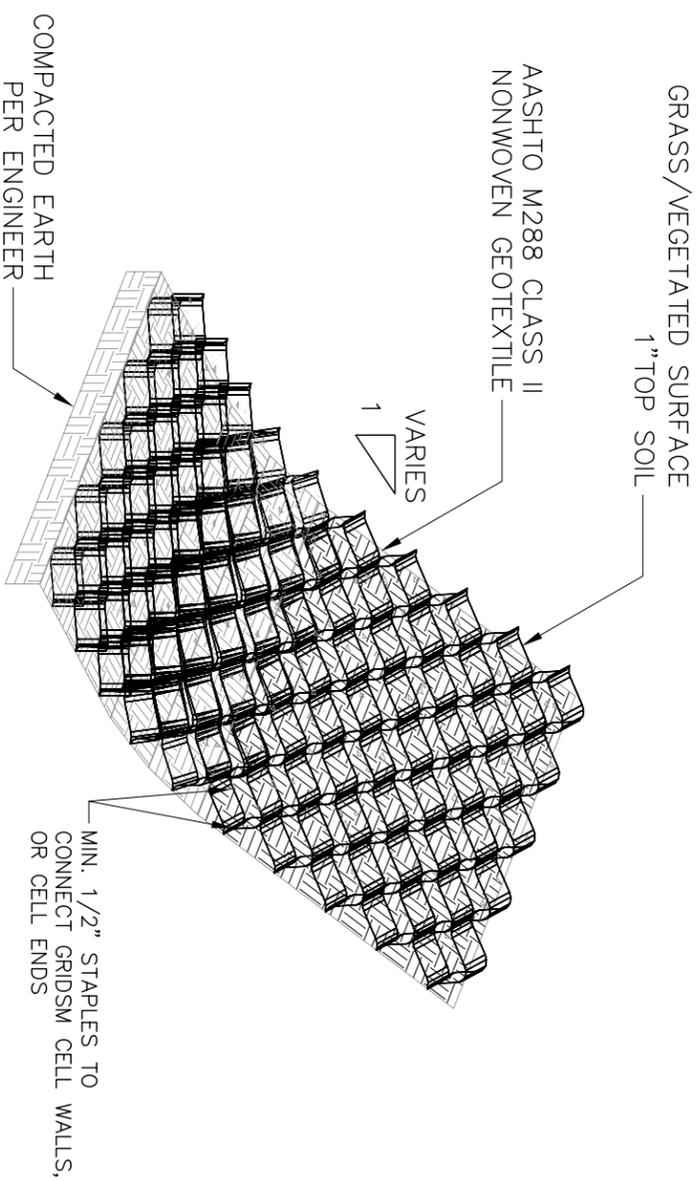
**INSTALLATION OPTION  
J-HOOKS ENGAGED TO TENDONS**

- STEP 1: MAKE 2 LOOPS IN THE TENDON.
- STEP 2: PULL LOOP 1 PARTIALLY THROUGH LOOP 2.
- STEP 3: INSERT THE J-HOOK ANCHOR THROUGH LOOP 1 AND DRIVE J-HOOK INTO THE GROUND UNTIL THE TOP OF THE HOOK IS LEVEL WITH THE TOP OF THE CELLTEK SECTION.
- STEP 4: PULL BOTH ENDS OF TENDON TO CLOSE THE LOOP AND DRIVE J-HOOK UNTIL THE TOP OF IT IS FLUSH WITH GROUND SURFACE.

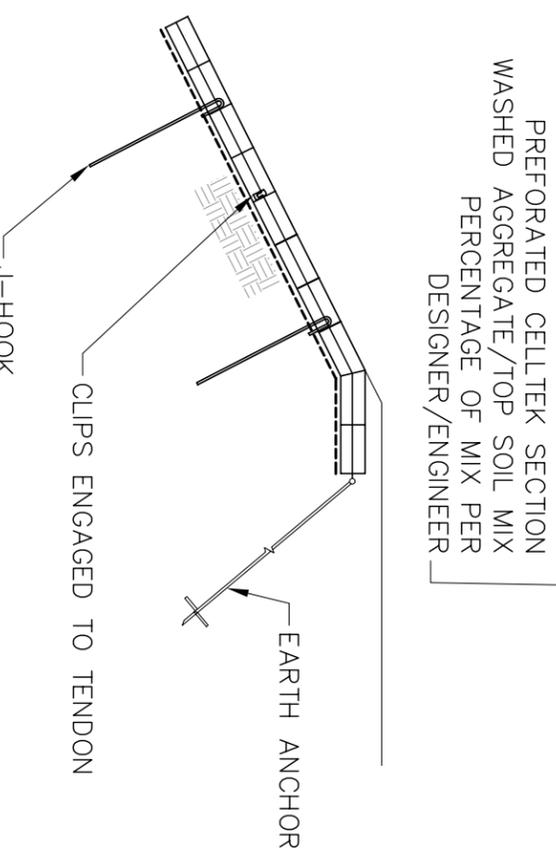
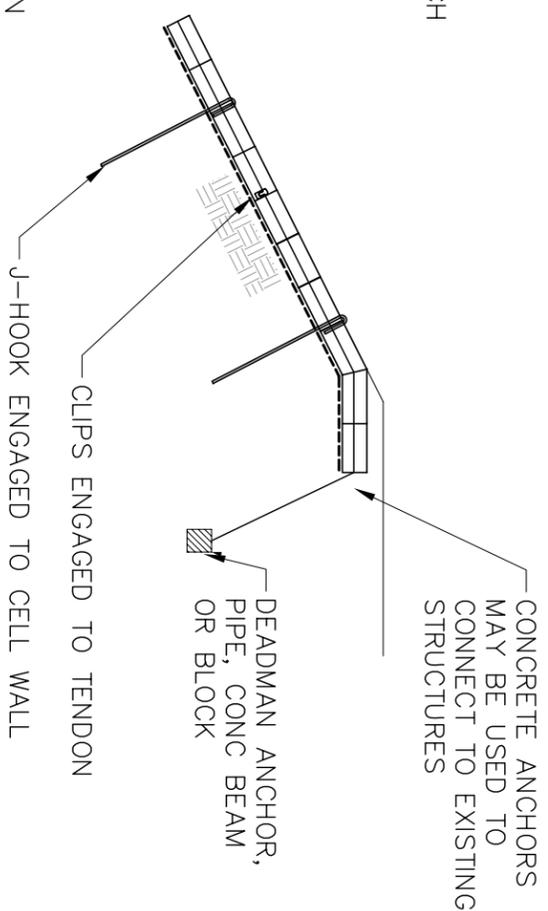
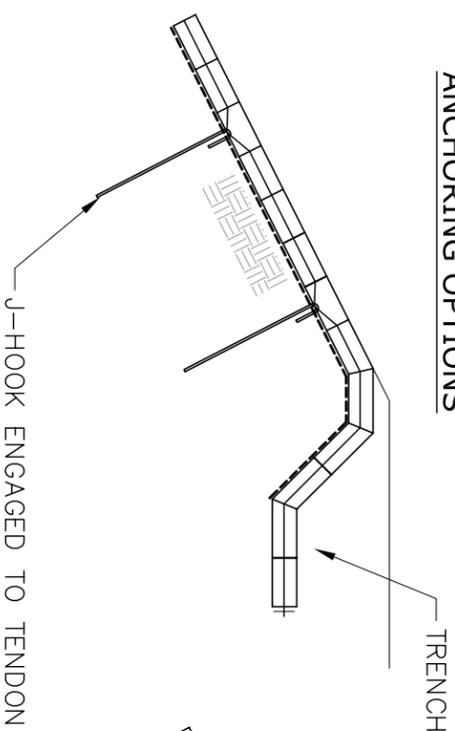


**INSTALLATION OPTION  
J-HOOK ENGAGED TO CELLS**

- TENDONS PRE-THREADED THROUGH INDIVIDUAL CELLTEK SECTION PRIOR TO EXPANDING SYSTEM
- POSITION STAKE NEXT TO CELL WALL.
- DRIVE STAKE INTO THE GROUND UNTIL FLUSH WITH TOP OD CELL WALL.



**ANCHORING OPTIONS**



TOLL FREE 888-851-0051  
WWW.CELLTEKDIRECT.COM



**SLOPE PROTECTION**

VEGETATED GREEN SURFACE

DRAWN BY:	as
CHECKED BY:	AS
	4/15/08



CALL TOLL-FREE  
888-851-0051



LSG SERIES	GRAVEL-LOK	PRODUCTS	VISUAL	DEALERS	CONTACT	MORE
------------	------------	----------	--------	---------	---------	------

**SLOPEGRID** cellular confinement system provides the protection needed to control erosion. The system can also aid other geosynthetic products in producing vegetation on steep slopes. SlopeGrid consists of a slightly larger cell than the LSG Series available in a variety of cell depths.

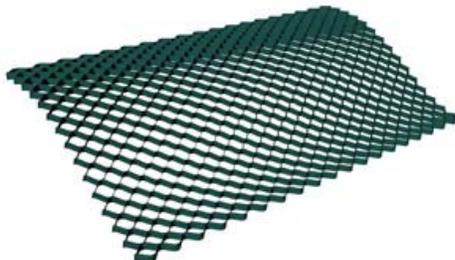


**APPLICATIONS INCLUDE:**

Slopes • Green Roofs • Mountain sides • Lush Rainforests • Overpasses • Roadside Shoulder Reinforcement • Ports & Marinas



SINGLE CELL



EXPANDED GRID



COLLAPSED GRID

PRODUCT	CELL DEPTH
SLP 300	3" (75mm)
SLP 400	4" (100mm)
SLP 600	6" (150mm)
SLP 800	8" (200mm)

Nominal Cell Dimensions	12" x 12" x Cell Depth
Expanded Grid Dimensions	8' x 29' (232SFT)

PROPERTIES	TEST METHOD	TEST VALUE
Material Composition	ASTM D1505	Polymer; Recycled HDPE Density: 0.965g/cm3
Normal Sheet Thickness	ASTM D5199	1.78mm
Environmental Stress Cracking	ASTM D1693	3500 Hrs.
Stabilizer	ASTM E682	Hindered amine light stabilizer (HALS) 1.0% by weight
Short Term Seam Peel Strength	3" (75mm)	1030N
	4" (100mm)	1390N
	6" (150mm)	2090N
	8" (200mm)	2760N
Long Term Seam Peel Strength	A 100mm (4 inch) wide section sample shall support a (160 lb.) load for a period of 7 days (168 hrs.) minimum in a temperature controlled environment undergoing a temperature change on a 1 hour cycle from ambient room temperature to (130F)	

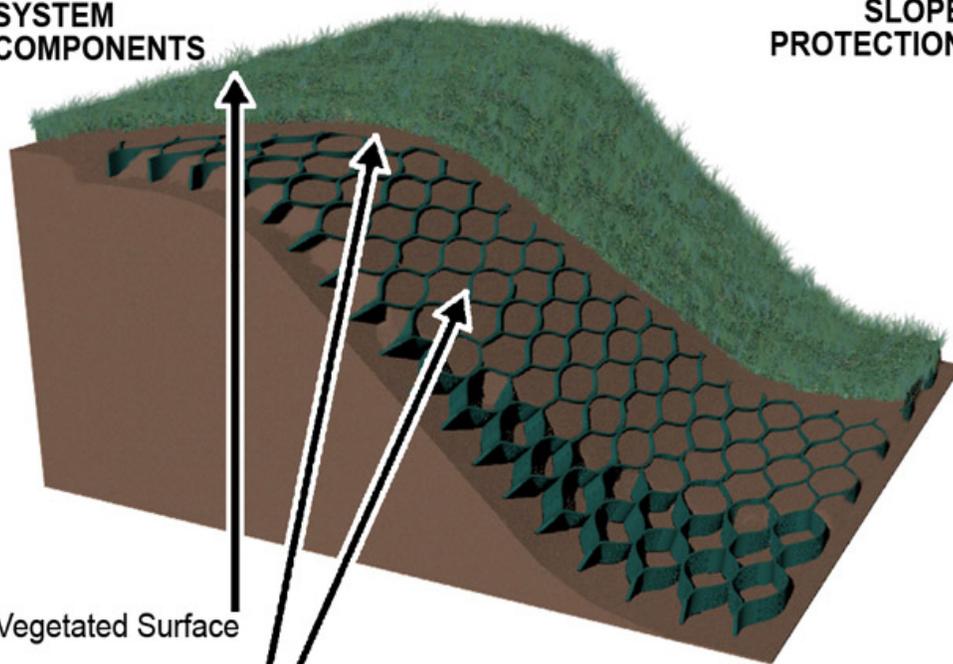
SPECIFICATIONS	SLP 300	SLP 400	SLP 600	SLP 800
Units Per Pallet	24	18	12	10
SF Per Pallet	5568	4176	2784	2320

**CAD / DOWNLOADS**

SLOPE PROTECTION: CONCRETE - [CLICK HERE](#)  
 SLOPE PROTECTION: AGGREGATE - [CLICK HERE](#)  
 SLOPE PROTECTION: VEGETATED / GREEN - [CLICK HERE](#)  
 SLOPE PROTECTION WITH GEOMEMBRANE - [CLICK HERE](#)

**SYSTEM COMPONENTS**

**SLOPE PROTECTION**



Vegetated Surface

2" Topsoil Over Cells

**Cell-Tek Slope Grid**  
SLP600 6" (150mm) Min.  
w/ Soil Infill

Optional Tendon System

Optional Earth Anchor

Rebar Grid Hooks

**SlopeGrid**

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# APPENDIX B

## Forms





**TREE MONITORING FORM  
 SITE 83 RESTORATION  
 MCAS CHERRY POINT, NORTH CAROLINA  
 RHEA ENGINEERS & CONSULTANTS, INC.**

Inspector: \_\_\_\_\_

Date: \_\_\_\_\_

Project: \_\_\_\_\_

**Observations**

Species	Height of Plant	# Alive	# Dead

Totals: 

--	--

Condition of Plantings: \_\_\_\_\_  
 \_\_\_\_\_

**Natural Recruits/Invasives**

Species	Amount	Height

Total Number of Species	Total Number of Individual Trees	Average Height



<b>CONTRACTOR QUALITY CONTROL REPORT</b> (ATTACH ADDITIONAL SHEET IF NECESSARY)			SHEET ___ of ___	DATE
CONTRACT NO. N40085-09-D-3214		TASK ORDER NO. 0002		CONTRACTOR Rhea Engineers and Consultants, Inc.
PHASE	Y - YES, N- NO, SEE REMARKS BLANK - NOT APPLICABLE	IDENTIFY DEFINABLE FEATURES OF WORK, LOCATION, AND <i>LIST PERSONNEL PRESENT</i>		
P	THE PLANS AND SPECS HAVE BEEN REVIEWED			
R	THE SUBMITTALS HAVE BEEN APPROVED			
P	MATERIALS COMPLY WITH APPROVED SUBMITTALS			
A	MATERIALS STORED PROPERLY			
R	TESTING PLAN HAS BEEN REVIEWED			
T	WORK METHOD AND SCHEDULE DISCUSSED			
O				
R			TESTING PERFORMED AND WHO PERFORMED TEST	
Y				
I	PRELIMINARY WORK WAS DONE CORRECTLY			
N	SAMPLE HAS BEEN PREPARED/APPROVED			
I	WORKMANSHIP IS SATISFACTORY			
T	TEST RESULTS ARE ACCEPTABLE			
I	WORK IS IN COMPLIANCE WITH THE CONTRACT			
A			TESTING PERFORMED AND WHO PERFORMED TEST	
L				
L				
O	WORK COMPLIES WITH CONTRACT AS APPROVED IN INITIAL PHASE		TESTING PERFORMED AND WHO PERFORMED TEST	
W	COMPLETION INSPECTION			
U			TESTING PERFORMED AND WHO PERFORMED TEST	
P				
REWORK ITEMS IDENTIFIED TODAY (NOT CORRECTED BY CLOSE OF BUSINESS)			REWORK ITEMS CORRECTED TODAY (FROM REWORK ITEMS LIST)	
REMARKS:				
On behalf of the contractor, I certify that this report is complete and correct and equipment and materials used and work performed during this reporting period is in compliance with the contract drawings and specifications to the best of my knowledge except as noted in this report.				
			_____ AUTHORIZED QC MANAGER AT SITE	_____ DATE
<b>GOVERNMENT QUALITY ASSURANCE REPORT</b>				
QUALITY ASSURANCE REPRESENTATIVE'S REMARKS AND/OR EXCEPTIONS TO THE REPORT				
			_____ GOVERNMENT QUALITY CONTROL MANAGER	_____ DATE

<b>CONTRACTOR PRODUCTION REPORT</b> (ATTACH ADDITIONAL SHEET IF NECESSARY)			SHEET ___ of ___		DATE
CONTRACT NO. <b>N40085-09-D-3214</b>	TASK ORDER NO. <b>0002</b>	TITLE AND LOCATION <b>SITE 83 RESTORATION</b>			REPORT NO.
CONTRACTOR: <b>Rhēa Engineers &amp; Consultants, Inc.</b>			SUPERINTENDENT		
AM WEATHER	PM WEATHER	MAX TEMP	F	MIN TEMP	F
<b>WORK PERFORMED TODAY</b>					
WORK LOCATION AND DESCRIPTION		EMPLOYER	NUMBER	TRADE	HRS
<b>JOB SAFETY</b>	WAS A JOB SAFETY MEETING HELD THIS DATE? (If YES, attach a copy of the meeting minutes)	<input type="checkbox"/> YES	<input type="checkbox"/> NO	TOTAL WORK HOURS ON JOB SITE THIS DATE	
	WERE THERE ANY LOST TIME ACCIDENTS THIS DATE? (If YES, attach a copy of the OSHA Report)	<input type="checkbox"/> YES	<input type="checkbox"/> NO	CUMULATIVE TOTAL OF WORK HOURS FROM PREVIOUS REPORT	
	WAS TRENCHING/SCAFFOLD/HV ELECTRICAL/HIGH WORK DONE? (If YES, attach a statement or checklist showing inspection performed)	<input type="checkbox"/> YES	<input type="checkbox"/> NO	TOTAL WORK HOURS FROM START OF CONSTRUCTION	
	WAS HAZARDOUS MATERIAL/WASTE RELEASED IN TO THE ENVIRONMENT? (If YES, attach description of incident and proposed action)	<input type="checkbox"/> YES	<input type="checkbox"/> NO		
LIST SAFETY ACTIONS TAKEN TODAY/SAFETY INSPECTION CONDUCTED			SAFETY REQUIREMENTS HAVE BEEN MET		
EQUIPMENT/MATERIAL RECEIVED TODAY TO BE INCORPORATED IN JOB					
CONSTRUCTION AND PLANT EQUIPMENT ON JOB SITE TODAY. INCLUDE NUMBER OF HOURS USED TODAY					
REMARKS					
_____ CONTRACTOR'S SUPERINTENDENT				_____ DATE	

AirStaO 5090.7  
 21 Feb 2006

<b>SPILL REPORTING FORM (front)</b>			
<b>Unit responsible for spill:</b>		<b>Responder:</b> (circle)	
<b>Name:</b>		Fire Department / CFR	
<b>Phone No.:</b>		<b>Responder's POC:</b>	
<b>Spill location:</b> (pit #, bldg #, etc.)		<b>Reporting Individual signature:</b>	
<b>Date/Time of Spill:</b>			
<b>TYPE OF SPILL</b> Check appropriate box		<b>Estimated amount:</b>	
JP5	<input type="checkbox"/>	Hazardous Material	<input type="checkbox"/>
Used oil	<input type="checkbox"/>	Hazardous Waste	<input type="checkbox"/>
Antifreeze	<input type="checkbox"/>	Diesel fuel	<input type="checkbox"/>
Other		<b>PROCEDURE TO ELIMINATE SPILL</b> Check appropriate box	
<b>CLEAN UP</b>		Shutoff pumps	<input type="checkbox"/>
		Over pack container	<input type="checkbox"/>
Date/time started:		Close valves	<input type="checkbox"/>
Date/time ended:		Upright container	<input type="checkbox"/>
<b>TYPE OF SURFACE SPILL WAS ON</b> Check appropriate box		<b>SPILL CAUSED BY:</b> Check appropriate box	
Water	<input type="checkbox"/>	Asphalt	<input type="checkbox"/>
Grass	<input type="checkbox"/>	Gravel	<input type="checkbox"/>
Soil	<input type="checkbox"/>	Concrete	<input type="checkbox"/>
Other		Equipment failure	
<b>NOTIFICATION</b>		Human error	
		Other	
<b>Required:</b>		<b>Is this a recurring problem:</b>	
<b>Fire Dept. (911/6-3333) ...or...</b>		Yes <input type="checkbox"/> No <input type="checkbox"/>	
<b>Crash Crew (6-2420)</b>		Optional:	
		EAD (6-4591) Safety (6-2730)	
		FMD (6-4363)	
Additional comments from the reporting activity:			
<b>EAD Representative:</b>			

ENCLOSURE (2)

**APPENDIX C**  
**Accident Prevention Plan**  
(Not included in EPA and NCDENR copies)

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## ACRONYMS AND ABBREVIATIONS

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APP	Accident Prevention Plan
ASTM	ASTM International, Inc.
CFR	Code of Federal Regulations
CPR	Cardiopulmonary Resuscitation
CSS	Coastal Stormwater Services, Inc.
EC	Emergency Coordinator
EAD	Environmental Affairs Department
HSM	Health and Safety Manager
LEPC	Local Emergency Planning Committee
MCAS	Marine Corps Air Station
MSDS	Material Safety Data Sheet
NAVFAC	Naval Facilities Engineering Command
NCDENR	North Carolina Department of Environment and Natural Resources
NOSC	Navy On-Scene Coordinator
NRC	National Response Center
OSHA	Occupational Safety and Health Administration
PM	Project Manager
PPE	Personal Protective Equipment
Precon	Pre-Construction Meeting
Rhēa	Rhēa Engineers & Consultants, Inc.
ROICC	Resident Officer in Charge of Construction
RPM	Remedial Project Manager
SHSO	Site Health and Safety Officer
SS	Site Superintendent
USACE	United States Army Corps of Engineers
USEPA	United States Environmental Protection Agency

## 1.0 SIGNATURE SHEET

---

### 1.A Plan Preparer

Plan Prepared By:

Name: R. Scott Powell  
Title: Project Manager  
Company: Rhēa Engineers & Consultants, Inc.  
Telephone: (910) 350-3156  
Fax: (910) 350-2987

This Site-Specific Accident Prevention Plan has been prepared by:



Signature: \_\_\_\_\_

R. Scott Powell, Project Manager

### 1.B Plan Approval

Plan Approved By:

Name: Brad A. McCalla  
Title: Corporate Health & Safety Manager  
Company: Rhēa Engineers & Consultants, Inc.  
Telephone: (724) 443-4111  
Fax: (724) 443-4187

I hereby acknowledge that I have reviewed and approve the tenets of this Site-Specific Accident Prevention Plan:



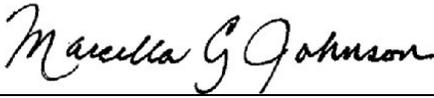
Signature: \_\_\_\_\_

Brad A. McCalla, Corporate Health & Safety Manager

Plan Approved By:

Name: Marcella G. Johnson  
Title: President  
Company: Rhēa Engineers & Consultants, Inc.  
Telephone: (724) 443-4111  
Fax: (724) 443-4187

I hereby acknowledge that I have reviewed and approve the tenets of this Site-Specific Accident Prevention Plan:

Signature:   
\_\_\_\_\_  
Marcella G. Johnson, President

## 1.C Plan Concurrence

Name: Erica L.S. DeLattre  
Title: Technical Project Manager  
Company: Rhēa Engineers & Consultants, Inc.  
Telephone: (724) 443-4111  
Fax: (724) 443-4187

I hereby acknowledge that I have reviewed and approve the tenets of this Site-Specific Accident Prevention Plan:

Signature:   
\_\_\_\_\_  
Erica L.S. DeLattre, Technical Project Manager

Name: Ken Robitaille  
Title: Construction Site Superintendent,  
Site Health and Safety Officer  
Company: Rhēa Engineers & Consultants, Inc.  
Telephone: (910) 350-3156  
Fax: (910) 350-2987

I hereby acknowledge that I have reviewed and concur with the tenets of this Site-Specific Accident Prevention Plan:

Signature:   
Ken Robitaille, Site Superintendent, Site Health and Safety Officer

Name: Tim Price  
Title: Alternate Construction Site Superintendent  
Alternate Site Health and Safety Officer  
Company: Rhēa Engineers & Consultants, Inc.  
Telephone: (910) 350-3156  
Fax: (910) 350-2987

I hereby acknowledge that I have reviewed and concur with the tenets of this Site-Specific Accident Prevention Plan:

Signature:   
Tim Price, Alternate Site Superintendent,  
Alternate Site Health and Safety Officer

## 2.0 BACKGROUND INFORMATION

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### 2.A Contractor

Rhēa Engineers & Consultants, Inc. (Rhēa)

### 2.B Contract Number

N40085-09-D-3214, Task Order 0002

### 2.C Project Name

Operable Unit (OU) 1, Site 83 Restoration.

### 2.D Description

Rhēa Engineers & Consultants, Inc. (Rhēa) will be restoring the vegetation and improving the stormwater drainage in the western portion of Site 83 at the Marine Corps Air Station (MCAS) Cherry Point, North Carolina. This work will be performed under Naval Facilities Engineering Command (NAVFAC) Mid-Atlantic, Contract No. N40085-09-D-3214.

The project will be completed through the following definable features of work:

1. Pre-Construction Coordination;
2. Mobilization and Site Setup;
3. Drainage and Grading Improvements;
4. Revegetation;
5. Vegetation Monitoring; and
6. Construction Closeout Report.

The following paragraphs describe the activities to occur during each feature of work.

#### ***Pre-Construction Coordination***

Rhēa will provide the approved construction schedule to the MCAS Environmental Affairs Department (EAD), and the NAVFAC Remedial Project Manager (RPM). Prior to the proposed mobilization date, Rhēa will

coordinate with the MCAS EAD to identify the date, time, and location for a pre-construction meeting (Precon). A representative from Rhēa will attend the Precon along with representatives from EAD, NAVFAC, and any additional MCAS Cherry Point representatives deemed necessary. Rhēa will be prepared to present an overview of the project scope and schedule, discuss logistics, roles and responsibilities, and respond to questions.

### ***Mobilization and Site Setup***

This task will consist of the mobilization of personnel and equipment to the work site, the installation of temporary site controls, and the verification of utilities. All necessary paperwork and documentation will be kept with the Rhēa representative on site.

Coastal Stormwater Services, Inc. (CSS) will be prepared to install silt fence, or other erosion and sediment (E&S) controls, as determined by Rhēa's on-site representative.

### ***Drainage and Grading Improvement***

The drainage improvements will include backfilling and grading activities along the top and the slope of the bank to reduce concentrated flow and to eliminate washouts along the bank. A vegetated soil berm will be installed along the length of the slope to divert runoff to three grass-lined swales.

The slope of the bank will be cleared of existing vegetation and overgrowth, allowing for visual assessment and site access. The flumes and the concrete aprons at the top of the slope will be removed and broken into manageable pieces for use as part of the energy dissipaters at the base of the proposed swales. Previously placed riprap along the slope and at the bottom of the flumes will be reused as part of the energy dissipaters. During backfilling activities, the former location of the two flumes and the gully will be graded for use as swales.

Fill soil will be placed along the slope to fill in low-lying portions and even out the contour of the slope. The top of the bank will be backfilled and graded to divert overland flow to the three proposed grass-lined swales. A cellular confinement material will be installed over the soil berm and along the proposed grass-lined swales to reinforce the soil.

After placement and backfill of the cellular confinement material, the removed riprap and broken concrete from the flumes will be placed at the end of the proposed swales to dissipate energy from the channeled flows. The

existing mulch piles from the 2009 clearing will be spread evenly throughout the western portion of the site to improve conditions for vegetation establishment.

### ***Revegetation***

Activities to restore the site to its former vegetated condition will begin when clearing and grading activities are completed. The site will be seeded with a native seed mixture. Rhēa will also plant three species of trees at the site, including loblolly pine, red maple, and bald cypress. The trees will be planted approximately 20 feet apart.

### ***Vegetation Monitoring***

A site visit to inspect the health of the restored habitat and judge the success of the restoration will be scheduled after the first growing season of the initial restoration event.

### ***Construction Closeout Report***

A Construction Closeout Report will be prepared and submitted following the restoration phase of the project. A Pre-Draft of this Report will be submitted to NAVFAC and EAD for review and comment. Once the comments are incorporated, the Construction Closeout Report will be submitted to the North Carolina Department of Environment and Natural Resources (NCDENR).

## 3.0 STATEMENT OF SAFETY AND HEALTH POLICY

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The following statement is from Rhēa’s Corporate Health & Safety Policies Manual:

“Rhēa values its employees as its greatest asset and places a premium on the safety and health of its employees. It is the policy of Rhēa to conduct its operations in such a manner as to minimize the risk of personal injury, personal exposure to harmful substances and property damage for Rhēa employees, clients, and the public.”

A copy of Rhēa’s Corporate Health & Safety Policies Manual will be kept on site for reference or to address health and safety issues that may not be addressed by this Site-Specific Accident Prevention Plan (APP).

## 4.0 RESPONSIBILITIES AND LINES OF AUTHORITY

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### 4.A Employer's Responsibility

It is the responsibility of Rhēa, as represented by our employees, to implement this APP. The responsibilities of the various positions within Rhēa and the responsibilities of our subcontractors are presented in this APP.

Site safety is accomplished through an integrated team effort. The health and safety personnel, supervisors, site workers, and administrative team all perform essential safety roles. The following sections outline the work team's respective responsibilities and training requirements, and identify key personnel.

### 4.B Corporate and Project Health and Safety Personnel

Brad McCalla is Rhēa's Corporate Health & Safety Manager responsible for monitoring and enforcing policies and procedures as set forth in this APP. Rhēa corporate personnel shall have the authority to intervene and suspend work in the interest of safety policy compliance. Mr. McCalla can be reached at the following phone numbers:

(724) 443-4111 (office)  
(724) 462-4202 (cell)

As Rhēa PM, Mr. Powell has the overall responsibility for the project and verifies that the project goals are attained in a manner consistent with APP requirements. The PM will coordinate with the SHSO to confirm that the remedial action goals are completed in a manner consistent with the APP. Mr. Powell's health and safety credentials are provided in Attachment A, Rhēa Personnel Certifications.

Mr. Powell holds and maintains the following health and safety certificates:

- + 40-Hour Occupational Safety and Health Administration (OSHA) Health and Safety (29 Code of Federal Regulations [CFR] 1910.120)
- + 8-Hour OSHA Refresher Training (annually)
- + OSHA Supervisor Health and Safety Training (29 CFR 1910.120)

## 4.C Site Health and Safety Personnel

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

### Site Superintendent (SS), Site Health and Safety Officer (SHSO), and Competent Person

Ken Robitaille  
(910)-350-3156 (office)  
(910) 650-9979 (cell)

### Alternate SS, Alternate SHSO, and Alternate Competent Person

Tim Price  
(910) 350-3156 (office)  
(910) 581-4774 (cell)

#### 4.C.1 Site Health and Safety Officer and Competent Person

The SHSO (also considered the Competent Person) has the responsibility for administering the APP relative to site activities, and will be available full-time on site. The SHSO's primary operational responsibilities include personal and environmental monitoring, coordination of job safety analyses, personal protective equipment (PPE) maintenance, and assignment of protection levels. The SHSO will direct field activity involved with safety, and is authorized to stop work when an imminent health or safety risk exists. The SHSO is responsible for informing on-site personnel of safety requirements. The SHSO will submit an APP Acceptance Form and maintain a log of any visitors entering and exiting the site (see Figures 1 and 2).

Mr. Robitaille of Rhēa will be the acting SS and SHSO. He possesses remedial action experience and a working knowledge of the state and federal occupational safety and health regulations.

Mr. Robitaille holds and maintains the following health and safety certificates:

- + 40-Hour OSHA Health and Safety (29 CFR 1910.120)
- + 8-Hour OSHA Refresher Training (annually)
- + OSHA Supervisor Health and Safety Training (29 CFR 1910.120)

In addition, Mr. Robitaille, and at least one additional on-site personnel, will be trained in standard first aid, cardiopulmonary resuscitation (CPR), and

the OSHA Bloodborne Pathogens Standard. Training certificates and certifications will be retained at the site during the project. Mr. Robitaille possesses demonstrable experience and has received specialized training in the use and selection of PPE, and is familiar with the PPE implementation program. Furthermore, he has experience in the proper use of air monitoring instrumentation and sampling procedures relevant to the activities that will be performed at the site. Mr. Robitaille's health and safety credentials are provided in Attachment A of this APP.

The SS/SHSO will be in direct communication with the MCAS EAD, Rhēa, CSS, and, if necessary, the Resident Officer in Charge of Construction (ROICC). It will be his responsibility to coordinate with these individuals regarding the health and safety aspects of the daily work activities. A Daily Safety Meeting Log will be maintained to relay daily health and safety hazards (see Figure 3).

#### **4.C.2 Site Labor Forces**

Site labor forces will be comprised of personnel within appropriate trade categories who possess the training and experience to work at a remedial site. Those who may be exposed to hazardous substances and/or potential health and safety hazards will have completed the required 40-Hour OSHA Health and Safety Training and the 8-Hour OSHA refresher training.

### **4.D Work On Site**

No on-site work will be performed without the SHSO or Alternate SHSO on site.

### **4.E Pre-Task Safety & Health Analysis**

The pre-task safety and health analysis will be performed by the SHSO prior to commencing any new phase of work. This is addressed in more detail in Attachment B, Site Safety and Health Plan.

### **4.F Personnel Roles, Lines of Authority, and Communications**

The primary Emergency Coordinator (EC) for this site is the SS. In an emergency, the SS or the highest-ranking employee on site will serve as the EC. The EC will determine the nature of the emergency and take appropriate action.

#### 4.F.1 Responsibilities and Duties

It is recognized that the structure of the “Incident Command System” will change as additional response organizations are added. The Rhēa team will follow procedures as directed by the fire department, Local Emergency Planning Committee (LEPC), and state and federal agencies, as required. The Rhēa team will defer to the first on-scene local fire department individual with command responsibility for the incident scene.

#### 4.F.2 On-Site Emergency Coordinator Duties

The on-site EC is responsible for implementing and directing emergency procedures. The EC will immediately contact outside authorities for assistance in the event of a spill or release.

Initially, emergency personnel and their communications will be coordinated through the EC. Specific duties of the EC include the following:

- + Identify the source and character of the incident, including type and quantity of 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 minimize the potential for fires, explosions, or spillage to other parts of the site. While operations are dormant, monitor for leaks, pressure buildup, gas generation, or ruptures in valves, pipes, or other equipment where appropriate.
- + Notify the Navy On-Scene Coordinator (NOSC) if outside emergency response help is necessary to control the incident.
- + Direct on-site personnel to control the incident until help arrives.
- + Verify that the building or area where the incident occurred and the surrounding area are evacuated, and shut off possible ignition sources only if shut off can be achieved safely and such action is appropriate.
- + If fire or explosion is involved, notify the local fire department, by calling 911.

- + Notify the ROICC.
- + Notify the Rhēa PM.
- + Notify the MCAS EAD and NAVFAC RPM.

If the incident may threaten human health or the environment outside of the site, the EC should immediately determine whether evacuation of the area outside of the site might be necessary and, if so, notify the police department and the on-site fire, safety, and rescue offices (see Figure 4).

When required (as determined by the NOSC), notify the National Response Center (NRC). The following information should be provided to the NRC:

- + Name and telephone number;
- + Name and address of facility;
- + Time and type of incident;
- + Name and type of materials involved, if known;
- + Extent of injuries; and
- + Possible hazards to human health or the environment outside of the facility.

The emergency number for the NRC is **800-424-8802**.

If hazardous waste has been released or produced through control of the incident, the following steps shall occur:

- + Collect and contain waste.
- + Remove or isolate containers of waste from the immediate site of the emergency.
- + Treat or store the recovered waste, contaminated soil or surface water, or any other material that results from the incident or its control.
- + Confirm that any waste incompatible with released material is NOT treated or stored at the site until cleanup procedures are completed.
- + Confirm that all equipment used is decontaminated, recharged, and fit for its intended use before operations are resumed.

- + Notify the United States Environmental Protection Agency (USEPA) Regional Administrator that cleanup procedures have been completed and that all emergency equipment is fit for its intended use before resuming operations in the affected area of the facility.
- + Record time, date, and details of the incident, and submit a written report to the USEPA Regional Administrator (due within 15 days of the incident).
- + Perform the post-incident evaluation and response critique, and submit a written report to the USEPA Regional Health and Safety Director within 30 days of the incident conclusion.

## 4.G Safety Procedures/Non-Compliance

Employees and supervisors are informed through training and administrative correspondence that safe behaviors and practices are required on jobs and during Rhēa work activities. Failure to work safely could affect the offending individual, coworkers, the environment, and/or Rhēa assets. Supervisors are authorized to discipline workers who compromise safety by ignoring or attempting to circumvent safety requirements. Rhēa's Corporate Health and Safety Manager, Mr. McCalla, along with the SAs are authorized to stop unsafe work practices, if necessary, until risks of severe injury or illness are adequately mitigated. Workers found disregarding known safety procedures may ultimately be removed from the project.

## 4.H Supervisor Safety Accountability

Rhēa is a small business with a rather flat management structure; therefore, Rhēa does not have a formal supervisor safety accountability program. Supervisors will be treated similarly as all Rhēa employees. Rhea's Health & Safety Policies Manual simply states the following:

“Violations of Health and Safety Policies or Procedures will not be tolerated and violators will be subject to discipline up to and including termination.”

These violations apply to both supervisors and non-supervisors.

## 5.0 SUBCONTRACTORS

---

### 5.A Identification of Subcontractors

Rhēa will subcontract the following contractors:

- + Professional Locating Services, Inc., who will locate site utilities before intrusive activities begin; and
- + Coastal Stormwater Services, Inc. (CSS), who will install drainage features, grade site, and revegetate site.

The Rhēa SS will be on site when work is being performed. The subcontractor will not perform work unless the Rhēa SS or Alternate SS is on site.

### 5.B Subcontractor Safety Responsibility

Subcontractor personnel will adhere to policies and procedures outlined in this APP. Subcontractors that provide on-site services are encouraged to develop and submit to the SHSO, for approval, their own project-specific APP. Such plans must meet or exceed the requirements of the Rhēa APP.

In lieu of a formal plan submitted by a subcontractor, the subcontractor or supplier must subscribe to the tenets of the APP. Subcontractor and supplier personnel that work or visit the project site shall be required to review the APP and accept the Rhēa Superintendent/SHSO as the governing site authority. These individuals will be required to sign their name, indicating they have read this plan and will comply with the rules, practices, and procedures contained herein. The Accident Prevention Plan Acceptance Form is included as Figure 1.

Rhēa is responsible for informing its lower tier subcontractors and suppliers of these requirements, for directing and supervising the work of subcontractors, and for assuring that its subcontractors adhere to the requirements herein. Rhēa may request the subcontractor provide proof of its subcontractors' adherence to all rules and regulations, and will prohibit access to Rhēa/Rhēa client property and/or the job site for those contractors not in compliance.

It is also the responsibility of Rhēa subcontractors to work in a manner so as not to endanger themselves, fellow employees, Rhēa team employees, authorized work site visitors and customers, the general public, the environment, and Rhēa equipment or property.

### **5.B.1 General Requirements**

Where the Rhēa SHSO deems appropriate, the subcontractor will provide a safety representative to monitor work practices. The subcontractor's safety representative may be required to remain on site at all times while work is in progress. Subcontractors noting any unsafe practices, dangerous situations, or unsafe conditions, must immediately report the information to the Rhēa SHSO before commencing or continuing work.

Subcontractors and their employees working at the site are required to comply with the Rhēa Contractor/Subcontractor Procedures, the APP, and/or their own site-specific approved accident prevention plan, whichever is most stringent.

### **5.B.2 Hazard Communication (29 CFR 1910.1200)**

Each subcontractor must have a Hazard Communication Program in compliance with 29 CFR 1910.1200 or 29 CFR 1926.59. Subcontractors will provide Rhēa with a Material Safety Data Sheet (MSDS) for all chemicals or otherwise hazardous materials they introduce to Rhēa facilities and work locations.

The Rhēa SHSO will be responsible for hazard communication training for the subcontractor as part of site safety orientation.

Rhēa will provide the following information to the subcontractor's supervisor who will be responsible for his/her crew's training:

- + A description of hazardous materials, if any, that exist in the area in which they will be working;
- + A copy of the MSDS for the hazardous materials in the work area;
- + Training on the MSDS and the hazardous material labeling system in effect at the location; and
- + Training on the local emergency response procedures.

## 6.0 TRAINING REQUIREMENTS

---

### 6.A New Employee Safety Training

Safety is of the utmost importance to Rhēa. All new employees of Rhēa must read the Rhēa Corporate Health & Safety Procedures Manual. Prior to the start of the fieldwork associated with this project, the following will be reviewed with both Rhēa and subcontractors working on site:

- + Restatement of company safety policy and project commitment to safety;
- + Review location of first aid equipment, fire extinguisher, and other safety related equipment;
- + Review fire and accident reporting procedures;
- + Responsibility of supervisors regarding records and reporting of incidents/accidents to the Client/Client Representative; and
- + Location of required safety equipment, manuals, and report forms.

### 6.B Mandatory Training

Rhēa employees and subcontractors working on the site who may potentially be exposed to hazardous substances and/or potential health and safety hazards will have completed the 40-Hour OSHA Health and Safety Training and 8-Hour OSHA Refresher training as required by OSHA regulations, 29 CFR 1910.120. The SHSO and alternate SHSO will have completed the additional OSHA Supervisor Health and Safety Training.

Rhēa will maintain records of training and refresher courses for on-site Rhēa and subcontractor personnel and records of site personnel experience under the direction of a skilled supervisor (24 hours minimum). Also, a log of visitors to the site, including name, company name/organization, date and activities conducted, will be maintained at the site. Individuals visiting the site will be required to sign this log. Rhēa will retain these and other health and safety records after project activities have been completed. The standard form used for sign-in and sign-out of visitors is included as Figure 2.

#### 6.B.1 Site-Specific Training

Site-specific training will be provided to site personnel involved in site work activities. This training will address potential site hazards and review site safety measures that must be followed on certain areas of the site where

health and safety hazards may exist. Procedures regarding the buddy system, spill response, fire prevention/suppression techniques, levels of protection, recognition of potential hazards, overexposure to chemical hazards, and air monitoring will also be covered as part of the training. Further, the training will include a discussion of general site conditions.

### **6.B.2 Emergency First Aid Training**

The SHSO and an additional on-site person (if there is one) will be trained in standard first aid, CPR, and the OSHA Bloodborne Pathogens Standard. This training has been provided so that any necessary primary care may be provided to an individual before professional response providers arrive.

### **6.B.3 Daily Safety Meeting**

Project personnel will be given briefings by the SHSO daily or additionally, as determined by the SHSO. These daily meetings will further assist site personnel in conducting their activities in a safe manner, and provide workers with information on new operations, changes in work practices, or changes in environmental conditions at the work site. Briefings will also be given to facilitate conformance to prescribed safety practices when performance deficiencies are identified during routine daily activities or as a result of safety audits.

A summary form that will be completed to document topics discussed during each Daily Safety Meeting is included as Figure 3.

## **6.C Periodic Safety and Health Training**

The SHSO may also perform one-on-one training. In such a scenario, the SHSO will periodically observe the work of individual employees, and then meet with them to discuss safe work practices, bestow credit for safe work, and provide additional instruction to counteract any observed unsafe practices if necessary.

Additional periodic safety and health training will be provided to employees prior to their performance of new tasks and the implementation of new equipment.

## **6.D Requirements for Emergency Response Training**

Emergency response training is addressed in Sections 6.B and 9.B of this APP.

## 7.0 SAFETY AND HEALTH INSPECTIONS

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### 7.A Safety Inspections

The Rhēa Health and Safety Manager (HSM), PM, and/or SHSO may conduct periodic inspections of the site. The SHSO will discuss necessary corrective actions with the PM, and/or the HSM, and review new procedures. The Job Safety Inspection Checklist (from Rhēa’s Corporate Health & Safety Policies Manual) will be kept on file at the site and at Rhēa’s office in Gibsonia, Pennsylvania.

### 7.B External Inspections/Certifications

Rhēa does not anticipate, but may consider, the use of outside sources to provide safety inspections on an as-needed basis.

As required, Rhēa safety equipment will comply with appropriate National Institute of Occupational Safety and Health, ASTM International, Inc. (ASTM), and the United States Coast Guard or other recognized certification organizations.

## 8.0 ACCIDENT REPORTING

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### 8.A Exposure Data (Man-hours Worked)

The HSM and Rhēa personnel department will track and maintain incident records at the Rhēa Gibsonia, Pennsylvania office.

### 8.B Accident Investigations, Reports, and Logs

Site personnel will report accidents or unusual incidents to the SHSO. The SHSO is responsible for conducting any emergency response actions in an efficient and safe manner. It will be the responsibility of the SHSO to determine whether off-site assistance and/or medical treatment are required. The SHSO is responsible for completing the Supervisor's Accident Investigation Report. If an employee is injured, an Employee Injury Report must be completed. A Supervisor's Accident Investigation Report is provided as Figure 5. Copies of Employee Injury Reports (Figure 6) will be submitted to the EAD, the ROICC, and the Rhēa HSM.

### 8.C Immediate Notification Of Major Incidents

Rhēa will immediately notify the EAD, the NAVFAC RPM, and the ROICC of any major incident including the following: fatal injury; permanent, total, or partial disability; the hospitalization of three or more people resulting from a single occurrence; fire, equipment/property damage of \$200,000 or more; and environmental incidents. A full report will be provided within 24 hours.

## 9.0 PLANS REQUIRED BY THE SAFETY MANUAL

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The following subsections discuss the plans, programs, or procedures that the United States Army Corps of Engineers (USACE) Safety and Health Requirements Manual (EM 385-1-1, September 15, 2008) identifies for inclusion in the APP.

Attachments C, D, E, F, H, and I include sections from Rhēa’s Corporate Health & Safety Manual that are applicable to this project. These sections may include references to other sections within Rhēa’s Corporate Health & Safety Manual that are not included in this document. As identified in Section 3.0, a complete copy of Rhēa’s Corporate Health & Safety Policies Manual will be kept in the on-site support trucks.

### 9.A Layout Plans

There will be no temporary facilities associated with this project, due to its size and scope.

### 9.B Emergency Response Plan

The following section provides information on personnel roles, lines of authority, communications, safe distances and places of refuge, evacuation routes and procedures, and procedures for containing/collecting spills. Route maps to primary and secondary medical facilities are provided in Figures 7 and 8, respectively. A list of emergency phone numbers is provided on Figure 4. This list will be posted and updated as necessary and held with the SS.

#### 9.B.1 Personnel Roles, Lines of Authority, and Communications

The primary EC for this site is the SS. In the event of an emergency, the SS or the highest-ranking employee on site, will serve as the EC. The EC will determine the nature of the emergency and take appropriate action.

#### *Responsibilities and Duties*

As mentioned above, it is recognized that the structure of the “Incident Command System” will change as additional response organizations are added. The Rhēa team will follow procedures as directed by the MCAS Cherry Point fire department, LEPC, and state and federal agencies, as required. The Rhēa team will defer to the first on-scene MCAS Cherry Point

fire department individual with command responsibility for the incident scene.

### ***On-Site Emergency Coordinator Duties***

The on-site EC is responsible for implementing and directing emergency procedures. The EC will immediately contact outside authorities for assistance in the event of a spill or release. Initially, emergency personnel and their communications will be coordinated through the EC. Specific duties of the EC are as follows:

- + Identify the source and character of the incident, including type and quantity of 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 minimize the potential for fires, explosions, or spillage to other parts of the site. While operations are dormant, monitor for leaks, pressure buildup, gas generation, or ruptures in valves, pipes, or other equipment where appropriate.
- + Notify the NOSC if outside emergency response help is necessary to control the incident.
- + Direct on-site personnel to control the incident until help arrives.
- + Verify that the building or area where the incident occurred and the surrounding area are evacuated, and shut off possible ignition sources only if shut off can be achieved safely and such action is appropriate.
- + If fire or explosion is involved, notify the local fire department, by calling 911.
- + Notify the ROICC.
- + Notify the Rhēa PM.
- + Notify the MCAS EAD and NAVFAC RPM.

If the incident may threaten human health or the environment outside of the site, the EC should immediately determine whether evacuation of the area outside of the site might be necessary and, if so, notify the police department and the on-site fire, safety and rescue offices (see Figure 4).

When required (as determined by the NOSC), notify the NRC. The following information should be provided to NRC:

- + Name and telephone number;
- + Name and address of facility;
- + Time and type of incident;
- + Name and type of materials involved, if known;
- + Extent of injuries; and
- + Possible hazards to human health or the environment outside of the facility.

The emergency number for the NRC is **800-424-8802**.

If hazardous waste has been released or produced through control of the incident, the following steps shall occur:

- + Collect and contain waste.
- + Remove or isolate containers of waste from the immediate site of the emergency.
- + Treat or store the recovered waste, contaminated soil or surface water, or any other material that results from the incident or its control.
- + Confirm that any waste incompatible with released material is NOT treated or stored at the site until cleanup procedures are completed.
- + Confirm that all equipment used is decontaminated, recharged, and fit for its intended use before operations are resumed.
- + Notify the USEPA Regional Administrator that cleanup procedures have been completed and that all emergency equipment is fit for its intended use before resuming operations in the affected area of the facility.

- + Record time, date, and details of the incident, and submit a written report to the USEPA Regional Administrator. The report is due to USEPA within 15 days of the incident.
- + Perform the post-incident evaluation and response critique, and submit a written report to the USEPA Regional Health and Safety Director within 30 days of the incident conclusion.

### **9.B.2 Procedure for Containing/Collecting Spills**

The initial response to a spill or discharge will be to protect human health and safety and the environment. Identification, containment, treatment, and disposal assessment will be the secondary response.

If a chemical spill is not contained within a dike or sump area, an area of isolation will be established around the spill. The size of the area will generally depend on the size of the spill and the materials involved. If the spill is large (greater than 55 gallons) and involves a tank or a pipeline rupture, an initial isolation of at least 100 feet in all directions will be used. Small spills (less than or equal to 55 gallons) or leaks from a tank or pipe will require evacuation of at least 50 feet in all directions to allow cleanup and repair and to prevent exposure. When any spill occurs, only those persons involved in overseeing or performing emergency operations will be allowed within the designated hazard area. If possible, the area will be roped or otherwise blocked off.

If the spill results in the formation of a toxic vapor cloud (by reaction with the surrounding materials or by outbreak of fire) and its release (due to high vapor pressures under ambient conditions), further evacuation will be enforced. In general, an area at least 500 feet wide and 1,000 feet long will be evacuated downwind if volatile materials are spilled.

If an incident may threaten the health or safety of the surrounding community, the public will be informed and possibly evacuated from the area. The on-site EC will inform the proper agencies in the event that this response is necessary.

### **9.B.3 Fires**

Rhēa personnel and subcontractors are not trained professional firefighters; therefore, if there is any doubt a fire can be quickly contained and

extinguished, personnel will vacate the area and immediately contact the MCAS Fire Department.

The following procedures will be used to prevent the possibility of fires and resulting injuries:

- + Sources of ignition will be isolated from flammable materials.
- + Air will be monitored for explosive atmospheres before and during hot work and periodically where flammable materials are present. Hot Work Permits will be required and displayed for any such work.
- + “No Smoking” signs will be conspicuously posted in areas where flammable materials are present.
- + Fire extinguishers will be placed in all areas where a fire hazard may exist. Before workers begin operations in an area, the EC will give instructions on egress procedures and assembly points.

The following procedures will be used in the event of a fire:

- + Workers who see a fire will notify the EC, who will contact the MCAS Cherry Point fire department.
- + When the emergency horn sounds, workers will disconnect electrical equipment in use (if possible) and proceed off site.
- + If a small fire has been extinguished by a worker, the EC will be notified.

**Small Fires:** In the event of a small fire at the site, the EC will, at a minimum, take the following actions:

- + Immediately notify the MCAS Cherry Point Fire Department.
- + Evacuate all unnecessary personnel from the area to an upwind location, if possible.
- + Attempt, using properly protected personnel, to extinguish the fire using portable fire extinguishers or by smothering.
- + Request emergency response assistance (ambulance, fire, hospital, poison control center) as needed for any fire that cannot be extinguished and for any injuries or exposures to hazardous chemicals.

**Large Fires:** In the event of a large or small fire that cannot be extinguished, the SS/SHSO or EC will undertake the following actions:

- + Immediately notify the MCAS Cherry Point Fire Department.
- + Evacuate all personnel from the area of the fire, preferably to an upwind location.
- + Order the appropriate level of protective clothing.
- + Notify the fire department and other emergency response agencies.

**Evacuation Procedures:** If the EC declares an evacuation, all personnel are required to exit the defined work area to an upwind location near the site perimeter or beyond. Evacuation procedures will be reviewed during site-specific training.

#### **9.B.4 Emergency Telephone Numbers**

The Emergency Telephone Number List is provided as Figure 4. Other state and federal employee notices such as, but not limited to, Right-to-Know, Equal Opportunity is the Law, Minimum Wage, and Workers Compensation Carrier Identification, will be kept with the SS along with other data required for emergency response.

#### **9.B.5 Man Overboard**

Man Overboard response information is not applicable to this project because of the land-based nature of the work.

#### **9.B.6 Medical Support**

##### ***Response Requirements***

The American Red Cross or other approved agency shall certify the SHSO and at least one other on-site employee in first aid, adult CPR, and the handling of bloodborne pathogens according to OSHA standards. The trained individuals will be available to provide first aid in the event of an emergency. The following procedure will be followed in response to any major personal injury:

1. The nearest workers will immediately assist a person who shows signs of medical distress or who is involved in an accident. The SS will be summoned.

2. The SS will immediately determine the following:
  - + Location of the victim at the work site;
  - + Nature of the emergency;
  - + Whether the victim is conscious; and
  - + Specific conditions contributing to the injury, if known.
  
3. The following actions will be taken depending on the severity of the incident:
  - + **Life-Threatening Incident:** If an apparent life-threatening condition exists, the SS will immediately contact local Emergency Medical Response Services and the SHSO. An on-site person will be appointed to meet the EMS and have him/her quickly taken to the victim. Rhēa personnel will evacuate injured personnel, injury permitting, from the active work zone to a clean area for treatment by EMS personnel.
  
  - + **Non Life-Threatening Incident:** If it is determined that no threat to life is present, the SS will immediately contact the SHSO, who will direct the injured person through procedures appropriate to the nature of the illness or accident. Appropriate first aid or medical attention will be administered.

\***Note:** The area surrounding an accident site must not be disturbed until the SHSO has cleared the scene.

Personnel requiring emergency medical attention will be evacuated from active work areas if doing so would not endanger the life of the injured person or otherwise aggravate the injury. Personnel will not enter the area to attempt a rescue if their own lives would be threatened.

### ***First Aid***

First aid will be administered by the closest certified individual to the accident/incident. This assistance will be coordinated by the SHSO in a manner that avoids placing those rendering assistance in a situation of

unacceptable risk. The primary concern will be to avoid placing a greater number of individuals in jeopardy.

- + **Bloodborne Pathogens Program:** In regard to first aid procedures, Rhēa will follow the “Bloodborne Pathogens Procedure” (in accordance with 29 CFR 1910.1030), found in the Rhēa Corporate Safety Procedures. A copy of the procedure will be retained at the site and will be reviewed during site-specific training.

### ***Off-Site Medical Arrangements***

Prior to the start of work, Rhēa shall arrange for medical facilities personnel to provide timely attention to any injured person at the work sites. Primary emergency attention will be conducted at Craven Regional Medical Center. Secondary medical facility will be conducted at Carteret General Hospital. As mentioned above, a detailed map with directions to and contact numbers of the primary and secondary medical facilities is provided as Figures 7 and 8. Addresses, phone numbers, and directions are as follows:

**Primary Medical Facility**  
**Craven Regional Medical Center**  
Non-Emergency Phone No.: (252) 633-8111  
2000 Neuse Blvd.  
P.O. Box 12157  
New Bern, NC 28561

Directions to Medical Center: From the main gate, turn right (west) onto SR 101 (Fontana Blvd.), bear right onto U.S. Route (Rt) 70 West (W. Main St.), follow U.S. Rt 70 West to NC State Rt (SR) 1200 (Pembroke Road), turn left onto 1<sup>st</sup> Street, turn left onto US Rt 17 (U.S. Rt 70 Bus/SR 55/Neuse Blvd.), and turn right onto Hospital Drive. The hospital is on the left.

Emergency Phone No.: 911 (see note below)

**\*Important Note:** If dialing 911 from a cell phone, the 911 call center in New Bern (or Carteret) will be contacted. Dialing 911 on a MCAS Cherry Point land line phone will contact the MCAS Cherry Point 911 operator.

**Secondary Medical Facility**  
**Carteret General Hospital**  
Non-emergency Phone No.: (252) 808-6000  
3500 Arendell Street  
P.O. Drawer 1619  
Morehead City, NC 28557

Directions to Carteret General Hospital: From the main gate, turn right (west) onto NC SR 101 (Fontana Blvd.), turn left onto U.S. Rt 70 East (E. Main St.), follow U.S. Rt 70 East to North 35<sup>th</sup> Street, and turn left into the hospital.

## **9.C Plan for Prevention of Alcohol and Drug Abuse**

Excerpts from Rhēa's Office Policy Manual that address the required aspects of an Alcohol and Drug Abuse Prevention Plan are included as Attachment C.

## **9.D Site Sanitation Plan**

Work sites shall be kept neat and clean to prevent accidents or disease caused by debris or an unsanitary work environment. A Marine Corps Exchange Store is located at the corner of Slocum Road and Roosevelt Boulevard and contains facilities for use during this project. The bathrooms have both hot and cold running water and hand soap, individual hand towels, and toilet paper. Showers are not available and are not required for this job site.

## **9.E Access and Haul Road Plan**

Site 83 is accessible and will not require an access road to be built; therefore, an Access and Haul Road Plan is not included in this APP.

## **9.F Respiratory Protection Plan**

Attachment D is the Respiratory Protection Program from Rhēa's Health and Safety Policies Manual.

## **9.G Health Hazard Control Program**

All aspects of a Health Hazard Control Program are included in Attachment B, Site Safety and Health Plan.

## **9.H Hazard Communication Program**

Attachment E is the Hazard Communication Program from Rhēa's Health and Safety Policies Manual.

## **9.I Process Safety Management Plan**

The restoration activities do not involve the use of highly hazardous chemicals; therefore, a Process Safety Management Plan is not included with this APP.

## **9.J Lead Abatement Plan**

There is no reason to believe that lead would be present during the restoration activities; therefore, a Lead Abatement Plan is not included in this APP.

## **9.K Asbestos Abatement Plan**

There is no reason to believe that asbestos would be present during the restoration activities; therefore, an Asbestos Abatement Plan is not included in this APP.

## **9.L Radiation Safety Program**

There is no reason to believe that radiation would be present during the restoration activities; therefore, a Radiation Safety Plan is not included in this APP.

## **9.M Abrasive Blasting Plan**

There will be no abrasive blasting associated with the restoration activities; therefore, an Abrasive Blasting Plan is not included in this APP.

## **9.N Heat/Cold Stress Monitoring Plan**

Attachment F is the Heat/Cold Stress Monitoring Plan from Rhēa's Corporate Health and Safety Procedures Manual.

## **9.O Crystalline Silica Monitoring Plan**

There will be no crystalline silica associated with the restoration activities; therefore, a Crystalline Silica Monitoring Plan is not included in this APP.

## **9.P Night Operations Lighting Plan**

The restoration activities do not require work to be performed during darkened hours; therefore, a Night Operations Lighting Plan is not included in this APP.

## **9.Q Fire Prevention Plan**

Fire prevention is discussed in Section 9.B.3.

## **9.R Wildland Fire Management Plan**

The site is not located within wildlands; therefore, a Wildland Fire Management Plan is not included in this APP.

## **9.S Hazardous Energy Control Plan**

There will be no hazardous energy, compressed air, or electricity at the site; therefore, a Hazardous Energy Control Plan is not included in this APP.

## **9.T Critical Lift**

There will be no critical lifts associated with the restoration activities; therefore, a Critical Lift Plan is not included in this APP.

## **9.U Contingency Plan for Severe Weather**

Inclement weather conditions may occur without warning. It will be the responsibility of the EC to halt work due to eminent dangers. The EC will also be responsible for ordering the re-commencement of work once the danger has passed.

Work activities will not be started or continued when the following hazardous weather conditions are present:

- + Lightning
- + Heavy rains
- + High winds

Personnel working in hazardous weather conditions will move to safe refuge. The EC will determine when it is necessary to evacuate the area and will coordinate these efforts with fire, police, and other agencies.

The EC will be responsible for assessing hazardous weather conditions and notifying personnel of specific contingency measures. Notifications will include the following:

- + Rhēa PM
- + Rhēa Corporate Safety Manager
- + EAD
- + Local Civil Defense Organization

In the event of the potential for a hurricane to impact the work activities, the EC will implement the requirements of the Hurricane Preparation Plan (see Attachment G).

## **9.V Float Plan**

Restoration activities do not require anything to be moved via floatation; therefore, a Float Plan is not included in this APP.

## **9.W Fall Protection Plan**

Restoration activities do not require elevated work; therefore, a Fall Protection Plan is not included in this APP.

## **9.X Demolition Plan**

Restoration is not a structural demolition; therefore, a Demolition Plan is not included in this APP.

## **9.Y Excavation/Trenching Plan**

Restoration will not involve excavation or trenching of site soils; therefore, a Excavation/Trenching Plan is not included in this APP.

## **9.Z Emergency Rescue (Tunneling)**

Restoration activities do not require tunneling; therefore, an Emergency Rescue Plan is not included in this APP.

## **9.AA Underground Construction Fire Prevention and Protection Plan**

Restoration activities do not require underground construction; therefore, an Underground Construction Fire Prevention and Protection Plan is not included in this APP.

## **9.BB Compressed Air Plan**

Restoration activities do not require compressed air; therefore, a Compressed Air Plan is not included in this APP.

## **9.CC Formwork, Shoring Erection, and Removal Plans**

Restoration activities do not require formwork or shoring; therefore, a Formwork, Shoring Erection, and Removal Plan is not included in this APP.

## **9.DD Pre-Cast Concrete Plan**

Restoration activities do not require installation of pre-cast concrete; therefore, a Pre-Cast Concrete Plan is not included in this APP.

## **9.EE Lift Slab Plan**

Restoration activities do not require slabs to be lifted; therefore, a Lift Slab Plan is not included in this APP.

## **9.FF Steel Erection Plan**

Restoration activities do not require steel erection; therefore, a Steel Erection Plan is not included in this APP.

## **9.GG Site Safety and Health Plan for Hazardous, Toxic and Radioactive Waste Work**

A Site Safety and Health Plan is included as Attachment B.

## **9.HH Blasting Plan**

Restoration activities do not require blasting; therefore, a Blasting Plan is not included in this APP.

## **9.II Diving Plan**

Restoration activities do not require diving; therefore, a Diving Plan is not included in this APP.

## **9.JJ Confined Space**

There will be no confined space entry associated with the restoration activities; therefore, a Confined Space Entry Plan is not included in this APP.

## 10.0 RISK MANAGEMENT

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An Activity Hazard Analysis is included in Attachment B, Site Safety and Health Plan, as Figure B1.

## FIGURES





## FIGURE 2 SIGN-IN LOG

Rhēa Engineers & Consultants, Inc.  
OU1 Site 83 Restoration  
MCAS Cherry Point, North Carolina

VISITOR NAME	COMPANY NAME	DATE	TIME IN	TIME OUT	PURPOSE OF VISIT



## FIGURE 3 DAILY SAFETY MEETING LOG

**Rhēa Engineers & Consultants Inc.**  
OU1 Site 83 Restoration  
MCAS Cherry Point, NC

Date: \_\_\_\_\_ Time: \_\_\_\_\_ HSO: \_\_\_\_\_

### Safety Topics Presented

Issue	Today's Work Areas			
Chemicals of Concern				
Physical Hazards of Concern				
Special Concerns				

### Attendees (Please Print)




**FIGURE 4  
EMERGENCY TELEPHONE NUMBERS**

**Rhēa Engineers & Consultants, Inc.  
OU1 Site 83 Restoration  
MCAS Cherry Point, North Carolina**

**MCAS Cherry Point On-Site Emergency Telephone Numbers**

<b>Fire</b>	<b>252-466-3333</b>
<b>Security</b>	<b>252-466-3615</b>
<b>Safety</b>	<b>252-466-0102</b>
<b>ROICC (Karen Boyd)</b>	<b>252-466-4731</b>

**Off-Site Emergency Telephone Numbers**

<b>Site Superintendent/SHSO (Cell)</b>	<b>910-650-9979</b>
<b>Project Manager (Cell)</b>	<b>724-316-6593</b>
<b>Craven Regional Medical Center</b>	<b>252-633-8111</b>
<b>Carteret General Hospital</b>	<b>252-808-6000</b>
<b>Rescue Squad</b>	<b>911</b>
<b>Fire</b>	<b>911</b>
<b>Police</b>	<b>911</b>
<b>Poison Control</b>	<b>800-848-6946</b>
<b>ChemTrec/Spill Response</b>	<b>800-424-9300</b>
<b>National Response Center</b>	<b>800-424-8802</b>

**Important Notes:**

If dialing 911 from a cell phone, the 911 call center in New Bern (or Carteret) will be contacted.

Dialing 911 on a base phone will contact the MCAS Cherry Point 911 operator. To report a spill or fire, the MCAS Cherry Point 911 operator should be contacted. The 911 call center can redirect cell phone calls to the MCAS Cherry Point 911 operator.



## FIGURE 5 SUPERVISOR'S ACCIDENT INVESTIGATION REPORT

**Rhêa Engineers & Consultants, Inc.**  
**OU1 Site 83 Restoration**  
**MCAS Cherry Point, North Carolina**

Check all that apply:  Injury/Illness       Fatality       Complaint  
 Not Work Related       Auto Liability       Auto Physical Damage  
 General Liability       Property Damage       Environmental

Exact Date, Day, and Time of Incident: \_\_\_\_\_  am  pm

Shift:  1st  2nd  3rd

TMS: \_\_\_\_\_  
(Employee's Home Division/Regional Office/Subsidiary)

Address: \_\_\_\_\_  
City State Zip

### PROJECT IDENTIFICATION (Project Related Incidents Only)

Regular Full Time       Regular Part Time       Temporary       Non-Employee

Address: \_\_\_\_\_  
City State Zip

Birth Date: \_\_\_\_\_ Age: \_\_\_\_\_ Social Security No.: \_\_\_\_\_ Sex: \_\_\_\_\_

Job Title: \_\_\_\_\_ Department: \_\_\_\_\_ Date Hired: \_\_\_\_\_

Length of Employment:  In Training       Months       Years

Time in Job Class:  In Training       Months       Years

Name of Employee's Direct Supervisor: \_\_\_\_\_

Supervision at time of accident:  Directly Supervised       Indirectly Supervised       Not Supervised

Specific location where accident occurred: \_\_\_\_\_  
 MEC Facility       Project Site       Not Supervised       Other \_\_\_\_\_



## FIGURE 5 (continued) SUPERVISOR'S ACCIDENT INVESTIGATION REPORT

To whom was incident reported?: \_\_\_\_\_ When?: \_\_\_\_\_

Witness Name/Address: \_\_\_\_\_

Witness Job Title/Reason in Area: \_\_\_\_\_

Describe Employee's job duties being performed when injured: \_\_\_\_\_

Describe fully the events which resulted in the accident/injury/illness: \_\_\_\_\_

Describe the injury/illness in detail; indicate part of body affected: \_\_\_\_\_

Name of object/substance which directly injured employee: \_\_\_\_\_

Has/will employee seek treatment?:  Yes  No      Did Employee Die?  Yes  No

Name/Address of Hospital/Doctor: \_\_\_\_\_

Describe treatment given: \_\_\_\_\_

Was employee able to return to work?:  Yes  No

If YES:  Regular Work  Work with restricted activities

Restriction: \_\_\_\_\_

If NO:    Date lost time began: \_\_\_\_\_    Date/Est. Date to Return: \_\_\_\_\_



**FIGURE 5 (continued)**  
**SUPERVISOR'S ACCIDENT INVESTIGATION REPORT**

Specify personal protective equipment used by injured employee: \_\_\_\_\_

\_\_\_\_\_

What training or instruction had been given?: \_\_\_\_\_

\_\_\_\_\_

How could this accident have been prevented? \_\_\_\_\_

\_\_\_\_\_

Corrective Action: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Signature \_\_\_\_\_ (Supvr/Manager)                      Date \_\_\_\_\_

Signature \_\_\_\_\_ (Safety Officer)                      Date \_\_\_\_\_

Signature \_\_\_\_\_ (Project Manager)                      Date \_\_\_\_\_

**DISTRIBUTION**

Original to:    Division Secretary at Employee's Home Office

Copy to:     Corporate Health & Safety                       Regional Health & Safety Manager

Project Manager     Site Safety File



FIGURE 6
EMPLOYEE INJURY REPORT

Rhea Engineers & Consultants, Inc.
OU1 Site 83 Restoration
MCAS Cherry Point, North Carolina

Check all that apply: [ ] Injury/Illness [ ] Fatality [ ] Complaint
[ ] Not Work Related [ ] Auto Liability [ ] Auto Physical Damage
[ ] General Liability [ ] Property Damage [ ] Environmental

Date, Day, and Time of Incident: \_\_\_\_\_ [ ] am [ ] pm

Your Name: \_\_\_\_\_ Your Employee No.: \_\_\_\_\_

Home Address: \_\_\_\_\_ Home Phone No.: ( ) \_\_\_\_\_

Birth Date: \_\_\_\_\_ Age: \_\_\_\_\_ Social Security No.: \_\_\_\_\_ Sex: \_\_\_\_\_

Accident location (if project related, give Project No., Client, Address, and Phone No.):

On premises? [ ] Yes [ ] No

Business Name/Address: \_\_\_\_\_

How did accident occur?: \_\_\_\_\_

Was medical attention required?: [ ] Yes [ ] No

Did you return to work?: [ ] Yes [ ] No Your usual job?: [ ] Yes [ ] No

If not, explain: \_\_\_\_\_

Was the accident reported to a supervisor?: [ ] Yes [ ] No

Supervisor's Name: \_\_\_\_\_

Employee's Signature

Date



## FIGURE 7 ROUTE TO PRIMARY MEDICAL FACILITY

**Rhêa Engineers & Consultants, Inc.**  
OU1 Site 83 Restoration  
MCAS Cherry Point, North Carolina

**Craven Regional Medical Center**  
2000 Neuse Blvd.  
P.O. Box 12157  
New Bern, NC 28561  
**Emergency # 911**  
Non-Emergency # (252) 633-8111

### Directions to Hospital:

From the main gate, turn west onto NC State Route (SR) 101 (Fontana Blvd.), bear right onto U.S. Rt 70 West (W. Main St.), follow U.S. Rt 70 West to NC SR 1200 (Pembroke Road), turn left onto 1<sup>st</sup> Street, turn left onto U.S. Rt 17 (US Rt 70 Bus/NC SR 55/Neuse Blvd.), turn right onto Hospital Drive, and hospital is on the left.

Travel Time: Approx. 32 min.





## FIGURE 8 ROUTE TO SECONDARY MEDICAL FACILITY

**Rhêa Engineers & Consultants, Inc.**  
OU1 Site 83 Restoration  
MCAS Cherry Point, North Carolina

### **Carteret General Hospital**

3500 Arendell Street

P.O. Drawer 1619

Morehead City, NC 28557

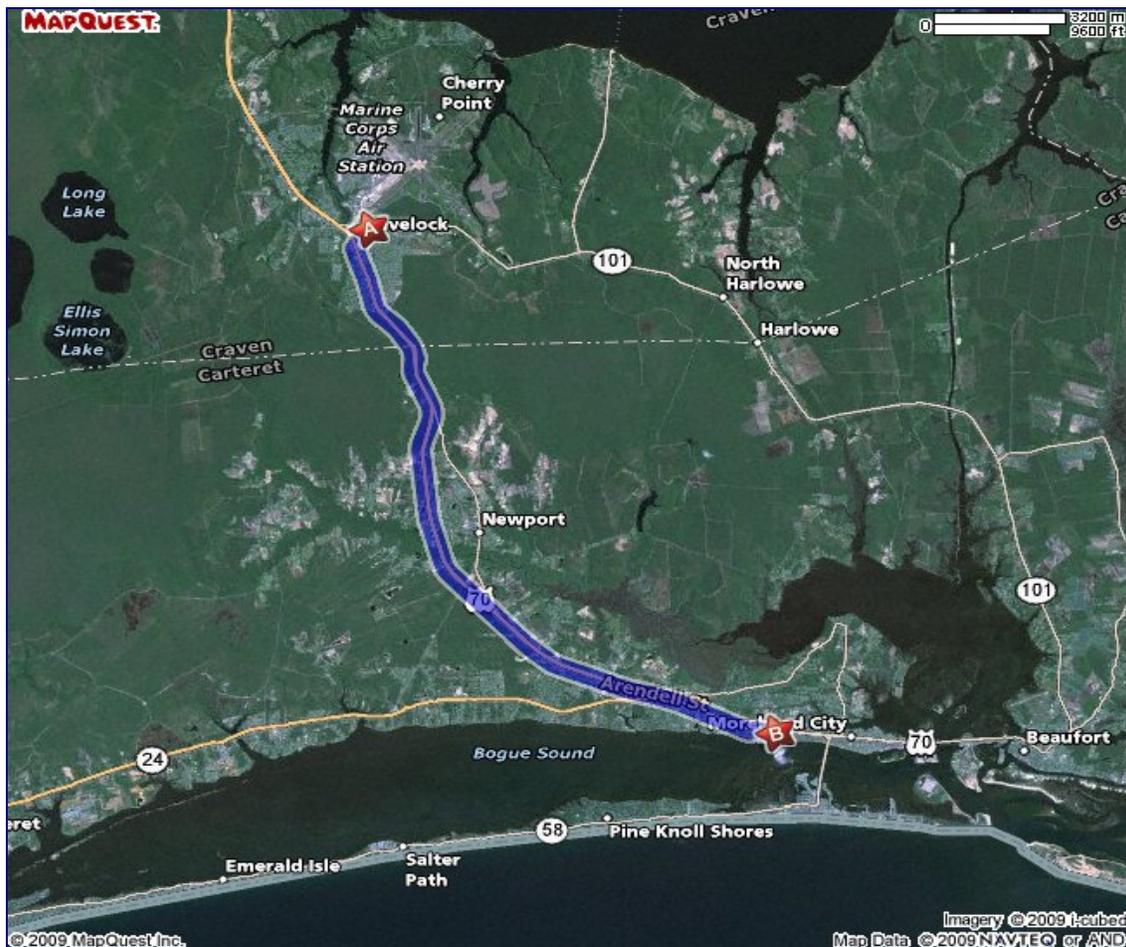
**Emergency # 911**

Non-Emergency # (252) 808-6000

### **Directions to Hospital:**

From the main gate, turn west onto NC State Route (SR) 101 (Fontana Blvd.), turn left onto U.S. Rt East (E. Main St.), follow U.S. Rt 70 East to North 35<sup>th</sup> Street, and turn left into the hospital.

**Travel Time:** Approx. 37 min.



**ATTACHMENT A**

**RHĒA PERSONNEL CERTIFICATIONS**

# Certificate of Completion

*awarded to*

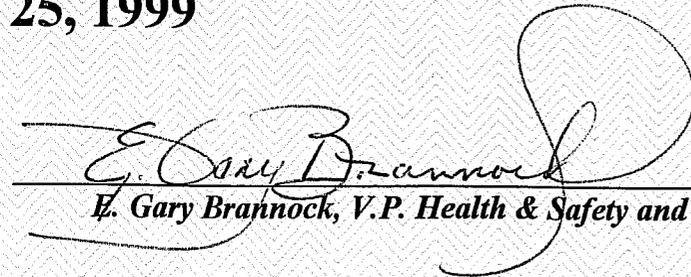
**R. Scott Powell**

**For Successful Completion of the 40 Hour Waste Site Worker Course  
(HAZWOPER)**

*presented by*

**YOUNG'S ENVIRONMENTAL CLEANUP, INC.**

**February 25, 1999**

  
E. Gary Brannock, V.P. Health & Safety and E/R

# Certificate of Completion

*This certifies that*

**R Scott Powell**

Has Successfully completed

**8 Hour HAZWOPER Supervisor Refresher Training**

This certificate does not in itself indicate initial 8 Hour OSHA Supervisor Training

**In Accordance With Federal OSHA Regulation 29 CFR 1910.120**

And all State OSHA and EPA Regulations As Well

*Julius P. Griggs*

Julius P. Griggs  
Instructor #892

110308543574

Certificate Number

3/8/2011

Issue Date



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[www.safetyunlimited.com](http://www.safetyunlimited.com)

Proof of initial certification and subsequent refresher training is NOT required to take refresher training  
Want to be sure this certificate is valid? Visit [safetyunlimited.com/verification](http://safetyunlimited.com/verification)

Association of  
Bay Area Governments



ABAG Training Center  
[www.hazmatschool.com](http://www.hazmatschool.com)

# CERTIFICATE OF COMPLETION

**R. Scott Powell**

has successfully completed the course titled

## OSHA 8-hr Training for Supervisors

Satisfies 29 CFR 1910.120(e)(4)

on

**February 5, 2010**

and has earned

IACET authorized 0.8 CEUs (Continuing Education Units) from the program



Certificate No 77112  
(verify at [www.hazmatschool.com](http://www.hazmatschool.com))

Brian Kirking, Training Director  
Sharon McCreadie, Training Coordinator  
[www.abag.ca.gov](http://www.abag.ca.gov); (510) 464-7964

Paul W. Gantt, CSP, REA  
Safety Compliance Management, Inc.



This recognizes that  
**Scott R. Powell**  
 has completed the requirements for  
**Adult CPR/AED**  
 conducted by  
**Cape Fear Chapter**  
 Date completed: 9/9/2011  
 Valid for 2 year(s)



This recognizes that  
**Scott R. Powell**  
 has completed the requirements for  
**First Aid**  
 conducted by  
**Cape Fear Chapter**  
 Date completed: 9/9/2011  
 Valid for 2 year(s)

redcross.org

Instructor's Signature

*Mike Seigh*  
 Chapter

*CAPE FEAR*  
 Holder's Signature

Stock No. 656799

redcross.org

Instructor's Signature

*Mike Seigh*  
 Chapter

*CAPE FEAR*  
 Holder's Signature

Stock No. 656799

# *Certificate of Training*

*Certifies that*

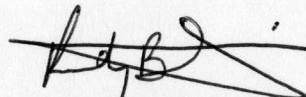
*Kenneth Robitaille*

*has completed*

*Hazardous Waste Operations and Emergency Response (HAZWOPER)  
40 Hour Training*

*in compliance with 29 CFR 1910.120 and is awarded this certificate*

*Issued on this fifteenth day, June, 2007, in Castle Hayne, North Carolina.*



*Randy B. Franklin  
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*8 Hour HAZWOPER  
Refresher Training  
Certificate of Attendance*

*The following student*

*Ken Robitaille*

*has successfully completed the 8 Hour Hazardous Waste Operations and  
Emergency Response Refresher Certification Course, as required by  
OSHA 29 CFR 1910.120(e)*

*June 30, 2011*

*Date*

*Eric Kislason*

*Instructor*



Association of  
Bay Area Governments



ABAG Training Center  
[www.hazmatschool.com](http://www.hazmatschool.com)

# CERTIFICATE OF COMPLETION

**Kenneth Robitaille**

has successfully completed the course titled

## OSHA 8-hr Training for Supervisors

Satisfies 29 CFR 1910.120(e)(4)

on

**August 22, 2009**

and has earned

IACET authorized 0.8 CEUs (Continuing Education Units) from the program



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**Paul W. Gantt, CSP, REA**  
**Safety Compliance Management, Inc.**

**American  
Red Cross**



This recognizes that  
**Kenneth Robitaille**  
has completed the requirements for  
**Adult CPR/AED**  
conducted by  
**Cape Fear Chapter**  
Date completed: 9/9/2011  
Valid for 2 year(s)

**American  
Red Cross**



This recognizes that  
**Kenneth Robitaille**  
has completed the requirements for  
**First Aid**  
conducted by  
**Cape Fear Chapter**  
Date completed: 9/9/2011  
Valid for 2 year(s)

**ATTACHMENT B**

**SITE SAFETY AND HEALTH PLAN**

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FIGURE B-1 Site-Specific Activity Hazard Analysis

## 1.0 INTRODUCTION

---

Rhēa Engineers & Consultants, Inc. (Rhēa) will be restoring vegetation and improving stormwater controls in the previously cleared areas at Operable Unit (OU) 1, Site 83 at Marine Corps Air Station (MCAS) Cherry Point, North Carolina. This work will be performed under Naval Facilities Engineering Command (NAVFAC) Mid-Atlantic, Contract No. N40085-09-D-3214.

The project will be completed through the following definable features of work:

1. Pre-Construction Coordination
2. Mobilization and Site Setup
3. Drainage and Grading Improvements
4. Revegetation
5. Vegetation Monitoring
6. Construction Closeout Report

The following paragraphs describe the activities to occur during each feature of work.

### 1.1 Pre-Construction Coordination

Rhēa will provide the approved construction schedule to MCAS Environmental Affairs Department (EAD), and the Naval Facilities Engineering Command (NAVFAC) Remedial Project Manager (RPM). Prior to the proposed mobilization date, Rhēa will coordinate with the MCAS EAD to identify the date, time, and location for a pre-construction meeting (Precon). A representative from Rhēa will attend the Precon along with representatives from EAD, NAVFAC, and any additional MCAS Cherry Point representatives deemed necessary. Rhēa will be prepared to present an overview of the project scope and schedule, discuss logistics, roles and responsibilities, and respond to questions.

### 1.2 Mobilization and Site Setup

This task will consist of the mobilization of personnel and equipment to the work site, the installation of temporary site controls, and the verification of

utilities. All necessary paperwork and documentation will be kept with the Rhēa representative on site.

Coastal Stormwater Services, Inc. (CSS) will be prepared to install silt fence, or other erosion and sediment (E&S) controls, as determined by Rhēa's on-site representative.

### **1.3 Drainage and Grading Improvements**

The drainage improvements will include backfilling and grading activities along the top and the slope of the bank to reduce concentrated flow and to eliminate washouts along the bank. A vegetated soil berm will be installed along the length of the slope to divert runoff to three grass-lined swales.

The slope of the bank will be cleared of existing vegetation and overgrowth, allowing for visual assessment and site access. The flumes and the concrete aprons at the top of the slope will be removed and broken into manageable pieces for use as part of the energy dissipaters at the base of the proposed swales. Previously placed riprap along the slope and at the bottom of the flumes will be reused as part of the energy dissipaters also. During backfilling activities, the former location of the two flumes and the gully will be graded for use as swales.

Fill soil will be placed along the slope to fill in low-lying portions and even out the contour of the slope. The top of the bank will be backfilled and graded to divert overland flow to the three proposed grass-lined swales. A cellular confinement material will be installed over the soil berm and along the proposed grass-lined swales to reinforce the soil.

After placement and backfill of the cellular confinement material, the removed riprap and broken concrete from the flumes will be placed at the end of the proposed swales to dissipate energy from the channeled flows.

The existing mulch piles from the 2009 clearing will be spread evenly throughout the western portion of the site to improve conditions for vegetation establishment.

### **1.4 Revegetation**

Activities to restore the site to its former habitat condition will begin when clearing and grading activities are completed. The site will be seeded with a native seed mixture. Rhēa will also plant three species of trees at the site,

including loblolly pine, red maple, and bald cypress. The trees will be planted approximately 20 feet apart.

## **1.5 Vegetation Monitoring**

A site visit to inspect the health of the restored habitat and judge the success of the restoration will be scheduled after the first growing season of the initial restoration event.

## **1.6 Construction Closeout Report**

A Construction Closeout Report will be prepared and submitted following the restoration phase of the project. A Pre-Draft of this Report will be submitted to NAVFAC and EAD for review and comment. Once the comments are incorporated, the Construction Closeout Report will be submitted to the North Carolina Department of Environment and Natural Resources (NCDENR).

## 2.0 SITE HISTORY AND DESCRIPTION

---

Site 83 is a former pesticide mixing area, approximately one acre in size, located in the southwest portion of OU1, near Site 16 and East Prong Slocum Creek (Figure 2). The former pesticide shop (Building 96) was constructed before 1948 and was used as a pesticide mixing and storage area from 1965 to 1981. From 1981 until it was demolished in 1997, Building 96 was used for storage of equipment and hazardous materials. The building's concrete foundation was removed during a demolition project in early 2006.

A Solid Waste Management Unit (SWMU) Assessment Report (Brown & Root Environmental [B&R], 1998) was conducted that included the collection of soil, groundwater, and sediment samples. Groundwater and soil contamination was identified, and an additional investigation of Site 83 was recommended as part of the comprehensive evaluation of OU1. Soil contamination was also identified outside of the Site 83 boundary in the downslope wetland area. This area of contamination was considered to be associated with Site 83. Several site investigations and removal activities occurred between 1997 and 2009.

Historical soil sampling analytical data indicated that polycyclic aromatic hydrocarbons (PAHs), pesticide, and lead concentrations exceeded various screening criteria within the Site 83 boundary and in soil located west/southwest of the site adjacent to East Prong Slocum Creek. These exceedances were the basis for additional soil sampling detailed in the *Final Sampling and Analysis Plan, Operable Unit 1, Site 83, Soil Delineation Sampling, MCAS Cherry Point, North Carolina* (Rhēa, 2009) (Uniform Federal Policy-Sampling and Analysis Plan [UFP-SAP]). The UFP-SAP states the following:

“The objective of the soil sampling is to confirm residual contamination of polycyclic aromatic hydrocarbons (PAHs), pesticides, and lead at the site, characterize portions of the site where historical information is limited or suspect, and delineate the vertical and horizontal extent of impacted site soils. This information will be incorporated into future site documents and will be used to develop feasible remedial alternatives. These investigative soil samples will be utilized as pre-confirmatory samples in the event that an excavation remedial alternative is selected.”

Efforts were initially made to minimize the clearing of large, established trees along the bank and in the lowland area west of the bank. During the initial clearing of underbrush and small trees, it was determined the larger trees in these areas would have to be removed to accurately locate and access the sampling locations identified in the UFP-SAP. Rhēa met with the Environmental Affairs Department (EAD) prior to clearing any large trees and subsequently received permission to clear the area.

Approximately 0.6 acres of trees and brush were cleared between July 21 and 24, 2009, using a combination of wide-tracked grinding equipment and chain saws. Trees were cut flush with the ground surface and chipped to provide a mulch layer over the ground surface. Wetlands & Woodlands Management, LLC, of Elizabethtown, North Carolina, provided clearing services. The approximate area of clearing is shown on Figure 3.

Rhēa performed soil sample collection activities between July 28 and August 21, 2009 in accordance with the UFP-SAP. Laboratory analysis of soil samples included 183 analyses for pesticides, 158 analyses for PAHs, and 15 analyses for lead. The results of the soil sampling were summarized in the *Final Site Soil Investigation Report* (Rhēa, 2010).

A Human Health Risk Assessment (HHRA) was completed in 2011 based on the soil samples collected in 2009 (CH2MHILL, 2011). The HHRA identified no unacceptable risk to human health; therefore, a No Further Action Record of Decision has been proposed, and the site will be restored to its condition prior to the 2009 soil sampling event.

### 3.0 ACTIVITY HAZARD ANALYSIS

---

During the Site 83 restoration activities, the following three types of hazards may be encountered:

- + Physical Hazards
- + Environmental Hazards
- + Chemical Hazards

Each type of hazard is described in more detail in the following sections. A complete site-specific Activity Hazard Analysis (AHA) is provided as Figure B-1. The following table lists each definable feature of work and whether there is potential to encounter physical, environmental, or chemical hazards:

DEFINABLE FEATURE OF WORK	PHYSICAL HAZARD	ENVIRONMENTAL HAZARD	CHEMICAL HAZARD
Pre-Construction Coordination			
Setup Temporary Site Controls	√	√	
Drainage and Grading Improvements	√	√	√
Revegetation	√	√	
Vegetation Monitoring	√	√	
Construction Closeout Report			

#### 3.1 Potential Physical Hazards

During site activities, Rhēa workers will obey the rules and regulations developed by the United States Navy and United States Marine Corps, as well as those presented in this Site Safety and Health Plan. Of special concern, with respect to site safety, are preventative measures and safe working practices that can minimize the risk of injury to site personnel. The following is a list of preventive measures that can be taken to complete site activities in a safe manner:

- + Back strain can be prevented by employing proper lifting techniques when moving supplies, equipment, and tools. Site personnel will be instructed in proper lifting procedures during site-specific training.

- + Slipping on wet surfaces can be minimized by using an absorbent material in a wet area, as well as wearing boots with a deep tread.
- + Heavy equipment hazards can be minimized by posting signs that notify site personnel regarding the existence of such equipment in the area. Additionally, those individuals operating pieces of heavy machinery should be aware of their surroundings and the existence of workers in their respective areas.
- + Fall hazards can be minimized by sloping the edge of the excavation back within acceptable limits and providing ladders for exiting. Construction fencing and/or tape can additionally mark the edges of the excavation.
- + Live electrical lines and/or bare wires will be avoided at all times.
- + Eye and hearing protection will be worn at all times.
- + Site personnel will be instructed regarding the location and use of fire suppression equipment.
- + Debris will be collected and properly contained so that flying debris does not become a safety hazard.
- + Site personnel will be familiar with the proper use of small tools.
- + In areas of potential traffic hazards, barricades or other appropriate traffic control devices will be used.

Additionally, the following sections describe procedures to be followed by site workers for: heavy and bulky loads; flame, heat and spark producing operations; slip, trip and fall hazards; head and back injuries; equipment and hand tools; and noise.

### **3.1.1 Heavy and Bulky Loads**

Back injury prevention should be given high priority when performing work activities. Individuals should exercise good judgment before heavy and bulky loads are lifted or handled manually. Equipment such as forklifts, wheelbarrows, hand trucks, loaders, and cranes should be used whenever possible. If a task involves lifting an object that is heavier than the

individual can lift on his/her own, the individual should seek assistance and/or use mechanical equipment to assist in the lifting.

### **3.1.2 Flame, Heat, or Spark Producing Operations**

Because of the possibilities of flammable materials being present, flame, heat, or spark producing operations will be limited. If hot work is necessary, workers will follow the Rhēa Hot Work Procedure, available in the on-site support vehicles, and will obtain a Hot Work Permit from the fire department.

### **3.1.3 Slip/Trip/Fall Hazards**

Some areas may have wet surfaces that will greatly increase the possibility of inadvertent slips. Caution must be exercised when using steps and stairs due to slippery surfaces in conjunction with fall hazards. Use of handrails when climbing stairs will be enforced, and handrails will remain secure until the support itself is removed and lowered to ground level. Good housekeeping practices are essential to minimize trip hazards.

The work area shall be kept clean and orderly. Tools and debris must be picked up and placed in the proper places to prevent a tripping hazard. Walkways and grating shall be kept in good condition. Spills will be cleaned up immediately. Personnel shall not walk or climb on piping, valves, fittings, or any other equipment not designed as walking surfaces.

Rhēa personnel should be constantly aware of the possibility of slips, trips, and falls due to poor, and possibly slippery, footing in the work areas before crossing either in front of or behind a piece of heavy equipment. Rhēa personnel will signal the operator and receive confirmation before moving.

### **3.1.4 Head and Back Injuries**

As minimum requirements, hard hats and safety glasses will be donned prior to performing work activities. This requirement will minimize minor injuries caused by a worker's head or eyes being impacted by hard or sharp objects while working around and under piping and other process-related structures. At the daily safety meeting, personnel are instructed in proper lifting techniques and reminded not to lift heavy items without assistance.

### **3.1.5 Equipment and Hand Tools**

Hand tools and power tools will be in good repair and will be used only for the task for which they were designed. Damaged tools will be tagged “out of service.” Tools will be kept clean. Sharp tools will not be carried in pockets. When working, overhead tools will be placed in a receptacle or secured when not in use. Tools cannot be dropped from heights. Only non-sparking tools will be used in flammable or explosive atmospheres. Cheater pipes will not be used.

## **3.2 Potential Environmental Hazards**

Environmental factors such as weather, wild animals, insects, and irritant plants pose a hazard when performing outdoor work. The Site Health and Safety Officer (SHSO) will take all necessary measures to alleviate these hazards should they arise.

### **3.2.1 Hazardous Flora**

While working in wooded areas, the potential for individuals to come into contact with poisonous/thorny plants is high. As such, bare skin should be covered (long pants and shirt, steel toe boots, leather or cotton gloves, safety glasses, and head protection) as much as practical when working in forested or densely vegetated areas. Personnel should avoid entering an area in the direct path of known poisonous flora (e.g., poison ivy, poison oak, or poison sumac); a secondary route should be selected. Care should also be taken when walking in such areas since uneven terrain or vines may present a tripping hazard.

### **3.2.2 Hazardous Fauna**

Mosquitoes and gnats pose a nuisance and physical hazard to field personnel; they distract workers, leading to accidents, and pose a physical threat by transmitting live microorganisms. Avoid the use of perfumes and scented deodorants. Donning light-colored clothing is preferable. The use of an insect repellent is encouraged and will be provided as needed.

Poisonous snakes such as the rattlesnake, copperhead, and cottonmouth (water moccasin), all known as pit vipers, are common to the eastern United States. Snakes typically do not attack people, but will bite when provoked, angered, or accidentally injured (as when stepped on). If a snake is encountered, quick/jerky motions and loud noises should be avoided. The snake should not be provoked, and the individual encountering one is to retreat slowly without provoking the snake.

In the event of a snakebite injury, the following procedures will be followed:

Look for signs and symptoms such as the characteristic appearance of two small holes, usually about a half-inch apart, with surrounding discoloration, swelling and pain. Systemic signs may or may not occur, but can include weakness, sweating, faintness, and signs of shock.

Provide treatment as follows:

1. Calm the victim and keep the affected area still.
2. Contact an ambulance if you cannot provide victim with transportation to the nearest hospital.
3. Wash the wound.
4. Keep the affected area below the level of the heart if the bite is on the arm or leg.
5. Treat the victim for shock.
6. Monitor airway, breathing, and circulation.
7. Obtain physical description of the snake, if possible.
8. Provide the emergency medical responder (either the ambulance attendant or the emergency room at the hospital) with all pertinent information, such as how long ago the bite occurred, the type of snake (if known), and any known allergic conditions.
9. Inform the SHSO as soon as possible.

There are two spiders commonly found in the United States whose bite can be serious: the black widow and the brown recluse spider. These bites may be life threatening. Many other spiders will bite, but they usually do not produce serious complications.

The black widow spider measures approximately one inch long with its legs extended. It is glossy black in color and has a distinctive yellow-orange marking in the shape of an hourglass on its belly. On its back, however, there is no marking, and unless you happen to turn the spider over, you cannot see this mark. The danger of the black widow spider bite lies in its

systemic manifestations. The venom from this spider attacks the nervous system, resulting in severe muscle cramps with board like rigidity of the abdominal muscles, tightness in the chest and difficulty in breathing. Sweating, nausea, and vomiting will also occur.

The emergency treatment for the black widow spider bite is basic life support. Sometimes the individual is not even aware of having been bitten, or where. Apply cold to the site of the bite if it can be identified. There is a specific antivenin for this spider bite that must be administered by a physician. It is particularly important to identify the spider, and bring it in, if possible.

The brown recluse spider is a little bit smaller than the black widow spider and is dull brown in color. It has a violin-shaped mark on its back, which can be seen when you are looking at the spider from above. The spider gets its name because it tends to live in dark areas, corners and old, unused buildings. The bite from this spider typically produces local effects rather than systemic manifestations. The venom of the brown recluse spider causes severe local tissue damage and can lead to an ulcer and gangrene. The bitten area becomes red, swollen, and tender within a few hours after the bite. A small blister forms, and several days later, this may form a large scab, covering a deep ulcer. Death is rarely reported.

The emergency treatment for the brown recluse spider is similar to that for the black widow spider, except that these bites need local surgical treatment. Spider bite victims should be brought to the hospital. Again, if possible, identification of the spider should be carried out.

There is also a potential to contact other dangerous insects that include fire ants, chiggers, bees, wasps, hornets, mites, fleas, and ticks. Personnel should perform checks periodically and at the end of the work shift, especially when working in grassy or forested areas. Insect bites must be reported to the SHSO.

Before initiating site activities, each individual will be questioned as to any known sensitivities to the previously mentioned organisms or agents.

Heat/cold stress is also an environmental hazard and is addressed in Attachment E.

### 3.3 Potential Chemical Hazards

Previous investigations identified that Site 83 had several chemical constituents that exceeded the NCDENR Regional Screening Levels (RSL) for industrial soil: These chemicals included the following:

- + PAHs including the following:
  - o benzo(a)pyrene
  - o benzo(a)anthracene
  - o benzo(b)fluoranthene
  - o dibenzo(a,h)anthracene
  - o indeno(1,2,3-cd)pyrene.
  
- + Pesticides including the following:
  - o dieldrin
  - o chlordane
  - o 4-4' DDT
  - o 4-4' DDE
  - o 4-4' DDD
  - o heptachlor
  - o heptachlor epoxide.
  
- + Lead (in one location only).

#### 3.3.1 PAHs

PAHs are one of the most widespread organic pollutants. They are formed by incomplete combustion of carbon-containing fuels. The five PAHs found at the site (identified above) are listed by the USEPA as Group B2 carcinogens, or probable human carcinogens. The primary constituents at this site included the following: 1) benzo(a)pyrene; 2) benzo(a)anthracene; 3) benzo(b)fluoranthene; 4) dibenzo(a,h)anthracene, and 5) indeno(1,2,3-cd)pyrene. There is no Permissible Exposure Limit (PEL) value for these individual PAHs; therefore, each is defaulted to the PEL for coal tar pitch volatiles, which is 0.2 mg/m<sup>3</sup>.

#### 3.3.2 Pesticides

##### ***Chlordane***

Chlordane is a hydrophobic organochlorine insecticide product commercially used for fire ant control in power transformers. It may appear as an amber-

colored, brown, or colorless, viscous, liquid. Chlordane may also appear as white crystals and has a slightly pungent, aromatic odor. It can also be absorbed through the skin. Chlordane is a probable human carcinogen with a PEL of 0.5 mg/m<sup>3</sup>.

#### ***4-4' DDT***

DDT, or dichlorodiphenyltrichloroethane, is an organochlorine insecticide and one of the best-known synthetic pesticides. It is a highly hydrophobic, colorless, crystalline solid with a weak, chemical odor. DDT is a probable human carcinogen with a PEL of 1 mg/m<sup>3</sup>.

#### ***4-4' DDE***

DDE, or dichlorodipenyldichloroethylene, is formed by the breakdown (or “dehydrohalogenation,” the loss of hydrogen chloride) of DDT. It is a white crystalline solid. DDE is a probable human carcinogen. There is no OSHA PEL for DDE.

#### ***4-4' DDD***

DDD, or dichlorodipenyldichloroethane, is formed by the breakdown (or “dehydrohalogenation,” the loss of hydrogen chloride) of DDT. It is a colorless crystalline solid. DDD is a probable human carcinogen. There is no OSHA PEL for DDD.

#### ***Heptachlor***

Heptachlor is an organochlorine cyclodiene insecticide. It is a persistent organic pollutant, and does not break down easily. It is usually found as a white or tan powder and has a camphor-like odor. Heptachlor can also be absorbed through the skin. Heptachlor is a probable human carcinogen with a PEL of 0.5 mg/m<sup>3</sup>.

#### ***Heptachlor Epoxide***

Heptachlor epoxide is formed by the metabolism of heptachlor. It is a white crystalline solid and is a probable human carcinogen. There is no OSHA PEL for Heptachlor Epoxide.

### **3.3.3 Lead**

Lead is a soft, heavy, toxic and malleable poor metal. It is bluish white when freshly cut, but tarnishes to dull gray when exposed to air. Lead is a potent neurotoxin that accumulates in soft tissues and bone over time. The PEL for lead is 0.050 mg/m<sup>3</sup>.

### **3.3.4 MSDS**

The Material Data Safety Sheets for the above chemicals are attached.

## 4.0 STAFF ORGANIZATION, QUALIFICATIONS, AND RESPONSIBILITIES

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Staff organization, qualifications, and responsibilities are addressed in Section 4.0 of the Accident Prevention Plan (APP). In addition, a copy of key personnel training certificates and qualifications are provided as Attachment A.

## 5.0 TRAINING, GENERAL, AND PROJECT-SPECIFIC REQUIREMENTS

---

Training requirements are addressed in Section 6.0 of the APP.

## 6.0 PERSONAL PROTECTIVE EQUIPMENT

---

Rhēa's personal protective equipment (PPE) policy is included as Attachment I. Due to known contaminants, it is not anticipated that the level of PPE shall exceed Level D.

## 7.0 MEDICAL SUPPORT

---

Medical support requirements are addressed in Section 9.B.6 in the APP.

## 8.0 EXPOSURE MONITORING/AIR SAMPLING

---

Exposure monitoring is addressed in Attachment D of the APP, Respiratory Protection Program.

## 9.0 HEAT AND COLD STRESS

---

Rhēa's Heat/Cold Stress Monitoring Plan is included as Attachment F.

## **10.0 STANDARD OPERATING SAFETY PROCEDURES**

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### **10.1 Site Rules and Prohibitions**

Attached to the APP, is Attachment I, Rhēa's Accident Prevention Policy from the Health and Safety Policies Manual.

### **10.2 Requirements**

No work permits will be necessary.

### **10.3 Material Handling Procedures**

The materials associated with the restoration may include general construction debris. If waste is generated during restoration activities, waste manifests will be completed and signed by appropriate personnel before the waste leaves the base. Trucks will be weighed and shall have appropriate cover for hauling materials. The Site Superintendent (SS) will document any materials leaving or arriving to the site.

### **10.4 Drum/Container/Tank Handling**

No containerization of material is planned for the vegetation restoration of Site 83.

### **10.5 Comprehensive AHA of Treatment of Technologies Employed at the Site**

There will be no on-site treatment of materials during the vegetation restoration of Site 83.

## 11.0 SITE CONTROL MEASURES

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Any persons not documented within the work plan to be on site during construction activities will be briefed by the site superintendent and will sign the visitor sign-in sheet.

## 12.0 PERSONAL HYGIENE AND DECONTAMINATION

---

Since PPE higher than Level D is not expected, a full decontamination station will not be necessary. However, if over-boots, coveralls, or disposable gloves are deemed necessary, they will be disposed of in appropriately labeled plastic bags before disposal or transfer. All personnel will be required to carefully wash their hands and face with soap and water upon leaving the work zone. Work boots and reusable gloves will be carefully cleaned before leaving the work zone.

PPE decontamination procedures are addressed in Section 10.2.6 of Attachment H.

## 13.0 EQUIPMENT DECONTAMINATION

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### 13.1 Decontamination Pad

It is unlikely that a decontamination pad will have to be constructed. If it is determined that a decontamination pad is required, the pad should meet the following specifications:

- + The pad should be constructed in an area known or believed to be free of surface contamination.
- + The pad should be constructed on a paved or level surface, and should facilitate the removal of wastewater. This may be accomplished by either constructing the pad with one corner lower than the rest, or by creating a sump pit in a corner or along the side.
- + The pad, and sump pit (if applicable), should be lined with plastic sheeting that is at least 20 mil in thickness (two layers of 10 mil plastic sheeting may be used). This material should either be easily replaceable (disposable) or easily repairable.
- + Any sawhorses or racks constructed to hold equipment while being cleaned should be high enough above ground to avoid being splashed by the wastewater.
- + Wastewater should be removed from the decontamination pad frequently and properly disposed of at the on-site industrial wastewater treatment plant.

At the completion of all site activities, the decontamination pad should be deactivated. The pit or sump (if applicable) should be backfilled with the appropriate material designated by the site project leader. This should only take place after all of the wastewater has been properly disposed of. If it

appears that the decontamination pad has leaked excessively, soil sampling may be required.

## **13.2 Decontamination Process**

Heavy equipment (e.g., backhoe) used on site will be decontaminated. Decontamination activities will include the removal of contaminated soil, debris, and other miscellaneous materials from the equipment and tools. This will be performed using a combination of hand tools and coarse brushes and, if necessary, high-pressure water sprays, low-pressure hoses, and detergent washing. Decontaminated materials, wastewater, and contaminated soil removed from the equipment should be disposed of in accordance with applicable regulations.

## 14.0 EMERGENCY EQUIPMENT AND FIRST AID

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A list of Rhēa's emergency response equipment and the first aid policy is addressed in Section 9.B of the APP.

ATTACHMENT B

SITE SAFETY AND HEALTH PLAN

**ACTIVITY HAZARD ANALYSIS (AHA)**

## FIGURE B-1 ACTIVITY HAZARD ANALYSIS (AHA)

<p><b>Activity/Work Task:</b> Operable Unit 1 Site 83, Site Restoration</p> <p><b>Project Location:</b> MCAS Cherry Point, North Carolina</p> <p><b>Contract Number:</b> N40085-09-D-3214</p> <p><b>Date Prepared:</b> December 2011</p> <p><b>Prepared By (Name/Title):</b> R. Scott Powell/ Project Manager</p> <p><b>Reviewed By (Name/Title):</b> Erica DeLattre/ Technical Project Manager</p> <p><b>Notes (Field Notes, Review Comments, etc.):</b> Hazards and Controls were identified from the USACE Safety and Health Requirements Manual EM-385-1-1 (September 2008), Rhēa’s Corporate Health and Safety Policies, and material contained in this Accident Prevention Plan.</p>	<p style="text-align: center;"><b>OVERALL RISK ASSESSMENT CODE (RAC) (Use highest code.)</b></p> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr style="background-color: #000080; color: white;"> <th colspan="7">RISK ASSESSMENT CODE (RAC) MATRIX</th> </tr> <tr> <th colspan="2"></th> <th colspan="5">Probability</th> </tr> <tr> <th colspan="2"></th> <th>Frequent</th> <th>Likely</th> <th>Occasional</th> <th>Seldom</th> <th>Unlikely</th> </tr> </thead> <tbody> <tr> <th rowspan="4" style="writing-mode: vertical-rl; transform: rotate(180deg);">SEVERITY</th> <th>Catastrophic</th> <td style="background-color: red; color: white;">E</td> <td style="background-color: red; color: white;">E</td> <td style="background-color: orange; color: white;">H</td> <td style="background-color: orange; color: white;">H</td> <td style="background-color: green; color: white;">M</td> </tr> <tr> <th>Critical</th> <td style="background-color: red; color: white;">E</td> <td style="background-color: orange; color: white;">H</td> <td style="background-color: orange; color: white;">H</td> <td style="background-color: green; color: white;">M</td> <td style="background-color: yellow; color: black;">L</td> </tr> <tr> <th>Marginal</th> <td style="background-color: orange; color: white;">H</td> <td style="background-color: green; color: white;">M</td> <td style="background-color: green; color: white;">M</td> <td style="background-color: yellow; color: black;">L</td> <td style="background-color: yellow; color: black;">L</td> </tr> <tr> <th>Negligible</th> <td style="background-color: green; color: white;">M</td> <td style="background-color: yellow; color: black;">L</td> </tr> </tbody> </table> <p><b>Step 1:</b> Review each “<b>Hazard</b>” with identified safety “<b>Controls</b>” and determine RAC (see above).</p> <p>“<b>Probability</b>” is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom, or Unlikely.  “<b>Severity</b>” is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible.</p> <p><b>Step 2:</b> Identify the RAC (Probability/Severity) as E, H, M, or L for each “Hazard” on AHA.</p> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center; margin-top: 10px;"> <thead> <tr style="background-color: #000080; color: white;"> <th>RAC CHART</th> </tr> </thead> <tbody> <tr style="background-color: red; color: white;"> <td>E = Extremely High Risk</td> </tr> <tr style="background-color: orange; color: white;"> <td>H = High Risk</td> </tr> <tr style="background-color: green; color: white;"> <td>M = Moderate Risk</td> </tr> <tr style="background-color: yellow; color: black;"> <td>L = Low Risk</td> </tr> </tbody> </table>	RISK ASSESSMENT CODE (RAC) MATRIX									Probability							Frequent	Likely	Occasional	Seldom	Unlikely	SEVERITY	Catastrophic	E	E	H	H	M	Critical	E	H	H	M	L	Marginal	H	M	M	L	L	Negligible	M	L	L	L	L	RAC CHART	E = Extremely High Risk	H = High Risk	M = Moderate Risk	L = Low Risk
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**FIGURE B-1  
ACTIVITY HAZARD ANALYSIS (AHA)**

Job Steps		Hazards	Controls	RAC
1.	Mobilization and Site Set-Up	Slips, Trips, and Falls; Hazardous Flora and Fauna, Heat and Cold Stress	Persons operating vehicles will be licensed per State Regulations. Subcontractors will be required to read and accept the Accident Prevention Plan (APP) prior to initiation of work. Daily safety meetings will be conducted to assist personnel in conducting their activities in a safe manner. OSHA certificates will be verified prior to mobilization of subcontractors. Appropriate personal protective equipment (PPE) – hard hat, safety glasses, steel toed boots, ear plugs, and high visibility vests are required. Visitors are required to sign in prior to entering site.	L
2.	Drainage and Grading Improvements	Heavy Construction Equipment; Slips, Trips, and Falls; Hand and Power Tool Hazards; Hazardous Flora and Fauna, Heat and Cold Stress; Pinch Points	Maintain safe distances from equipment; be aware of equipment pinch points, use appropriate hand signals. See Controls for Item 1.	L
3.	Revegetation	Heavy Construction Equipment; Slips, Trips, and Falls; Hand and Power Tool Hazards; Hazardous Flora and Fauna, Heat and Cold Stress; Pinch Points	See Controls for Items 1 and 2.	L
4.	Vegetation Monitoring	Slips, Trips, and Falls; Hazardous Flora and Fauna, Heat and Cold Stress;	See Controls for Items 1.	L
<p>Hazards and Controls are identified by the definable feature of work for the appropriate job step. The controls stated are for unique hazards relative to the identified Job Step and Hazard. See Appendices B through I for detailed controls associated with individual hazards.</p>				

**FIGURE B-1  
ACTIVITY HAZARD ANALYSIS (AHA)**

Job Steps		Equipment to be Used	Inspection Requirements
1.	Mobilization and Site Set-Up	Support Vehicles	
2.	Drainage and Grading Improvements	Heavy Construction Equipment, Hand Tools	Hand and power tools shall be used, inspected, and maintained in accordance with manufacturer's instructions; inspect heavy equipment daily and ensure that backup alarms operational.
3.	Revegetation	Heavy Construction Equipment, Hand Tools	See Inspection Requirements for Item 2.
4.	Vegetation Monitoring	Support Vehicles	
<p><b>Training requirements/competent or qualified personnel name(s):</b> R. Scott Powell – Rhēa / Erica DeLattre – Rhēa</p> <p>*Site Labor forces will be comprised of personnel within appropriate trade categories who possess the training and experience to work at a remedial site. Those who may be exposed to hazardous substances and/or potential health and safety hazards will have completed the 40-hour OSHA training and the required refreshed training.</p> <p>*The Accident Prevention Plan and Rhēa's Corporate Health and Safety Policies Manual will be on-site during the field activities.</p>			

## BACK PAGE OF AHA EM 385-1-1 2008 EDITION

01.A.13 Contractor-Required AHA. Before beginning each work activity involving a type of work presenting hazards not experienced in previous project operations or where a new work crew or subcontractor is to perform the work, the Contractor(s) performing that work activity shall prepare an AHA. > *See Figure 1-2 for an outline of an AHA. An electronic version AHA may be found on the HQUSACE Safety Office Website.*

- a. AHAs shall define the activities being performed and identify the work sequences, the specific anticipated hazards, site conditions, equipment, materials, and the control measures to be implemented to eliminate or reduce each hazard to an acceptable level of risk.
- b. Work shall not begin until the AHA for the work activity has been accepted by the GDA and discussed with all engaged in the activity, including the Contractor, subcontractor(s), and Government on-site representatives at preparatory and initial control phase meetings.
- c. The names of the Competent/Qualified Person(s) required for a particular activity (for example, excavations, scaffolding, fall protection, other activities as specified by OSHA and this manual) shall be identified and included in the AHA. Proof of their competency/qualification shall be submitted to the GDA for acceptance prior to the start of that work activity.
- d. The AHA shall be reviewed and modified as necessary to address changing site conditions, operations, or change of competent/qualified person(s).
  - (1) If more than one Competent/Qualified Person is used on the AHA activity, a list of names shall be submitted as an attachment to the AHA. Those listed must be Competent/Qualified for the type of work involved in the AHA and familiar with current site safety issues.
  - (2) If a new Competent/Qualified Person (not on the original list) is added, the list shall be updated (an administrative action not requiring an updated AHA). The new person shall acknowledge in writing that he or she has reviewed the AHA and is familiar with current site safety issues.

ATTACHMENT B

SITE SAFETY AND HEALTH PLAN

**MATERIAL SAFETY DATA SHEETS (MSDS)**

# Material Safety Data Sheet

## Benzo[a]pyrene, 98%

ACC# 37175

### Section 1 - Chemical Product and Company Identification

**MSDS Name:** Benzo[a]pyrene, 98%

**Catalog Numbers:** AC105600000, AC105600010, AC105601000, AC377200000, AC377200010, AC377201000  
AC377201000

**Synonyms:** 3,4-Benzopyrene; 3,4-Benzpyrene; Benzo[def]chrysene.

**Company Identification:**

Acros Organics N.V.

One Reagent Lane

Fair Lawn, NJ 07410

**For information in North America, call:** 800-ACROS-01

**For emergencies in the US, call CHEMTREC:** 800-424-9300

### Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
50-32-8	Benzo[a]pyrene	>96	200-028-5

### Section 3 - Hazards Identification

#### EMERGENCY OVERVIEW

Appearance: yellow to brown powder.

**Danger!** May cause harm to the unborn child. May impair fertility. May cause eye, skin, and respiratory tract irritation. Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment. Cancer hazard. May cause allergic skin reaction. May cause heritable genetic damage.

**Target Organs:** Reproductive system, skin.

#### Potential Health Effects

**Eye:** May cause eye irritation.

**Skin:** May cause skin irritation. May be harmful if absorbed through the skin. May cause an allergic reaction in certain individuals.

**Ingestion:** May cause irritation of the digestive tract. The toxicological properties of this substance have not been fully investigated. May be harmful if swallowed.

**Inhalation:** May cause respiratory tract irritation. The toxicological properties of this substance have not been fully investigated. May be harmful if inhaled.

**Chronic:** May cause cancer in humans. May cause reproductive and fetal effects. Laboratory experiments have resulted in mutagenic effects.

### Section 4 - First Aid Measures

**Eyes:** Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid.

**Skin:** Get medical aid. Flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse.

**Ingestion:** Never give anything by mouth to an unconscious person. Get medical aid. Do NOT induce vomiting. If

conscious and alert, rinse mouth and drink 2-4 cupfuls of milk or water.

**Inhalation:** Remove from exposure and move to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid.

**Notes to Physician:** Treat symptomatically and supportively.

## Section 5 - Fire Fighting Measures

**General Information:** As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion.

**Extinguishing Media:** Use water spray, dry chemical, carbon dioxide, or appropriate foam.

**Flash Point:** Not available.

**Autoignition Temperature:** Not available.

**Explosion Limits, Lower:** Not available.

**Upper:** Not available.

**NFPA Rating:** (estimated) Health: 2; Flammability: 0; Instability: 0

## Section 6 - Accidental Release Measures

**General Information:** Use proper personal protective equipment as indicated in Section 8.

**Spills/Leaks:** Clean up spills immediately, observing precautions in the Protective Equipment section. Sweep up, then place into a suitable container for disposal. Avoid generating dusty conditions. Provide ventilation.

## Section 7 - Handling and Storage

**Handling:** Wash thoroughly after handling. Use with adequate ventilation. Minimize dust generation and accumulation. Avoid contact with eyes, skin, and clothing. Keep container tightly closed. Avoid ingestion and inhalation.

**Storage:** Store in a tightly closed container. Store in a cool, dry, well-ventilated area away from incompatible substances.

## Section 8 - Exposure Controls, Personal Protection

**Engineering Controls:** Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate ventilation to keep airborne concentrations low.

### Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Benzo[a]pyrene	0.2 mg/m <sup>3</sup> TWA (as benzene soluble aerosol) (listed under Coal tar pitches).	0.1 mg/m <sup>3</sup> TWA (cyclohexane-extractable fraction) (listed under Coal tar pitches).80 mg/m <sup>3</sup> IDLH (listed under Coal tar pitches).	0.2 mg/m <sup>3</sup> TWA (as benzene soluble fraction) (listed under Coal tar pitches).

**OSHA Vacated PELs:** Benzo[a]pyrene: No OSHA Vacated PELs are listed for this chemical.

### Personal Protective Equipment

**Eyes:** Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

**Skin:** Wear appropriate protective gloves to prevent skin exposure.

**Clothing:** Wear appropriate protective clothing to prevent skin exposure.

**Respirators:** A respiratory protection program that meets OSHA's 29 CFR 1910.134 and ANSI Z88.2 requirements

or European Standard EN 149 must be followed whenever workplace conditions warrant respirator use.

## Section 9 - Physical and Chemical Properties

**Physical State:** Powder

**Appearance:** yellow to brown

**Odor:** faint aromatic odor

**pH:** Not available.

**Vapor Pressure:** Not available.

**Vapor Density:** Not available.

**Evaporation Rate:** Not available.

**Viscosity:** Not available.

**Boiling Point:** 495 deg C @ 760 mm Hg

**Freezing/Melting Point:** 175 - 179 deg C

**Decomposition Temperature:** Not available.

**Solubility:** 1.60x10<sup>-3</sup> mg/l @25°C

**Specific Gravity/Density:** Not available.

**Molecular Formula:** C<sub>20</sub>H<sub>12</sub>

**Molecular Weight:** 252.31

## Section 10 - Stability and Reactivity

**Chemical Stability:** Stable under normal temperatures and pressures.

**Conditions to Avoid:** Dust generation.

**Incompatibilities with Other Materials:** Strong oxidizing agents.

**Hazardous Decomposition Products:** Carbon monoxide, carbon dioxide.

**Hazardous Polymerization:** Has not been reported.

## Section 11 - Toxicological Information

**RTECS#:**

**CAS#** 50-32-8: DJ3675000

**LD50/LC50:**

Not available.

**Carcinogenicity:**

CAS# 50-32-8:

- **ACGIH:** A2 - Suspected Human Carcinogen
- **California:** carcinogen, initial date 7/1/87
- **NTP:** Suspect carcinogen
- **IARC:** Group 1 carcinogen (listed as Coal tar pitches).

**Epidemiology:** No information found

**Teratogenicity:** No information found

**Reproductive Effects:** Adverse reproductive effects have occurred in experimental animals.

**Mutagenicity:** Mutagenic effects have occurred in humans. Mutagenic effects have occurred in experimental animals.

**Neurotoxicity:** No information found

**Other Studies:**

## Section 12 - Ecological Information

No information available.

## Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.

**RCRA P-Series:** None listed.

**RCRA U-Series:**

CAS# 50-32-8: waste number U022.

## Section 14 - Transport Information

	US DOT	Canada TDG
<b>Shipping Name:</b>	NOT REGULATED FOR DOMESTIC TRANSPORT	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOL (Benzo{a} pyrene)
<b>Hazard Class:</b>		9
<b>UN Number:</b>		UN3077
<b>Packing Group:</b>		III

## Section 15 - Regulatory Information

### US FEDERAL

#### TSCA

CAS# 50-32-8 is listed on the TSCA inventory.

#### Health & Safety Reporting List

None of the chemicals are on the Health & Safety Reporting List.

#### Chemical Test Rules

None of the chemicals in this product are under a Chemical Test Rule.

#### Section 12b

None of the chemicals are listed under TSCA Section 12b.

#### TSCA Significant New Use Rule

None of the chemicals in this material have a SNUR under TSCA.

#### CERCLA Hazardous Substances and corresponding RQs

CAS# 50-32-8: 1 lb final RQ; 0.454 kg final RQ

#### SARA Section 302 Extremely Hazardous Substances

None of the chemicals in this product have a TPQ.

#### SARA Codes

CAS # 50-32-8: immediate, delayed.

#### Section 313

This material contains Benzo[a]pyrene (CAS# 50-32-8, >96%), which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR

#### Clean Air Act:

This material does not contain any hazardous air pollutants.

This material does not contain any Class 1 Ozone depletors.

This material does not contain any Class 2 Ozone depletors.

#### Clean Water Act:

None of the chemicals in this product are listed as Hazardous Substances under the CWA. CAS# 50-32-8 is listed as a Priority Pollutant under the Clean Water Act.

None of the chemicals in this product are listed as Toxic Pollutants under the CWA.

**OSHA:**

None of the chemicals in this product are considered highly hazardous by OSHA.

**STATE**

CAS# 50-32-8 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, Massachusetts.

**California Prop 65**

**The following statement(s) is(are) made in order to comply with the California Safe Drinking Water Act:**

WARNING: This product contains Benzo[a]pyrene, a chemical known to the state of California to cause cancer.  
California No Significant Risk Level: CAS# 50-32-8: 0.06 æg/day NSRL

**European/International Regulations****European Labeling in Accordance with EC Directives****Hazard Symbols:**

T N

**Risk Phrases:**

- R 43 May cause sensitization by skin contact.
- R 45 May cause cancer.
- R 46 May cause heritable genetic damage.
- R 60 May impair fertility.
- R 61 May cause harm to the unborn child.
- R 50/53 Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

**Safety Phrases:**

- S 45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).
- S 53 Avoid exposure - obtain special instructions before use.
- S 60 This material and its container must be disposed of as hazardous waste.
- S 61 Avoid release to the environment. Refer to special instructions /safety data sheets.

**WGK (Water Danger/Protection)**

CAS# 50-32-8: No information available.

**Canada - DSL/NDSL**

CAS# 50-32-8 is listed on Canada's DSL List.

**Canada - WHMIS**

This product has a WHMIS classification of D2A.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

**Canadian Ingredient Disclosure List**

CAS# 50-32-8 is listed on the Canadian Ingredient Disclosure List.

**Section 16 - Additional Information**

**MSDS Creation Date:** 9/02/1997

**Revision #7 Date:** 6/30/2006

*The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall Fisher be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if Fisher has been advised of the possibility of such damages.*

# International Chemical Safety Cards

## BENZ(a)ANTHRACENE

ICSC: 0385

BENZ(a)ANTHRACENE

1,2-Benzoanthracene

Benzo(a)anthracene

2,3-Benzphenanthrene

Naphthanthracene

C<sub>18</sub>H<sub>12</sub>

Molecular mass: 228.3

CAS # 56-55-3

RTECS # CV9275000

ICSC # 0385

EC # 601-033-00-9

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
<b>FIRE</b>	Combustible.		Water spray, powder. In case of fire in the surroundings: all extinguishing agents allowed.
<b>EXPLOSION</b>	Finely dispersed particles form explosive mixtures in air.	Prevent deposition of dust; closed system, dust explosion-proof electrical equipment and lighting.	
<b>EXPOSURE</b>		AVOID ALL CONTACT!	
• <b>INHALATION</b>		Local exhaust or breathing protection.	Fresh air, rest.
• <b>SKIN</b>		Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
• <b>EYES</b>		Safety goggles, face shield, or eye protection in combination with breathing protection.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
• <b>INGESTION</b>		Do not eat, drink, or smoke during work. Wash hands before eating.	Rinse mouth.
SPILLAGE DISPOSAL		STORAGE	PACKAGING & LABELLING
Sweep spilled substance into sealable containers; if appropriate, moisten first to prevent dusting. Carefully collect remainder, then remove to safe place (extra personal protection: complete protective clothing including self-contained breathing apparatus).		Well closed.	T symbol R: 45 S: 53-45
<b>SEE IMPORTANT INFORMATION ON BACK</b>			
<b>ICSC: 0385</b>		Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities © IPCS CEC 1993	

# International Chemical Safety Cards

**BENZ(a)ANTHRACENE**

ICSC: 0385

<b>I M P O R T A N T  D A T A</b>	<p><b>PHYSICAL STATE; APPEARANCE:</b> COLOURLESS TO YELLOW-BROWN FLUORESCENT FLAKES OR POWDER.</p> <p><b>PHYSICAL DANGERS:</b> Dust explosion possible if in powder or granular form, mixed with air.</p> <p><b>CHEMICAL DANGERS:</b></p> <p><b>OCCUPATIONAL EXPOSURE LIMITS (OELs):</b> TLV not established.</p>	<p><b>ROUTES OF EXPOSURE:</b> The substance can be absorbed into the body by inhalation, through the skin and by ingestion.</p> <p><b>INHALATION RISK:</b> Evaporation at 20°C is negligible; a harmful concentration of airborne particles can, however, be reached quickly.</p> <p><b>EFFECTS OF SHORT-TERM EXPOSURE:</b></p> <p><b>EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:</b> This substance is probably carcinogenic to humans.</p>
	<p><b>PHYSICAL PROPERTIES</b></p> <p>Sublimation point: 435°C Melting point: 162°C Relative density (water = 1): 1.274</p>	<p>Solubility in water: none Vapour pressure, Pa at 20°C: 292 Octanol/water partition coefficient as log Pow: 5.61</p>
	<p><b>ENVIRONMENTAL DATA</b></p> <p>In the food chain important to humans, bioaccumulation takes place, specifically in seafood.</p>	
	<b>NOTES</b>	
<p>This substance is one of many polycyclic aromatic hydrocarbons - standards are usually established for them as mixtures, e.g., coal tar pitch volatiles. However, it may be encountered as a laboratory chemical in its pure form. Insufficient data are available on the effect of this substance on human health, therefore utmost care must be taken. Do NOT take working clothes home. Tetraphene is a common name.</p>		
<b>ADDITIONAL INFORMATION</b>		
<div style="display: flex; justify-content: space-between;"> <span>ICSC: 0385</span> <span>BENZ(a)ANTHRACENE</span> </div> <p style="text-align: center;">© IPCS, CEC, 1993</p>		
<p><b>IMPORTANT LEGAL NOTICE:</b></p>	<p>Neither the CEC or the IPCS nor any person acting on behalf of the CEC or the IPCS is responsible for the use which might be made of this information. This card contains the collective views of the IPCS Peer Review Committee and may not reflect in all cases all the detailed requirements included in national legislation on the subject. The user should verify compliance of the cards with the relevant legislation in the country of use.</p>	

# International Chemical Safety Cards

## BENZO(B)FLUORANTHENE

ICSC: 0720

### BENZO(B)FLUORANTHENE

Benzo(e)acephenanthrylene

2,3-Benzofluoroanthene

C<sub>20</sub>H<sub>12</sub>

Molecular mass: 252.3

CAS # 205-99-2

RTECS # CU1400000

ICSC # 0720

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
<b>FIRE</b>	Combustible.	NO open flames.	Water spray, powder.
<b>EXPLOSION</b>			
<b>EXPOSURE</b>		PREVENT DISPERSION OF DUST! STRICT HYGIENE! AVOID ALL CONTACT!	IN ALL CASES CONSULT A DOCTOR!
• <b>INHALATION</b>		Local exhaust or breathing protection.	Fresh air, rest.
• <b>SKIN</b>	MAY BE ABSORBED!	Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse and then wash skin with water and soap. Refer for medical attention. Wear protective gloves when administering first aid.
• <b>EYES</b>		Safety goggles or eye protection in combination with breathing protection.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
• <b>INGESTION</b>		Do not eat, drink, or smoke during work.	Wear protective gloves when inducing vomiting. Induce vomiting (ONLY IN CONSCIOUS PERSONS!). Refer for medical attention.
SPILLAGE DISPOSAL		STORAGE	PACKAGING & LABELLING
Sweep spilled substance into containers. Carefully collect remainder, then remove to safe place. Do NOT let this chemical enter the environment.		Provision to contain effluent from fire extinguishing. Tightly closed.	Unbreakable packaging; put breakable packaging into closed unbreakable container.
<b>SEE IMPORTANT INFORMATION ON BACK</b>			
<b>ICSC: 0720</b>		Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities © IPCS CEC 1993	

# International Chemical Safety Cards

## BENZO(B)FLUORANTHENE

ICSC: 0720

PHYSICAL STATE; APPEARANCE:

ROUTES OF EXPOSURE:

<b>I M P O R T A N T  D A T A</b>	COLOURLESS TO YELLOW CRYSTALS.		The substance can be absorbed into the body by inhalation of its aerosol and through the skin.			
	<b>PHYSICAL DANGERS:</b>		<b>INHALATION RISK:</b>			
<b>CHEMICAL DANGERS:</b>		Evaporation at 20°C is negligible; a harmful concentration of airborne particles can, however, be reached quickly.		<b>EFFECTS OF SHORT-TERM EXPOSURE:</b>		
Upon heating, toxic fumes are formed.		<b>EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:</b>		This substance is possibly carcinogenic to humans.		
<b>OCCUPATIONAL EXPOSURE LIMITS (OELs):</b>		TLV not established.				
<b>PHYSICAL PROPERTIES</b>	Melting point: 168°C Solubility in water: none	Vapour pressure, Pa at 20°C: <10 Octanol/water partition coefficient as log Pow: 6.04				
<b>ENVIRONMENTAL DATA</b>	This substance may be hazardous to the environment; special attention should be given to the total environment. In the food chain important to humans, bioaccumulation takes place, specifically in oils and fats.					
<b>NOTES</b>						
Depending on the degree of exposure, periodic medical examination is indicated. Data are insufficiently available on the effect of this substance on human health, therefore utmost care must be taken. Do NOT take working clothes home.						
<b>ADDITIONAL INFORMATION</b>						
<table border="1" style="width: 100%; height: 20px;"> <tr> <td style="width: 50%;"></td> <td style="width: 50%;"></td> </tr> </table>						
<b>ICSC: 0720</b>		<b>BENZO(B)FLUORANTHENE</b>				
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SUPELCO INC -- 48574, DIBENZO (A,H) ANTHRACENE 0.1G -- 6810-00N032523

=====  
Product Identification  
=====

Product ID:48574, DIBENZO (A,H) ANTHRACENE 0.1G  
MSDS Date:12/19/1985  
FSC:6810  
NIIN:00N032523  
MSDS Number: BNSSL  
=== Responsible Party ===  
Company Name:SUPELCO INC  
Address:SUPELCO PARK  
City:BELLEFONTE  
State:PA  
ZIP:16823-0048  
Country:US  
Info Phone Num:814-359-3441  
Emergency Phone Num:814-359-3441  
CAGE:54968  
=== Contractor Identification ===  
Company Name:SIGMA-ALDRICH INC.  
Address:3050 SPRUCE STREET  
Box:14508  
City:ST. LOUIS  
State:MO  
ZIP:63103  
Country:US  
Phone:314-771-5765/414-273-3850X5996  
CAGE:54968

=====  
Composition/Information on Ingredients  
=====

Ingred Name:DIBENZ A,H ANTHRACENE  
CAS:53-70-3  
RTECS #:HN2625000  
EPA Rpt Qty:1 LB  
DOT Rpt Qty:1 LB

=====  
Hazards Identification  
=====

LD50 LC50 Mixture:NONE SPECIFIED BY MANUFACTURER.  
Routes of Entry: Inhalation:YES Skin:NO Ingestion:YES  
Reports of Carcinogenicity:NTP:YES IARC:YES OSHA:NO  
Health Hazards Acute and Chronic:REPORTED ANIMAL CARCINOGEN.  
Explanation of Carcinogenicity:DIBENZ(A,H) ANTHRACENE: GROUP 2A(IARC),  
ANTICIPATED TO BE CARCINOGEN (NTP).  
Effects of Overexposure:NONE SPECIFIED BY MANUFACTURER.  
Medical Cond Aggravated by Exposure:NONE SPECIFIED BY MANUFACTURER.

=====  
First Aid Measures  
=====

First Aid:EYES: FLUSH WITH WATER FOR AT LEAST 15 MIN. CONTACT A  
PHYSICIAN. SKIN: FLUSH WITH LARGE VOLUMES OF WATER. CONTACT A  
PHYSICIAN. INHAL: IMMED MOVE TO FRESH AIR. INGEST: CONTACT A  
PHYSICIAN.

=====  
Fire Fighting Measures  
=====

Lower Limits:1%  
Extinguishing Media:WATER, CO2, DRY CHEMICAL.  
Fire Fighting Procedures:WEAR NIOSH/MSHA APPROVED SCBA AND FULL  
PROTECTIVE EQUIPMENT .

=====  
Accidental Release Measures  
=====

Spill Release Procedures:SWEEP UP MATERIAL. AVOID GENERATING DUST.  
Neutralizing Agent:NONE SPECIFIED BY MANUFACTURER.

=====  
Handling and Storage  
=====

Handling and Storage Precautions:STORE IN SEALED CONTAINER IN COOL, DRY  
LOCATION. AVOID GENERATING DUST.  
Other Precautions:REPORTED CANCER HAZARD. AVOID EYE OR SKIN CONTACT.

=====  
Exposure Controls/Personal Protection  
=====

Respiratory Protection:WEAR NIOSH/MSHA APPROVED SCBA.  
Ventilation:USE ONLY IN WELL VENTILATED AREA.  
Protective Gloves:IMPERVIOUS GLOVES .

Eye Protection:CHEMICAL WORKERS GOGGLES .  
Work Hygienic Practices:NONE SPECIFIED BY MANUFACTURER.  
Supplemental Safety and Health  
NONE SPECIFIED BY MANUFACTURER.

===== Physical/Chemical Properties =====

HCC:T6  
Boiling Pt:B.P. Text:509F,265C  
Vapor Density:9.60  
Spec Gravity:>1(H2O=1)  
Appearance and Odor:OFF-WHITE TO YELLOW-GREEN CRYSTALLINE

===== Stability and Reactivity Data =====

Stability Indicator/Materials to Avoid:YES  
OXIDIZING AGENTS.

===== Disposal Considerations =====

Waste Disposal Methods:COMPLY WITH ALL APPLICABLE FEDERAL, STATE, OR  
LOCAL REGULATIONS.

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document should seek competent professional advice to verify and  
assume responsibility for the suitability of this information to their  
particular situation.

# International Chemical Safety Cards

## CHLORDANE

ICSC: 0740

<b>CHLORDANE</b> 1,2,4,5,6,7,8,8-Octachloro-2,3,3a,4,7,7a-hexahydro-4,7-methanoindene $C_{10}H_6Cl_8$ Molecular mass: 409.8
CAS # 57-74-9 RTECS # PB9800000 ICSC # 0740 UN # 2996 EC # 602-047-00-8

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
<b>FIRE</b>	Combustible. Liquid formulations containing organic solvents may be flammable. Gives off irritating or toxic fumes (or gases) in a fire.	NO open flames.	Alcohol-resistant foam, powder, carbon dioxide.
<b>EXPLOSION</b>	Above 56°C explosive vapour/air mixtures may be formed. Explosion hazard will depend on the solvent used or on the characteristics of the dust.	Above 56°C closed system, ventilation.	In case of fire: keep drums, etc., cool by spraying with water.

EXPOSURE		PREVENT GENERATION OF MISTS! STRICT HYGIENE!	
• <b>INHALATION</b>	(see Ingestion).	Breathing protection.	Fresh air, rest. Refer for medical attention.
• <b>SKIN</b>	MAY BE ABSORBED!	Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
• <b>EYES</b>	Redness.	Safety goggles or face shield, or eye protection in combination with breathing protection.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
• <b>INGESTION</b>	Convulsions. Nausea. Vomiting.	Do not eat, drink, or smoke during work.	Do NOT induce vomiting. Rest. Refer for medical attention.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Collect leaking liquid in sealable containers. Absorb remaining liquid in sand or inert absorbent and remove to safe place. Do NOT wash away into sewer (extra personal protection: complete protective clothing including self-contained breathing apparatus).	Separated from food and feedstuffs, strong bases. Cool. Dry.	Do not transport with food and feedstuffs. Xn symbol R: 21/22-40 S: 36/37 UN Hazard Class: 6.1 UN Packing Group: III Severe marine pollutant.

**SEE IMPORTANT INFORMATION ON BACK**

ICSC: 0740

Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities © IPCS CEC 1993

# International Chemical Safety Cards

## CHLORDANE

ICSC: 0740

<b>I M P O R T A N T  D A T A</b>	<p><b>PHYSICAL STATE; APPEARANCE:</b> LIGHT YELLOW TO AMBER VISCOUS LIQUID.</p> <p><b>PHYSICAL DANGERS:</b></p> <p><b>CHEMICAL DANGERS:</b> The substance decomposes on heating and/or on burning and on contact with bases producing toxic fumes: chlorine fumes, hydrogen chloride, phosgene. Attacks plastic, rubber and coating.</p> <p><b>OCCUPATIONAL EXPOSURE LIMITS (OELs):</b> TLV: ppm; 0.5 mg/m<sup>3</sup> (as TWA) (skin) (ACGIH 1991-1992). PDK: 0.01 mg/m<sup>3</sup> C (USSR 1977).</p>	<p><b>ROUTES OF EXPOSURE:</b> The substance can be absorbed into the body by inhalation of dusts from powder concentrates, through the skin especially from liquid formulations, and by ingestion.</p> <p><b>INHALATION RISK:</b> Evaporation at 20°C is negligible; a nuisance-causing concentration of airborne particles can, however, be reached quickly when dispersed.</p> <p><b>EFFECTS OF SHORT-TERM EXPOSURE:</b> Inhalation of dust may cause irritation. Exposure at high levels may result in disorientation, tremors, convulsions, respiratory failure and death. Medical observation is indicated.</p> <p><b>EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:</b> This substance is possibly carcinogenic to humans.</p>
	<p><b>PHYSICAL PROPERTIES</b></p> <p>Boiling point at 1.33 kPa: 175°C Relative density (water = 1): 1.59-1.63 Solubility in water: None</p>	<p>Vapour pressure, Pa at 25°C: 0.0013 Octanol/water partition coefficient as log Pow: 2.78</p>
<b>ENVIRONMENTAL DATA</b>	Chlordane is persistent and rather immobile in soil. This substance may be hazardous to the environment; special attention should be given to fish in tropical areas. It is strongly advised not to let the chemical enter into the environment.	
<b>NOTES</b>		
<p>The commercial product (technical chlordane) is a mixture containing 60 to 75% of the pure compound and 25 to 40% of related compounds. The chlorine content is 64-67%. Other melting points: cis-isomer: 106-107°C; trans-isomer: 104-105°C. All uses of this substance are increasingly restricted. Safe and equally effective alternatives should be prepared. Carrier solvents used in commercial formulations may change physical and toxicological properties. Do NOT take working clothes home. Aspon Chlordane, Belt, Corodane, Niran, Velsicol 1068, Toxichlor, Octachlor, Ortho-klor, Synklor, Topiclör, Toxichlor are trade names. Also consult ICSC # 0743 on heptachlor.</p> <p style="text-align: right;">Transport Emergency Card: TEC (R)-61G57c</p>		
<b>ADDITIONAL INFORMATION</b>		
<div style="display: flex; justify-content: space-between;"> <span>ICSC: 0740</span> <span>CHLORDANE</span> </div> <p style="text-align: center; font-size: small;">© IPCS, CEC, 1993</p>		
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**RM Number: 8469 (Renewals)**  
**MSDS Number: 8469**  
**RM Name: 4,4'-DDT**  
**Issued: May, 1992**

## **MATERIAL SAFETY DATA SHEET**

**National Institute of Standards and Technology**  
**Standard Reference Materials Program**  
**Gaithersburg, Maryland 20899**  
**(301) 975-2019**

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### **SECTION I. MATERIAL IDENTIFICATION**

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**Material Name:** 4,4'-DDT

**Description:** This material is a polychlorinated, non-degradable pesticide. A unit of RM 8469 consists of one vial containing approximately 100 mg of 4,4'-DDT.

**Other Designations:** *p,p'*DDT; DDT; 1'1(2,2,2-trichloroethylidene)bis[4-chlorobenzene]; 1,1,1-trichloro-2,2-bis(*p*-chlorophenyl)ethane; *a,a*-bis(*p*-chlorophenyl)-*b,b*-trichlorethane; benzene, 1,1'-(2,2,2-trichloroethylidene)bis(4-chloro); ethane, 1,1,1-trichloro-2,2-bis(*p*-chlorophenyl)-ethane;  $\alpha,\alpha$ -bis(*p*-chlorophenyl)- $\beta,\beta,\beta$ -trichloroethane; dichlorodiphenyltrichloroethane; chlorophenothane; clofenotane; dicophane; pentachlorin; *Agritan*; *Gesapon*; *Gesarex*; *Gesarol*; *Guesapon*; *Neocid*

**Chemical Formula:** (Cl-C<sub>6</sub>-H<sub>4</sub>)<sub>2</sub>-C-H-C-Cl<sub>3</sub>

**CAS Reg. No.:** 50-29-3

**DOT Classification:** Class 6.1 Poison

**Manufacturer/Supplier:** Available from a number of suppliers.

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## SECTION II. HAZARDOUS INGREDIENTS

---

<u>Hazardous Component</u>	<u>Nominal Concentration</u>	<u>Limits and Toxicity Data</u>
4,4'-DDT	~ 100%	OSHA TLV:  1 mg/m <sup>3</sup> (skin)  ACGIH TLV-TWA:  1 mg/m <sup>3</sup>  NIOSH TWA (validated method):  0.5 mg/m <sup>3</sup>  DFG MAK TWA:  1 mg/m <sup>3</sup> (total dust/skin)  DFG MAK (30 Min Peak):  10 mg/m <sup>3</sup> (1 time/shift)  Rabbit, Skin:  LD <sub>50</sub> : 300 mg/kg  Rat, Skin:  LD <sub>50</sub> : 1931 mg/kg

Guinea Pig, Skin:

LD<sub>50</sub>: 1000 mg/kg

Human, Oral:

TD<sub>Lo</sub>: 5 mg/kg

Infant, Oral:

LD<sub>Lo</sub>: 150 mg/kg

Man, Oral:

TD<sub>Lo</sub>: 6 mg/kg

Human, Oral:

LD<sub>Lo</sub>: 500 mg/kg

Human, Oral:

TD<sub>Lo</sub>: 16 mg/kg

Rat, Oral:

LD<sub>50</sub>: 87 mg/kg

Mouse, Oral:

LD<sub>50</sub>: 135 mg/kg

Dog, Oral:

LD<sub>50</sub>: 150 mg.kg

Rabbit, Oral:

LD<sub>50</sub>: 250 mg/kg

Guinea Pig, Oral:

LD<sub>50</sub>: 150 mg.kg

Monkey, Oral:

LD<sub>50</sub>: 200 mg/kg

Cat, Oral:

LD<sub>10</sub>: 250 mg/kg

---

**HAZARDOUS INGREDIENTS CONTINUED**

---

<u>Hazardous Component</u>	<u>Nominal Concentration</u>	<u>Limits and Toxicity Data</u>
4,4'-DDT	~ 100%	Domestic Animal, Oral:  LD <sub>10</sub> : 300 mg/kg  Rat, Subcutaneous:  LD <sub>50</sub> : 1500 mg/kg  Rabbit, Subcutaneous:  LD <sub>50</sub> : 250 mg/kg  Guinea Pig, Subcutaneous:  LD <sub>50</sub> : 900 mg/kg  Rat, Intravenous:  LD <sub>50</sub> : 68 mg/kg  Mouse, Intravenous:  LD <sub>50</sub> : 68,500 µg/kg  Rabbit, Intravenous:  LD <sub>10</sub> : 50 mg/kg  Monkey, Intravenous:

LD<sub>10</sub>: 50 mg/kg

Dog, Intravenous:

LD<sub>10</sub>: 75 mg/kg

Rat, Intraperitoneal:

LD<sub>50</sub>: 9100 µg/kg

Mouse, Intraperitoneal:

LD<sub>50</sub>: 32 mg/kg

Man, Unreported:

LD<sub>10</sub>: 221 mg/kg

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### SECTION III. PHYSICAL/ CHEMICAL CHARACTERISTICS

---

#### 4,4'-DDT

**Appearance and Odor:** A tasteless, almost odorless, white crystalline powder.

**Molecular Weight:** 354.49

**Density:** 1.56

**Boiling Point:** 260 °C

**Melting Point:** 108.5 - 109 °C

**Vapor Pressure:**  $1.5 \times 10^{-7}$  mmHg

**Solubility in Water (vol/vol at 0 °C):** Practically insoluble.

<b>Solubility in Other Compounds (g/100 ml):</b>	acetone .....	58
	benzene .....	78
	benzyl benzoate .....	42
	carbon tetrachloride .....	45
	chlorobenzene .....	74
	cyclohexanone .....	116
	95% alcohol .....	2
	ethyl ether .....	28
	gasoline .....	20
	isopropanol .....	3
	kerosene .....	8 - 10
	morpholine .....	75
	peanut oil .....	11
	pine oil .....	10 - 16
tetralin .....	61	
tributyl phosphate .....	50	

This material is freely soluble in pyridine and dioxane. The solubility in organic solvents increases sharply with with a temperature increase. **Insoluble** in dilute acids and alkalies.

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#### SECTION IV. FIRE AND EXPLOSION HAZARD DATA

---

**Flash Point:** N/A

**(Method Used):** N/A

**Autoignition Temperature:** N/A

**Flammability Limits in Air (Volume %):** **UPPER:** N/A  
**LOWER:** N/A

**Extinguishing Media:** Use dry chemical, water spray of regular foam.

**Special Fire Procedures:** Fire-fighters should wear self-contained breathing apparatus operated in a pressure-demand or other positive-pressure mode and other protective clothing when fighting fires involving this material.

**Unusual Fire and Explosion Hazards:** This material is a negligible fire hazard when exposed to heat or flame. This material may burn but does not ignite readily. Containers may explode in the heat of a fire.

This material in the presence of strong oxidizers may cause a fire and explosion hazard.

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## SECTION V. REACTIVITY DATA

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Stability:      X   Stable               Unstable

**Note:** The unusual stability of this material has resulted in difficulties in residue removal from water, soil, and food mediums.

**Conditions to Avoid:** Keep this material from excessive temperatures and incompatible materials.

**Incompatibility (Materials to Avoid):** Dichlorodiphenyltrichloroethane with alkalies, alkaloid nicotine, bordeaux mixture (a fungicide and insecticide mixture made by adding slaked lime to a copper sulfate solution), clay, dolomite, or ferbam (dimethyldithiocarbamate) may cause a decomposition reaction.

See Section IV: Fire and Explosion Hazard Data.

**Hazardous Decomposition or Byproducts:** Thermal decomposition products may include toxic and corrosive fumes of chlorides and toxic oxides of carbon.

Hazardous Polymerization:           Will Occur          X   Will Not Occur

---

## SECTION VI. HEALTH HAZARD DATA

---

Route of Entry:      X   Inhalation          X   Skin          X   Ingestion

**Health Hazards (Acute and Chronic):** Ingestion can occur through oral administration or may result if sufficient amounts are absorbed from the lungs through inhalation. Repeated or prolonged inhalation may cause irritation of the nose, throat, and *mucous membranes*. A study of occupational exposure to DDT reported a higher frequency of white blood cells with chromosomal abnormalities among workers with high DDT blood levels. Menstrual irregularities are the most frequent complaint among migrant farm workers were observed in another study. Signs of liver and kidney damage can develop. Liver biopsy of 8 workers exposed to BHC (benzene hexachloride) and/or DDT for 5 - 13 years revealed chronic liver damage including *cirrhosis* (fibrosis with hardening caused by excessive formation of connective tissue followed by contraction) and *chronic hepatitis* (persistent inflammation of the liver). Liver *necrosis* (localized death of living tissue) has been reported in experimental animals.

Ingestion of large doses may induce prompt vomiting with nausea and diarrhea. Convulsions may alternate with periods of coma and partial paralysis. Death may be due to respiratory failure or *medullary paralysis* (paralysis of the pyramidal last part of the vertebrate brain, continuous posteriorly with the spinal cord). Complete recovery from sublethal doses may occur within 1 to 3 days, however, cases of weakness, paralysis and *ataxia* (an inability to coordinate voluntary muscular movements) were reported to have persisted for weeks.

*Palpitations* (rapid and strong throbbing), *tachycardia* (a rapid heart action) and irregular heart action have been noted in some cases of acute poisoning. DDT has been suspect in the development of *aplastic anemia* (anemia that is characterized by defective function of the blood-forming organs and is caused by toxic agents), *agranulocytosis* (an acute, febrile condition marked by severe decrease in blood granulocytes an often associated with the use of certain drugs), and *thrombocytopenia* (persistent decrease in the number of blood platelets that is usually associated with a hemorrhagic conditions).

In addition to the above effects, chronic exposures may cause *anorexia* (a prolonged loss of appetite), loss of weight, *anemia* (a condition in which the blood is deficient in red blood cells, in hemoglobin, or in total volume), nervous tension and myoclonic jerks. Chronic administration to animals has produced *necrosis* of the cardiac and skeletal muscles, degeneration of the kidneys and effects of the immune system. Oral administration to mice produced benign and malignant liver *neoplasms*

(a new growth of tissue serving no physiological function) and *lymphomas* (a tumor of lymphoid tissue) and *lung neoplasms*. Oral administration to rats produced liver neoplasms; in rats previously exposed to *n*-nitrosodiethylamine (a material detected in trace amounts in tobacco smoke) DDT increased the incidence of liver tumors. This material may cross the placenta and be excreted in breast milk. It may also impair fertility. Stimulants such as epinephrine or ephedrine may induce *ventricular fibrillation* (a muscular twitching involving individual muscle fibers, acting without coordination, of the chamber of the heart which receives blood from a corresponding atrium and from which blood is forced into the arteries).

**Signs and Symptoms of Exposure:** Effects of poisoning may be delayed for several hours after exposure. Symptoms of *paresthesias* (a sensation of pricking, tingling or creeping of the skin that has no objective cause) of the tongue, lips and face followed by tremor, a sense of apprehension, dizziness, confusion, malaise, headache, fatigue, weakness, *ataxia*, *nystagmus* (a rapid involuntary oscillation of the eyeballs), increased respiration and hyperexcitability may be experienced.

**Medical Conditions Generally Aggravated by Exposure:** N/A

**Listed as a Carcinogen/Potential Carcinogen:**

	<u>Yes</u>	<u>No</u>
In the National Toxicology Program (NTP) Report on Carcinogens	<u>X*</u>	—
In the International Agency for Research (IARC) Monographs	<u>X**</u>	—
By the Occupational Safety and Health Administration (OSHA)	—	<u>X</u>

\*Classified as an *anticipated human carcinogen* by NTP.

\*\*Classified as Group 2-B, *animal limited evidence* by IARC.

**EMERGENCY AND FIRST AID PROCEDURES:**

**Skin Contact:** Remove contaminated shoes and clothing. Rinse affected area with large amounts of water followed by washing the area with soap and water. Contact medical assistance if necessary.

**Eye Contact:** Immediately flush eyes, including under the eyelids, with copious amounts of water for at least 15 minutes. Contact medical assistance if necessary.

**Inhalation:** If inhaled, remove the victim to fresh air. If breathing is difficult, give oxygen; if victim is not breathing, give artificial respiration. Contact medical assistance if necessary.

**Ingestion:** If ingested, wash out mouth with water. Contact medical assistance if necessary.

**TARGET ORGAN(S) OF ATTACK:** The peripheral nervous system, liver, blood and kidneys.

---

**SECTION VII. PRECAUTIONS FOR SAFE HANDLING AND USE**

---

**Steps to be taken in Case Material is Released or Spilled:** Notify safety personnel of major spills and/or leaks. Evacuate all nonessential personnel. Ventilate closed area before entering. Stop the leak if you can do so without risk. Use water spray to reduce vapors. Small spills can be absorbed with sand or other absorbent material and place in containers for later disposal. Small dry spills can be recovered with a clean shovel and placed in covered containers. For larger spills, dike far ahead of the spill for later disposal.

**Note: Reportable Quantity (RQ): 1 Pound (4.536 Grams)**

The Superfund Amendments and Reauthorization Act (SARA) section 304 requires that a release equal to or greater than the reportable quantity for this substance be immediately reported to the local Emergency Planning Committee and the State Emergency Response Commission (40 CFR 355.40). If the release of this substance is reportable under Cercla Section 103, The National Response Center must be notified immediately.

**Waste Disposal:** Disposal must be in accordance with 40 CFR 165 recommended procedures for the disposal and storage of pesticides and pesticide containers. Follow all Federal, state and local regulations.

**Handling and Storage:** Employees handling this material must wear protective clothing and gloves to prevent skin contact and splash-proof or dust-resistant safety goggles to prevent eye contact with this substance. Any

chemical cartridge respirator with an organic vapor cartridge in combination with a dust and mist filter must be worn to prevent inhalation. The specific respirator selected must be based on contamination levels found in the work place, must be based on the specific operation, must not exceed the working limits of the respirator and must be jointly approved by the National Institute for Occupational Safety and Health (NIOSH) and the Mine Safety and Health Administration (MSHA).

**Note:** Contact lenses pose a special problem; soft lenses may absorb irritants and all lenses concentrate them. **DO NOT** wear contact lenses in the lab.

Do not store DDT in iron containers. High storage temperatures should be avoided. Provide local exhaust ventilation. Ventilation equipment must be explosion proof. Store material in accordance with 40 CFR 165 recommended procedures for the disposal and storage of pesticides and pesticide containers. Vials as received, should be kept tightly sealed, protected from light, and stored in a refrigerator or freezer. Emergency eye wash station must be available.

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## SECTION VIII. SOURCE DATA/ OTHER COMMENTS

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Sources: Occupational Health Services, Inc., MSDS *Dichlorodipenyltrichloroethane*, October 3, 1991.  
Dangerous Properties of Industrial Materials, 5th ed., 1979.  
Hawley's Condensed Chemical Dictionary, 11th ed., 1987.  
The Merk Index, 11th ed., 1989.  
Websters Ninth New Collegiate Dictionary, 1990.

**Note:** Physical and chemical data contained in this MSDS are provided for use in assessing the hazardous nature of the material. The MSDS was prepared carefully, using current references, however NIST does not certify the data on the MSDS. The certified values for this material are given only on the NIST Certificate of Analysis.

**RM Number: 8467 (Renewals)**  
**MSDS Number: 8467**  
**RM Name: 4,4'-DDE**  
**Issued: May, 1992**

## MATERIAL SAFETY DATA SHEET

National Institute of Standards and Technology  
Standard Reference Materials Program  
Gaithersburg, Maryland 20899  
(301) 975-2019

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### SECTION I. MATERIAL IDENTIFICATION

---

**Material Name:** 4,4'-DDE

**Description:** This material is a degradation product of DDT found as an impurity in DDT residues. A unit of RM 8467 consists of one vial containing approximately 100 mg of 4,4'-DDE.

**Other Designations:** *p,p'*-DDE, 1,1'-(dichloroethenyldiene)bis[4-chlorobenzene]);  
2,2-bis-(4-chlorophenyl)-1,1-dichloroethene; ethylene, 1,1-dichloro-2,2-bis(*p*-chlorophenyl);  
1,1'-(dichloroethenyldiene)bis(4-chloro-benzene); dichlorodiphenyldichloroethylene

**Chemical Formula:** Cl-C<sub>6</sub>-H<sub>4</sub>-C-(C-Cl<sub>2</sub>)-C<sub>6</sub>-H<sub>4</sub>-Cl

**CAS Reg. No.:** 72-55-9

**DOT Classification:** Class 6.1 Poison

**Manufacturer/Supplier:** Available from a number of suppliers.

---

### SECTION II. HAZARDOUS INGREDIENTS

---

<u>Hazardous Components</u>	<u>Nominal Concentration</u>	<u>Limits and Toxicity Data</u>
4,4'-DDE	~ 100%	*No TLV established.

Rat, Oral:

LD<sub>50</sub>: 880 mg/kg

Mouse, Oral:

LD<sub>50</sub>: 700 mg/kg

\*The suggested ACGIH-TWA for particulates not otherwise regulated is 10 mg/m<sup>3</sup> for total dust.

---

### SECTION III. PHYSICAL/ CHEMICAL CHARACTERISTICS

---

#### **4,4'-DDE**

**Appearance and Odor:** A white crystalline solid.

**Molecular Weight:** 318.03

**Melting Point (Range):** 88 - 90 °C

**Solubility in Water:** 0.12 ppm

**Solubility in Other Compounds:** Soluble in ethanol, acetone, dichloromethane, fat and most organic solvents.

---

### SECTION IV. FIRE AND EXPLOSION HAZARD DATA

---

**Flash Point:** N/A

**(Method Used):** N/A

**Autoignition Temperature:** N/A

**Flammability Limits in Air (Volume %): UPPER:** N/A  
**LOWER:** N/A

**Extinguishing Media:** Use dry chemical, water spray of regular foam.

**Special Fire Procedures:** Fire-fighters should wear self-contained breathing apparatus operated in a pressure-demand or other positive-pressure mode and other protective clothing when fighting fires involving this material.

**Unusual Fire and Explosion Hazards:** This material is a negligible fire hazard when exposed to heat or flame. This

material may burn but does not ignite readily. Containers may explode in the heat of a fire.

This pesticide material with strong oxidizers can present a fire and explosion hazard.

---

## SECTION V. REACTIVITY DATA

---

**Stability:**      X   Stable               Unstable

**Conditions to Avoid:** Avoid incompatible materials.

**Incompatibility (Materials to Avoid):** Keep this material from strong oxidizing materials.

See Section IV: Fire and Explosion Hazard Data.

**Hazardous Decomposition or Byproducts:** Thermal decomposition may include toxic and corrosive fumes of chlorides and toxic oxides of carbon.

**Hazardous Polymerization:**               Will Occur          X   Will Not Occur

---

## SECTION VI. HEALTH HAZARD DATA

---

**Route of Entry:**      X   Inhalation          X   Skin          X   Ingestion

**Health Hazards (Acute and Chronic):** Effects for **organochlorine pesticides** (i.e. DDT) may occur for exposures of 4,4'-DDE. Ingestion can occur through oral administration or may occur if sufficient amounts are absorbed from the lungs. A study of occupational exposure to DDT reported a higher frequency of white blood cells with chromosomal abnormalities among workers with high DDT blood levels. Menstrual irregularities are the most frequent complaint among migrant farm workers were observed in another study. Signs of liver and kidney damage can develop. Liver *necrosis* (localized death of living tissue) has been reported in experimental animals. Death may be due to respiratory failure or ventricular fibrillation. Symptoms of poisoning may not occur until several hours after ingestion.

This material may cross the placenta and be excreted in breast milk. It may also impair fertility. Stimulants such as epinephrine or ephedrine may induce *ventricular fibrillation* (a muscular twitching involving individual muscle fibers, acting without coordination, of the chamber of the heart which receives blood from a corresponding atrium and from which blood is forced into the arteries).

**Signs and Symptoms of Exposure:** Ingestion of organochlorine pesticides may cause gastrointestinal effects of nausea, vomiting, diarrhea, and stomach pains. Confusion, apprehension, irritability, excitability, dizziness, headache, disorientation,

weakness, paresthesias, muscle twitching, tremor, stupor, coma and convulsions may also be experienced.

**Medical Conditions Generally Aggravated by Exposure:** N/A

**Listed as a Carcinogen/Potential Carcinogen:**

	<u>Yes</u>	<u>No</u>
In the National Toxicology Program (NTP) Report on Carcinogens	_____	<u>X</u>
In the International Agency for Research (IARC) Monographs	_____	<u>X</u>
By the Occupational Safety and Health Administration (OSHA)	_____	<u>X</u>

**Note:** A high incidence of liver-cell tumors was observed in mice administered DDE orally (IARC).

**The carcinogenicity of this material is still undetermined.**

**EMERGENCY AND FIRST AID PROCEDURES:**

**Skin Contact:** Remove contaminated shoes and clothing. Rinse affected area with large amounts of water followed by washing the area with soap and water. Contact medical assistance if necessary.

**Eye Contact:** Immediately flush eyes, including under the eyelids, with copious amounts of water for at least 15 minutes. Contact medical assistance if necessary.

**Inhalation:** If inhaled, remove the victim to fresh air. If breathing is difficult, give oxygen; if victim is not breathing, give artificial respiration. Contact medical assistance if necessary.

**Ingestion:** If ingested, wash out mouth with water. If the person is conscious and not convulsing, induce vomiting by administering syrup of ipecac (when vomiting occurs, keep the head above below the hips to prevent aspiration). Medical personal can administer activated charcoal followed by gastric lavage. Follow with a saline cathartic. **DO NOT** give fats or oils. Intestinal lavage with 20% mannitol (200 mL) by stomach tube is also useful. Give artificial respiration with oxygen if respiration is depressed. Treat symptomatically and supportively.

**TARGET ORGAN(S) OF ATTACK:** The blood, liver and kidneys.

---

**SECTION VII. PRECAUTIONS FOR SAFE HANDLING AND USE**

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**Steps to be taken in Case Material is Released or Spilled:** Notify safety personnel of major spills and/or leaks. Evacuate all nonessential personnel. Ventilate closed area before entering. Stop the leak if you can do so without risk. Use water spray to reduce vapors. Small spills can be absorbed with sand or other absorbent material and place in containers for later disposal. Small dry spills can be recovered with a clean shovel and placed in covered containers. For larger spills, dike far ahead of the spill for later disposal.

**Note: Reportable Quantity (RQ): 1 Pound (4.536 Grams)**

The Superfund Amendments and Reauthorization Act (SARA) section 304 requires that a release equal to or greater than the reportable quantity for this substance be immediately reported to the local Emergency Planning Committee and the State Emergency Response Commission (40 CFR 355.40). If the release of this substance is reportable under Cercla Section 103, The National Response Center must be notified immediately.

**Waste Disposal:** Disposal must be in accordance with 40 CFR 165 recommended procedures for the disposal and storage of pesticides and pesticide containers. Follow all Federal, state and local regulations.

**Handling and Storage:** Employees handling this material must wear protective clothing and gloves to prevent skin contact and splash-proof or dust-resistant safety goggles to prevent eye contact with this substance. Any chemical cartridge respirator with an organic vapor cartridge in combination with a dust and mist filter must be worn to prevent inhalation. The specific respirator selected must be based on contamination levels found in the work place, must be based on the specific operation, must not exceed the working limits of the respirator and must be jointly approved by the National Institute for Occupational Safety and Health (NIOSH) and the Mine Safety and Health Administration (MSHA).

**Note:** Contact lenses pose a special problem; soft lenses may absorb irritants and all lenses concentrate them.  
**DO NOT** wear contact lenses in the lab.

Provide local exhaust ventilation. Ventilation equipment must be explosion proof. Store material in accordance with 40 CFR 165 recommended procedures for the disposal and storage of pesticides and pesticide containers. Vials, as received, should be kept tightly sealed, protected from light, and stored in a refrigerator or freezer. Emergency eye wash station must be available.

---

## SECTION VIII. SOURCE DATA/ OTHER COMMENTS

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Sources: Occupational Health Services, MSDS *2,2-Bis-(4-Chlorophenyl)-1,1-Dichloroethene*, February 21, 1991.  
Hawley's Condensed Chemical Dictionary, 11th ed., 1987.  
Webster's Ninth New Colligiate Dictionary, 1990.

Carmelita S. Davis (301) 975-6439  
National Institute of Standards and Technology  
Standard Reference Materials Program  
Gaithersburg, Maryland 20899

**Note:** Physical and chemical data contained in this MSDS are provided for use in assessing the hazardous nature of the material. The MSDS was prepared carefully, using current references, however NIST does not certify the data on the MSDS. The certified values for this material are given only on the NIST Certificate of Analysis.

# Safety data for rhothane



[Glossary](#) of terms on this data sheet.

The information on this web page is provided to help you to work safely, but it is intended to be an overview of hazards, not a replacement for a full Material Safety Data Sheet (MSDS). MSDS forms can be downloaded from the web sites of many chemical suppliers.

## General

Synonyms: 1,1-dichloro-2,2-bis(p-chlorophenyl)ethane, dichlorophenyl dichloroethane, 1,1-dichloro-2,2-di(4-chlorophenyl)ethane, tetrachlorodiphenylethane, TDE, DDD, p,p'-TDE, dilene, rothane

Use: organochlorine pesticide

Molecular formula:  $C_{14}H_{10}Cl_4$

CAS No: 72-54-8

EINECS No:

## Physical data

Appearance: colourless to off-white crystals

Melting point: 109 C

Boiling point: 193 C

Vapour density:

Vapour pressure:

Density ( $g\ cm^{-3}$ ):

Flash point:

Explosion limits:

Autoignition temperature:

Water solubility:

## Stability

Stable. Incompatible with strong oxidizing agents.

## Toxicology

Harmful if swallowed, or absorbed through the skin.

### Toxicity data

(The meaning of any toxicological abbreviations which appear in this section is given [here.](#))

ORL-RAT LD50 113 mg kg<sup>-1</sup>

ORL-MUS LDLO 600 mg kg<sup>-1</sup>

SKN-RBT LD50 1200 mg kg<sup>-1</sup>

### Risk phrases

(The meaning of any risk phrases which appear in this section is given [here.](#))

R21 R22.

## Transport information

(The meaning of any UN hazard codes which appear in this section is given [here.](#))

UN No 2761. Hazard class 6.1. Packing group III.

## Personal protection

Safety glasses.

### Safety phrases

(The meaning of any safety phrases which appear in this section is given [here.](#))

[Return to [Physical & Theoretical Chemistry Lab. Safety home page.](#)]

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# International Chemical Safety Cards

## HEPTACHLOR

ICSC: 0743

<b>HEPTACHLOR</b> 1,4,5,6,7,8,8-Heptachloro-3a,4,7,7a-tetrahydro-4,7-methanoindene $C_{10}H_5Cl_7$ Molecular mass: 373.35			
CAS # 76-44-8 RTECS # PC0700000 ICSC # 0743 UN # 2761 EC # 602-046-00-2			

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
<b>FIRE</b>	Not combustible. Liquid formulations containing organic solvents may be flammable. Gives off irritating or toxic fumes (or gases) in a fire.		In case of fire in the surroundings: all extinguishing agents allowed.
<b>EXPLOSION</b>	Explosion hazard will depend on the solvent used or on the characteristics of the dust.		In case of fire: keep drums, etc., cool by spraying with water.

EXPOSURE		PREVENT DISPERSION OF DUST! PREVENT GENERATION OF MISTS! STRICT HYGIENE!	
• <b>INHALATION</b>	Irritation from dust.	Breathing protection.	Fresh air, rest. Refer for medical attention.
• <b>SKIN</b>	MAY BE ABSORBED!	Protective gloves.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
• <b>EYES</b>		Safety goggles or eye protection in combination with breathing protection.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
• <b>INGESTION</b>		Do not eat, drink, or smoke during work.	Do NOT induce vomiting. Rest. Refer for medical attention.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Do NOT wash away into sewer. Sweep spilled substance into sealable containers. Carefully collect remainder, then remove to safe place (extra personal protection: complete protective clothing including self-contained breathing apparatus).	Separated from food and feedstuffs, strong bases. Cool. Dry.	Do not transport with food and feedstuffs. T symbol R: 24/25-33-40 S: 36/37-44 UN Hazard Class: 6.1 UN Packing Group: II Severe marine pollutant.

**SEE IMPORTANT INFORMATION ON BACK**
**ICSC: 0743**

Prepared in the context of cooperation between the International Programme on Chemical Safety &amp; the Commission of the European Communities © IPCS CEC 1993

# International Chemical Safety Cards

## HEPTACHLOR

ICSC: 0743

<b>I M P O R T A N T  D A T A</b>	<b>PHYSICAL STATE; APPEARANCE:</b> WHITE CRYSTALS WITH MILD ODOUR OF CAMPHOR.	<b>ROUTES OF EXPOSURE:</b> The substance can be absorbed into the body by inhalation of dusts from powder concentrates, through the skin especially from liquid formulations, and by ingestion.
	<b>PHYSICAL DANGERS:</b>  <b>CHEMICAL DANGERS:</b> The substance decomposes on heating producing toxic fumes: chlorine, hydrogen chloride. Reacts with strong oxidants.	<b>INHALATION RISK:</b> Evaporation at 20°C is negligible; a nuisance-causing concentration of airborne particles can, however, be reached quickly when dispersed.
	<b>OCCUPATIONAL EXPOSURE LIMITS (OELs):</b> TLV: ppm; 0.5 mg/m <sup>3</sup> (as TWA) (skin) (ACGIH 1991-1992). TLV (as STEL): ppm; 2 mg/m <sup>3</sup> (ACGIH 1991-1992). PDK: 0.01 mg/m <sup>3</sup> (USSR 1977).	<b>EFFECTS OF SHORT-TERM EXPOSURE:</b> Inhalation of dust may cause irritation.
		<b>EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:</b> This substance is possibly carcinogenic to humans. Heptachlor epoxide has been found in human milk in areas with high heptachlor exposure in the population.
<b>PHYSICAL PROPERTIES</b>	Boiling point at 0.2 kPa: 135-145°C Melting point: 95-96°C Relative density (water = 1): 1.65-1.67	Solubility in water: none Vapour pressure, Pa at 25°C: 0.053 Octanol/water partition coefficient as log Pow: 3.87-5.44 (estimated)
<b>ENVIRONMENTAL DATA</b>	Heptachlor is persistent and rather immobile in soil. This substance may be hazardous to the environment; special attention should be given to marine crustacea and young fish which are very sensitive. In the food chain important to humans, bioaccumulation takes place, specifically in fish and birds. It is strongly advised not to let the chemical enter into the environment.	
<b>NOTES</b>		
The technical grade is a waxy solid containing ca. 72% heptachlor and 28% related compounds. All uses of this compound are increasingly restricted. Safe and equally effective alternatives should be preferred. Other melting points: 46-74°C for the technical product. Carrier solvents used in commercial formulations may change physical and toxicological properties. Do NOT take working clothes home. Aahepta, Agroceres, Basaklor, Heptagran, Heptamul, Rhodiachlor, Velsicol 104, Drinox, among others are trade names.		
Transport Emergency Card: TEC (R)-61G53b		
<b>ADDITIONAL INFORMATION</b>		
<b>ICSC: 0743</b>		<b>HEPTACHLOR</b>
© IPCS, CEC, 1993		
<b>IMPORTANT LEGAL NOTICE:</b>	Neither the CEC or the IPCS nor any person acting on behalf of the CEC or the IPCS is responsible for the use which might be made of this information. This card contains the collective views of the IPCS Peer Review Committee and may not reflect in all cases all the detailed requirements included in national legislation on the subject. The user should verify compliance of the cards with the relevant legislation in the country of use.	

CHEM SERVICE INC -- PS-700 HEPTACHLOR EPOXIDE 99.5% PURE -- 6810-00F018389

=====  
Product Identification  
=====

Product ID:PS-700 HEPTACHLOR EPOXIDE 99.5% PURE  
MSDS Date:07/10/1990  
FSC:6810  
NIIN:00F018389  
MSDS Number: BKXVK  
=== Responsible Party ===  
Company Name:CHEM SERVICE INC  
Box:3108  
City:WEST CHESTER  
State:PA  
ZIP:19381  
Info Phone Num:(215) 692-3026  
Emergency Phone Num:(215) 386-2100  
CAGE:84898

=====  
Contractor Identification  
=====

Company Name:CHEM SERVICE INC  
Box:3108  
City:WEST CHESTER  
State:PA  
ZIP:19381  
Country:US  
Phone:215-692-3026  
CAGE:84898  
Company Name:CHEM SERVICE, INC  
Address:660 TOWER LN  
Box:599  
City:WEST CHESTER  
State:PA  
ZIP:19301-9650  
Country:US  
Phone:610-692-3026  
CAGE:8Y898

=====  
Composition/Information on Ingredients  
=====

Ingred Name:HEPTACHLOR EPOXIDE (SARA III)  
CAS:1024-57-3  
RTECS #:PB9450000  
Fraction by Wt: 99.5%  
EPA Rpt Qty:1 LB  
DOT Rpt Qty:1 LB

=====  
Hazards Identification  
=====

LD50 LC50 Mixture:ORAL LD50 (RAT): 62 MG/KG  
Routes of Entry: Inhalation:YES Skin:YES Ingestion:YES  
Reports of Carcinogenicity:NTP:NO IARC:NO OSHA:NO  
Health Hazards Acute and Chronic:SKIN: FATAL IF ABSORBED. INHALATION:  
FATAL. INGESTION: FATAL & TOXIC.  
Explanation of Carcinogenicity:NONE  
Effects of Overexposure:SKIN: FATAL IF ABSORBED. INHALATION: FATAL.  
INGESTION: FATAL & TOXIC.

=====  
First Aid Measures  
=====

First Aid:EYES/SKIN: FLUSH W/WATER FOR 15-20 MINS. IF NO BURNS HAVE  
OCCURED-USE SOAP & WATER TO CLEANSE SKIN. INHALATION: REMOVE TO  
FRESH AIR. ADMINISTER OXYGEN IF BREATHING DIFFICULTY. ADMINISTER  
CPR IF CARDIA C ARREST OCCURS. INGESTION: INDUCE VOMITING. DON'T  
ADMINISTER LIQUIDS/INDUCE VOMITING TO AN UNCONSCIOUS/CONVULSING  
PERSON. MAKE SURE AIRWAY DOESN'T BECOME OBSTRUCTED BY VOMIT. OBTAIN  
MEDICAL ATTENTION.

=====  
Fire Fighting Measures  
=====

Extinguishing Media:CO2, DRY CHEMICAL POWDER OR SPRAY.

=====  
Accidental Release Measures  
=====

Spill Release Procedures:EVACUATE AREA. WEAR APPROPRIATE EQUIPMENT.  
VENTILATE AREA. SWEEP UP & PLACE IN AN APPROPRIATE CONTAINER. WASH  
CONTAMINATED SURFACES TO REMOVE ANY RESIDUES.

=====  
Handling and Storage  
=====

Handling and Storage Precautions:KEEP CLOSED IN A COOL DRY PLACE. STORE ONLY W/COMPATIBLE CHEMICALS. FOR LABORATORY USE ONLY. DON'T WEAR CONTACT LENSES.

Other Precautions:DON'T USE AS DRUGS, COSMETICS, AGRICULTURAL OR PESTICIDAL PRODUCTS, FOOD ADDITIVES OR AS HOUSEHOLD CHEMICALS. AVOID DIRECT PHYSICAL CONTACT. AVOID CONTACT W/SKIN, EYES & CLOTHING. COMPOUND IS VOLATILE .

=====  
===== Exposure Controls/Personal Protection =====

Respiratory Protection:USE APPROPRIATE OSHA/MSHA APPROVED SAFETY EQUIPMENT.

Ventilation:HANDLE ONLY IN A HOOD

Protective Gloves:AS REQUIRED

Eye Protection:EYE SHIELDS

Work Hygienic Practices:REMOVE/WASH CONTAMINATED CLOTHING BEFORE REUSE. ONLY TRAINED PERSONNEL SHOULD HANDLE THIS CHEMICAL OR ITS CONTAINER.

Supplemental Safety and Health

=====  
===== Physical/Chemical Properties =====

Melt/Freeze Pt:M.P/F.P Text:327.2F

Appearance and Odor:CRYSTALLINE SOLID.

=====  
===== Stability and Reactivity Data =====

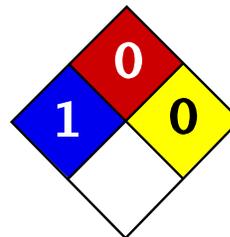
Stability Indicator/Materials to Avoid:YES

LOW REACTIVITY

=====  
===== Disposal Considerations =====

Waste Disposal Methods:BURN IN A CHEMICAL INCINERATOR EQUIPPED W/AN AFTERBURNER & SCRUBBER. DISPOSE OF IN ACCORDANCE W/FEDERAL, STATE, & LOCAL REGULATIONS.

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Health	1
Fire	0
Reactivity	0
Personal Protection	E

## Material Safety Data Sheet Lead MSDS

### Section 1: Chemical Product and Company Identification

**Product Name:** Lead

**Catalog Codes:** SLL1291, SLL1669, SLL1081, SLL1459, SLL1834

**CAS#:** 7439-92-1

**RTECS:** OF7525000

**TSCA:** TSCA 8(b) inventory: Lead

**CI#:** Not available.

**Synonym:** Lead Metal, granular; Lead Metal, foil; Lead Metal, sheet; Lead Metal, shot

**Chemical Name:** Lead

**Chemical Formula:** Pb

**Contact Information:**

**Sciencelab.com, Inc.**  
14025 Smith Rd.  
Houston, Texas 77396

US Sales: **1-800-901-7247**  
International Sales: **1-281-441-4400**

Order Online: [ScienceLab.com](http://ScienceLab.com)

**CHEMTREC (24HR Emergency Telephone), call:**  
1-800-424-9300

**International CHEMTREC, call:** 1-703-527-3887

**For non-emergency assistance, call:** 1-281-441-4400

### Section 2: Composition and Information on Ingredients

**Composition:**

Name	CAS #	% by Weight
Lead	7439-92-1	100

**Toxicological Data on Ingredients:** Lead LD50: Not available. LC50: Not available.

### Section 3: Hazards Identification

**Potential Acute Health Effects:** Slightly hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion, of inhalation.

**Potential Chronic Health Effects:**

Slightly hazardous in case of skin contact (permeator).

**CARCINOGENIC EFFECTS:** Classified A3 (Proven for animal.) by ACGIH, 2B (Possible for human.) by IARC.

**MUTAGENIC EFFECTS:** Not available.

**TERATOGENIC EFFECTS:** Not available.

**DEVELOPMENTAL TOXICITY:** Not available.

The substance may be toxic to blood, kidneys, central nervous system (CNS).

Repeated or prolonged exposure to the substance can produce target organs damage.

## Section 4: First Aid Measures

### Eye Contact:

Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention if irritation occurs.

**Skin Contact:** Wash with soap and water. Cover the irritated skin with an emollient. Get medical attention if irritation develops.

**Serious Skin Contact:** Not available.

### Inhalation:

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

**Serious Inhalation:** Not available.

### Ingestion:

Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If large quantities of this material are swallowed, call a physician immediately. Loosen tight clothing such as a collar, tie, belt or waistband.

**Serious Ingestion:** Not available.

## Section 5: Fire and Explosion Data

**Flammability of the Product:** May be combustible at high temperature.

**Auto-Ignition Temperature:** Not available.

**Flash Points:** Not available.

**Flammable Limits:** Not available.

**Products of Combustion:** Some metallic oxides.

**Fire Hazards in Presence of Various Substances:** Non-flammable in presence of open flames and sparks, of shocks, of heat.

### Explosion Hazards in Presence of Various Substances:

Risks of explosion of the product in presence of mechanical impact: Not available.

Risks of explosion of the product in presence of static discharge: Not available.

### Fire Fighting Media and Instructions:

SMALL FIRE: Use DRY chemical powder.

LARGE FIRE: Use water spray, fog or foam. Do not use water jet.

**Special Remarks on Fire Hazards:** When heated to decomposition it emits highly toxic fumes of lead.

**Special Remarks on Explosion Hazards:** Not available.

## Section 6: Accidental Release Measures

### Small Spill:

Use appropriate tools to put the spilled solid in a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and dispose of according to local and regional authority requirements.

### Large Spill:

Use a shovel to put the material into a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and allow to evacuate through the sanitary system. Be careful that the product is not

present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

## Section 7: Handling and Storage

### Precautions:

Keep locked up.. Keep away from heat. Keep away from sources of ignition. Empty containers pose a fire risk, evaporate the residue under a fume hood. Ground all equipment containing material. Do not ingest. Do not breathe dust. Wear suitable protective clothing. If ingested, seek medical advice immediately and show the container or the label. Keep away from incompatibles such as oxidizing agents.

**Storage:** Keep container tightly closed. Keep container in a cool, well-ventilated area.

## Section 8: Exposure Controls/Personal Protection

### Engineering Controls:

Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

**Personal Protection:** Safety glasses. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

### Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

### Exposure Limits:

TWA: 0.05 (mg/m<sup>3</sup>) from ACGIH (TLV) [United States]

TWA: 0.05 (mg/m<sup>3</sup>) from OSHA (PEL) [United States]

TWA: 0.03 (mg/m<sup>3</sup>) from NIOSH [United States]

TWA: 0.05 (mg/m<sup>3</sup>) [Canada] Consult local authorities for acceptable exposure limits.

## Section 9: Physical and Chemical Properties

**Physical state and appearance:** Solid. (Metal solid.)

**Odor:** Not available.

**Taste:** Not available.

**Molecular Weight:** 207.21 g/mole

**Color:** Bluish-white. Silvery. Gray

**pH (1% soln/water):** Not applicable.

**Boiling Point:** 1740°C (3164°F)

**Melting Point:** 327.43°C (621.4°F)

**Critical Temperature:** Not available.

**Specific Gravity:** 11.3 (Water = 1)

**Vapor Pressure:** Not applicable.

**Vapor Density:** Not available.

**Volatility:** Not available.

**Odor Threshold:** Not available.

**Water/Oil Dist. Coeff.:** Not available.

**Ionicity (in Water):** Not available.

**Dispersion Properties:** Not available.

**Solubility:** Insoluble in cold water.

## Section 10: Stability and Reactivity Data

**Stability:** The product is stable.

**Instability Temperature:** Not available.

**Conditions of Instability:** Incompatible materials, excess heat

**Incompatibility with various substances:** Reactive with oxidizing agents.

**Corrosivity:** Non-corrosive in presence of glass.

**Special Remarks on Reactivity:**

Can react vigorously with oxidizing materials.

Incompatible with sodium carbide, chlorine trifluoride, trioxane + hydrogen peroxide, ammonium nitrate, sodium azide, disodium acetylide, sodium acetylide, hot concentrated nitric acid, hot concentrated hydrochloric acid, hot concentrated sulfuric acid, zirconium.

**Special Remarks on Corrosivity:** Not available.

**Polymerization:** Will not occur.

## Section 11: Toxicological Information

**Routes of Entry:** Absorbed through skin. Inhalation. Ingestion.

**Toxicity to Animals:**

LD50: Not available.

LC50: Not available.

**Chronic Effects on Humans:**

CARCINOGENIC EFFECTS: Classified A3 (Proven for animal.) by ACGIH, 2B (Possible for human.) by IARC.

May cause damage to the following organs: blood, kidneys, central nervous system (CNS).

**Other Toxic Effects on Humans:** Slightly hazardous in case of skin contact (irritant), of ingestion, of inhalation.

**Special Remarks on Toxicity to Animals:** Not available.

**Special Remarks on Chronic Effects on Humans:** Not available.

**Special Remarks on other Toxic Effects on Humans:**

Acute Potential:

Skin:

Lead metal granules or dust: May cause skin irritation by mechanical action.

Lead metal foil, shot or sheets: Not likely to cause skin irritation

Eyes:

Lead metal granules or dust: Can irritate eyes by mechanical action.

Lead metal foil, shot or sheets: No hazard. Will not cause eye irritation.

**Inhalation:**

In an industrial setting, exposure to lead mainly occurs from inhalation of dust or fumes.

Lead dust or fumes: Can irritate the upper respiratory tract (nose, throat) as well as the bronchi and lungs by mechanical action. Lead dust can be absorbed through the respiratory system. However, inhaled lead does not accumulate in the lungs. All of an inhaled dose is eventually absorbed or transferred to the gastrointestinal tract. Inhalation effects of exposure to fumes or dust of inorganic lead may not develop quickly. Symptoms may include metallic taste, chest pain, decreased physical fitness, fatigue, sleep disturbance, headache, irritability, reduces memory, mood and personality changes, aching bones and muscles, constipation, abdominal pains, decreasing appetite. Inhalation of large amounts may lead to ataxia, delirium, convulsions/seizures, coma, and death.

Lead metal foil, shot, or sheets: Not an inhalation hazard unless metal is heated. If metal is heated, fumes will be released. Inhalation of these fumes may cause "fume metal fever", which is characterized by flu-like symptoms. Symptoms may include metallic taste, fever, nausea, vomiting, chills, cough, weakness, chest pain, generalized muscle pain/aches, and increased white blood cell count.

**Ingestion:**

Lead metal granules or dust: The symptoms of lead poisoning include abdominal pain or cramps (lead colic), spasms, nausea, vomiting, headache, muscle weakness, hallucinations, distorted perceptions, "lead line" on the gums, metallic taste, loss of appetite, insomnia, dizziness and other symptoms similar to that of inhalation. Acute poisoning may result in high lead levels in the blood and urine, shock, coma and death in extreme cases.

Lead metal foil, shot or sheets: Not an ingestion hazard for usual industrial handling.

### Section 12: Ecological Information

**Ecotoxicity:** Not available.

**BOD5 and COD:** Not available.

**Products of Biodegradation:**

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

**Toxicity of the Products of Biodegradation:** The products of degradation are less toxic than the product itself.

**Special Remarks on the Products of Biodegradation:** Not available.

### Section 13: Disposal Considerations

**Waste Disposal:**

Waste must be disposed of in accordance with federal, state and local environmental control regulations.

### Section 14: Transport Information

**DOT Classification:** Not a DOT controlled material (United States).

**Identification:** Not applicable.

**Special Provisions for Transport:** Not applicable.

### Section 15: Other Regulatory Information

**Federal and State Regulations:**

California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer, birth defects or other reproductive harm, which would require a warning under the statute: Lead

California prop. 65: This product contains the following ingredients for which the State of California has found to cause reproductive harm (female) which would require a warning under the statute: Lead

California prop. 65: This product contains the following ingredients for which the State of California has found to

cause reproductive harm (male) which would require a warning under the statute: Lead  
California prop. 65 (no significant risk level): Lead: 0.0005 mg/day (value)  
California prop. 65: This product contains the following ingredients for which the State of California has found to cause birth defects which would require a warning under the statute: Lead  
California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer which would require a warning under the statute: Lead  
Connecticut hazardous material survey.: Lead  
Illinois toxic substances disclosure to employee act: Lead  
Illinois chemical safety act: Lead  
New York release reporting list: Lead  
Rhode Island RTK hazardous substances: Lead  
Pennsylvania RTK: Lead

**Other Regulations:**

OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).  
EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

**Other Classifications:**

**WHMIS (Canada):** CLASS D-2A: Material causing other toxic effects (VERY TOXIC).

**DSCL (EEC):**

R20/22- Harmful by inhalation and if swallowed.  
R33- Danger of cumulative effects.  
R61- May cause harm to the unborn child.  
R62- Possible risk of impaired fertility.  
S36/37- Wear suitable protective clothing and gloves.  
S44- If you feel unwell, seek medical advice (show the label when possible).  
S53- Avoid exposure - obtain special instructions before use.

**HMIS (U.S.A.):**

**Health Hazard:** 1

**Fire Hazard:** 0

**Reactivity:** 0

**Personal Protection:** E

**National Fire Protection Association (U.S.A.):**

**Health:** 1

**Flammability:** 0

**Reactivity:** 0

**Specific hazard:**

**Protective Equipment:**

Gloves.  
Lab coat.  
Dust respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate.

Safety glasses.

## Section 16: Other Information

**References:** Not available.

**Other Special Considerations:** Not available.

**Created:** 10/10/2005 08:21 PM

**Last Updated:** 11/06/2008 12:00 PM

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**ATTACHMENT C**

**PLAN FOR PREVENTION OF ALCOHOL AND  
DRUG ABUSE**

The following are excerpts from Rhēa’s Office Policy Manual, which addresses the required aspects of an Alcohol and Drug Abuse Prevention Plan.

## **WORKPLACE SEARCH POLICY**

To safeguard our employees, their property, Rhēa Engineers & Consultants, Inc. (Rhēa) clients and Rhēa’s property, and to enforce Rhēa’s policies prohibiting misconduct, including theft and the unlawful use or sale of illegal drugs or alcohol, management may question employees and/or inspect any personal property. Such property includes any area from which Rhēa conducts business, including leased spaces, facilities and/or vehicles, whenever there is reasonable suspicion to believe that any Rhēa policy is being, or has been, violated.

Rhēa may provide offices, desks, vehicles, computers or computer containers, lockers, tools and other items for the use of Rhea’s employees. At all times, these items remain the property of Rhēa. Rhea may also search any work area and/or item whenever there is reasonable suspicion to believe that a Rhēa policy is being, or has been, violated. Employees are expected to cooperate with Rhēa’s workplace searches. Violations of this policy are subject to disciplinary action, including, in the discretion of Rhēa, immediate termination. Employees with questions regarding this policy should contact the president.

## **Substance Abuse**

Rhēa recognizes that individuals, sometimes to an extent that their abilities and senses are impaired, use substances such as alcohol and drugs. Our position regarding substance abuse is the same whether alcohol, marijuana, illegal drugs, prescription drugs, or controlled substances (hereafter referred to as “substances”) are involved.

This policy is implemented because we believe that the impairment of any Rhēa employee due to his or her use of substances is likely to result in the risk of injury to other employees, the impaired employee, or to third parties, such as customers or business guests. Moreover, substance abuse adversely affects employee morale and productivity.

The employee who begins work while impaired or who becomes impaired while at work is guilty of a major violation of company rules and is subject to severe disciplinary action. Severe disciplinary action can include suspension, dismissal, or any other penalty appropriate under the circumstances. Likewise, the use, possession, transfer, or sale of any substance on company premises or in any Rhēa parking lot, storage area, or job site is prohibited.

Violations are subject to severe disciplinary action. In all instances, the disciplinary action to be administered shall be at the sole discretion and determination of the company.

Employees who are taking prescription drugs shall report this to their supervisor/manager. This is for the protection of the employee and for safety purposes in case of an adverse reaction to the drug while at work, so the employee is not falsely accused of taking an illegal substance.

When an employee is involved in the use, possession, transfer, or sale of a substance in violation of this policy, the company may notify appropriate authorities. Such notice will be given only after such an incident has been investigated and reviewed by the employee's supervisor.

Nothing contained in this section shall eliminate or modify the company's right to terminate any employee at any time for any reason.

## **Drug Testing**

Rhēa is committed to providing a safe, efficient, and productive work environment for all employees. Using or being under the influence of drugs or alcohol on the job may pose serious safety and health risks. To help ensure a safe and healthful working environment, certain job applicants may be asked to provide body substance samples (such as urine and/or blood) to determine the illicit or illegal use of drugs and alcohol.

Employees and applicants who operate company owned vehicles, equipment, and machinery may be required to demonstrate that they are drug and alcohol free.

Employees involved in work-related accidents that involve vehicles may also be subject to drug or alcohol tests. Rhēa reserves the right to conduct workplace drug and alcohol testing.

## **Drug-Free Workplace Act of 1988**

The Drug-Free Workplace Act of 1988 requires some Federal contractors and all Federal grantees to agree that they will provide drug-free workplaces as a precondition of receiving a contract or grant from a Federal agency. Rhēa subscribes to the philosophies of this Act.

**ATTACHMENT D**

**RESPIRATORY PROTECTION PROGRAM**



## HEALTH & SAFETY POLICIES MANUAL

<b>TITLE: RESPIRATORY PROTECTION PROGRAM</b>		<b>NO: HS-11</b>
<b>DATE: JULY 14, 2005</b>	<b>SUPERSEDES: FEBRUARY 18, 2005</b>	<b>PAGE: 1 OF 10</b>

### 11.1 GENERAL POLICY STATEMENT

It is the policy of Rhēa to provide respiratory protection to individuals as required by the job specific requirements and/or site specific Health and Safety Plan (HASP). The elements of this program are also applicable to all situations where respirators are worn by employee's choice.

### 11.2 PROCEDURES

#### 11.2.1 Respirator Approval

- 11.2.1.1 Only respirators that meet the approval requirements of the National Institute for Occupational Safety and Health (NIOSH) and/or the Mining Safety and Health Administration (MSHA) may be used to control harmful exposures.
- 11.2.1.2 Approved respirators are to be used only to protect against those substances for which they are designed.
- 11.2.1.3 Individuals shall be approved to wear respirators by CHS only after it has been verified that they have been properly trained, medically evaluated, and fit-tested.
- 11.2.1.4 Individuals shall only wear respiratory protection for which they have been approved.

#### 11.2.2 Respirator Selection

- 11.2.2.1 Rhēa will provide respirators, at no cost to the employee, when such equipment is necessary to protect the health of the employee.
- 11.2.2.2 RHĒA WILL NOT SUPPLY CONTRACTORS WITH RESPIRATORY PROTECTION EQUIPMENT. Contractors must comply with all applicable regulations and the HASP.
- 11.2.2.3 Respirators are classified and selected on the basis of their design to protect the wearer from specific air contamination hazards. The selection takes into consideration the physical, chemical, and physiological properties of the contaminant and the concentration expected to be encountered. Selection of respirators shall be made according to the guidance of American National Standards Institute (ANSI) Practices for Respiratory Protection Z88.2.



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11.2.2.4 Potential air contamination hazards are determined by CHS, on the basis of site characterization information, including chemical identification and concentrations job activities, job location, and historically valid industrial hygiene monitoring data.

11.2.2.5 CHS will specify the type of respiratory protection equipment, including cartridges.

11.2.2.6 Rhēa's approach to Air Purifying Respirator (APR) use shall be as follows:

A. Specifically, APR's shall be donned by exposed personnel, as prescribed in the site specific HASP, when sustained personal exposure levels in the worker's breathing zone reach 50% of the OSHA Permissible Exposure Level (PEL) or American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Value (TLV).

B. Work stoppage shall occur and CHS shall be immediately consulted when:

- the PEL is reached after protection factors for donned respirator protective equipment have been accounted for;
- the atmosphere contains less than 19.5% or more than 23.5% oxygen;
- 10% of the Lower Explosive Limit (LEL) exists in a confined space; or
- 20% of the Lower Explosive Limit (LEL) exists in an open area.

C. APRs shall not be used in an Immediately Dangerous to Life and Health (IDLH) environment.

D. APRs shall not be used when chemicals do not have adequate warning properties.

E. APRs shall not be used in an environment in with chemical concentrations in the air greater than the Maximum Use Concentration (MUC) for which the respirator and cartridge system are approved.



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11.2.2.7 The protection factor is a ratio of the air contaminant concentration outside the respirator to the air contaminant concentration inside the respirator facepiece. The following respirator protection factors shall be used for respirators with a quantitative fit test:

<b>Airborne Contaminant</b>	<b>Minimum Protection Required</b>
< 10 X PEL	Half-mask, air purifying respirator (APR) with appropriate cartridges
< 50 X PEL	Full-face APR or powered air-purifying respirator (PAPR) with appropriate cartridges
< 2,000 X PEL	Supplied air respirator (SAR) with full facepiece, operated in pressure-demand mode.
<10,000 PEL or	SAR with full facepiece, operated in pressure demand mode with escape bottle or SCBA operated in pressure demand mode.

11.2.2.8 Protection factor for any respirator with a qualitative fit test is assumed to be 10

11.2.2.9 Contact lenses shall not be worn with respirators.

### **11.2.3 Respirator Fit-Testing**

11.2.3.1 Any employee who is assigned a respirator will be given the opportunity to wear the respirator in a contaminant-free environment and be qualitatively fit-tested prior to using the respirator.

11.2.3.2 Qualitative fit-testing shall be performed by the HSD at the time of initial fitting and annually thereafter, for each worker who wears a negative or positive pressure respirator. Results will be noted on Respiratory Authorization Form (HS 11-1). Employees who work with asbestos containing materials shall be fit tested every six months.



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- 11.2.3.3 Qualitative fit-testing will be performed by the HSD using irritant smoke or isoamyl acetate (banana oil). The qualitative fit-test is used to determine the fit of the respirator to the individual's face. If available, a more accurate quantitative fit-testing may be conducted. For the fit test, subjects shall be instructed to do the following exercises for one minute each while the respirator is being challenged with irritant smoke and/or banana oil: 1) breath normally 2) breath deeply, 3) turn head side to side, 4) nod up and down, 5) jog in place, 6) breath normally, and 7) read the *"Rainbow Passage"* – *"When the sunlight strikes raindrops in the air, they act like a prism and form a rainbow. The rainbow is a division of white light into many beautiful colors. These take the shape of a long round arch, with its path high above, and its two ends apparently beyond the horizon. There is, according to legend, a boiling pot of gold at one end. People look, but no one ever finds it. When a man looks for something beyond his reach, his friends say he is looking for the pot of gold at the end of the rainbow."*
- 11.2.3.4 Employees shall only wear respirators for which they have been successfully fitted.
- 11.2.3.5 Employees shall check the fit of their respirator each time they don it.
- 11.2.3.6 The face seal/fit determines the quality of protection. This seal can be lost easily due to facial hair, respirator deterioration, or damage.
- 11.2.3.7 A respirator shall not be worn if facial hair interferes with the face piece seal or the valve function.
- 11.2.3.8 If a spectacle, goggle, face shield, or helmet must be worn with a face piece, it shall be worn so as not to adversely affect the facepiece seal.
- 11.2.3.9 The HSD will issue a "Respirator User Certificate" (Form HS 11-2) to document that they have been approved and fit-tested for a respirator. A copy of the certificate shall be maintained/filed by the HSD and a copy shall be forwarded to CHS.



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### 11.2.4 Respirator Use

- 11.2.4.1 Respirators shall be issued to individual employees for their personal use upon approval by the HSD. It is the employee's responsibility to ensure that their respirator is properly used, inspected maintained, and stored in accordance with this procedure.
- 11.2.4.2 Prior to donning the respirator, it must be inspected for signs of degradation or damage in accordance with Section 11.2.6. It also must be examined for cleanliness and that the appropriate cartridges are available.
- 11.2.4.3 Upon donning the respirator, a negative/positive pressure check test must be conducted.
- 11.2.4.4 Defective or ill-fitting respirators must not be worn.
- 11.2.4.5 Air monitoring shall be conducted and documented to ensure the level of respiratory protection being used is appropriate and adequate.
- 11.2.4.6 Respirator cartridges may be used for a maximum of 8 hours in a contaminated atmosphere. At the end of 8 hours of use or the end of the work shift, the cartridges should be disposed of properly. Cartridges may need to be replaced sooner if "breakthrough" is detected or if excessive resistance to breathing is encountered.

### 11.2.5 Breathing Air Quality - Supplied Air Respirators

- 11.2.5.1 Compressed air used for respiration shall be of high purity. Breathing air shall meet at least the requirements of the specification for Grade D breathing air as described in Compressed Gas Association Commodity Specification G-7-1996. Compressed oxygen shall not be used in supplied-air respirators or in open circuit self-contained breathing apparatus that have previously used compressed air. Oxygen must never be used with airline respirators.
- 11.2.5.2 Breathing air may be supplied to respirators from cylinders or air compressors.



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- 11.2.5.3 Cylinders shall be tested and maintained as prescribed in the Shipping Container Specification Regulations of Department of Transportation (49 CFR Part 178).
- 11.2.5.4 The compressor for supplying air shall be equipped with necessary safety and standby devices. A breathing air-type compressor shall be used. Compressors shall be constructed and situated so as to avoid entry of contaminated air into the system and suitable in-line air purifying sorbent beds and filters installed to further assure breathing air quality. A receiver of sufficient capacity to enable the respirator wearer to escape from a contaminated atmosphere in the event of compressor failure, and alarms to indicate compressor failure and overheating shall be installed in the system. If an oil-lubricated compressor is used, it shall have a high temperature or carbon monoxide alarm, or both. If only a high temperature alarm is used, the air from the compressor shall be tested weekly for carbon monoxide to insure that it meets the specifications in paragraph (d)(1) of this section. Records of the results of such tests shall be maintained for the previous six months. Alarm systems shall be tested at least monthly.
- 11.2.5.5 Air line couplings shall be incompatible with outlets for other gas systems to prevent inadvertent servicing of airline respirators with nonrespirable gases or oxygen.
- 11.2.5.6 Breathing gas containers shall be marked to identify the material contained.
- 11.2.5.7 The air pressure at the hose connection to positive-pressure respiratory equipment shall be for the range specified in the approval of the equipment.
- 11.2.5.8 In areas where the wearer, with failure of the respirator, could be overcome by a toxic or oxygen-deficient atmosphere, or in IDLH atmospheres an additional person must be present. Communications shall be maintained between both or all individuals present. Planning shall be such that one individual will be unaffected by any likely incident and have the proper rescue equipment to be able to assist the others in case of emergency.



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11.2.5.9 Persons using airline respirators in IDLH atmospheres shall be equipped with safety harnesses and safety lines. A stand-by person with suitable self-contained breathing apparatus shall be at the nearest fresh air base for emergency rescue. Refer to the requirements referenced in HS-13, Permit-Required Confined Space Entry.

### 11.2.6 Respirator Inspection and Maintenance

11.2.6.1 Respirators shall be inspected before and after use and during cleaning for defects and proper functioning. The components, which should be inspected, and the appropriate corrective actions are summarized as follows:

- A. Excessive dirt - clean dirt from face piece;
- B. Cracks, tears or holes - obtain new face piece;
- C. Distortion - obtain new face piece;
- D. Cracked, scratched or loose-fitting lens - obtain replacement lens or obtain new face piece;
- E. Missing or worn gaskets - obtain replacement gaskets from manufacturer;
- F. Worn threads on cartridges or on facepiece - replace cartridges or facepiece, as applicable;
- G. Cracks or dents in cartridges - obtain new cartridges;
- H. Missing or loose clamps - obtain new clamps; and
- I. Torn, or missing exhalation or inhalation valves - replace valves (from manufacturer).

11.2.6.2 Repair or replacement of component parts must be done by a qualified individual. Substitution of parts from a different brand or type of respirator will invalidate the approval of the respirator. All repairs or replacements must be documented on a Respirator Maintenance Form (Form HS 12-3).

11.2.6.3 Respirators which are used for emergency purposes (i.e., SCBAs) must be inspected on a monthly basis, and a record of the inspection should be maintained.



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11.2.6.4 Respirators issued for the exclusive use of an individual shall be cleaned and disinfected after each day's use, or more often if necessary.

11.2.6.5 The respiratory cleaning and disinfection procedure is as follows:

- A. Respiratory equipment shall be washed with detergent in warm water using a brush or wiped thoroughly with a chem-wipe followed by the use of a spray cleaner.
- B. Organic solvents should not be used as they deteriorate the rubber face piece.
- C. If possible, detergents containing a bactericide should be used. If bactericide detergents are not available, the detergent wash should be followed with a disinfecting rinse.
- D. Two types of disinfectants may be made from readily available household solutions. A two-minute immersion of the respirator into either solution would be sufficient for disinfection.
  - 1. A hypochlorite solution (50 ppm) can be made by adding two tablespoons of chlorine bleach to one gallon of water.
  - 2. An aqueous solution of iodine (50 ppm) can be made by adding one teaspoon of iodine to one gallon of water.
- E. Respiratory equipment should be thoroughly rinsed in warm, clean water (120° F maximum) to remove traces of detergent, cleaner sanitizer, and disinfectant.
- F. Respiratory equipment should be allowed to air dry in a clean location.

11.2.6.6 When not in use, respiratory equipment should be sealed in plastic bags and stored in a single layer with the facepiece and exhalation valve in a nondistorted position.

### 11.2.7 Program Evaluation

Random inspections/audits shall be conducted by the PM and/or HSD to assure that respirators are properly selected, used, cleaned, and maintained.



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### 11.3 MEDICAL SURVEILLANCE

11.3.1 Rhēa will require and provide appropriate medical evaluations for those persons who are required to perform work, which involves the use of respiratory protective equipment.

11.3.2 Persons shall not be assigned to tasks requiring the use of respirators until it has been determined by a licensed physician that they are physically able to perform the required work while wearing a respirator according to HS-9 Medical Surveillance Program. The medical status of persons assigned use of respiratory equipment should be reviewed at least annually.

### 11.4 TRAINING REQUIREMENTS

11.4.1 Employees required to use a respirator shall be trained in the selection, fitting use, and care of respirators. This training shall include:

11.4.1.1 Verbal and written instructions in the nature of the hazard to ensure comprehension and standardization;

11.4.1.2 Discussion of selection procedures and respirator protection levels;

11.4.1.3 Respirator function and susceptibility for a specific job or application, capability of the respirator and limitations of the selected respirator;

11.4.1.4 Instructions in proper inspection maintenance and storage procedures;

11.4.1.5 Discussion of administrative and engineering controls available and the need for respirators to control exposures;

11.4.1.6 Review of regulatory and/or advisory limits established for the specific substances for which respiratory protective equipment is selected, (PELs, TLVs); and

11.4.1.7 Instructions on recognizing and responding to emergency situations.

11.4.2 The training shall be provided by the HSD initially upon assigning a respirator to an individual. The training shall also be reviewed with affected employees during the OSHA HAZWOPER 8-Hour Refresher training.



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11.4.3 Training in the use of supplied air respirators shall include familiarization with donning and doffing procedures, alarms, regulators, leak check procedures, emergency operation requirements, maintenance, cleaning, inspection, repair, functional testing, cylinder maintenance requirements, cold weather maintenance, storage, and manufacturer overhaul frequency. The Project Manager will assess assigned employees familiarity with the job tasks to be performed and the Supplied Air Respirator (SAR) to be used and provide training to ensure participating staff is knowledgeable in the specific SAR system used.

11.4.4 The training shall be documented on the "Respirator User Certificate" form. A copy of the form shall be provided to the employee and to CHS and the original shall be maintained in the offices' H&S files

### **11.5 RECORDKEEPING AND DOCUMENTATION**

11.5.1 Medical surveillance documentation shall be maintained by CHS.

11.5.2 Exposure measurements shall be documented and maintained with the project health and safety files.

11.5.3 Training and fit testing shall be documented and maintained with the project health and safety files. All training documentation shall be forwarded to Corporate Health and Safety and will include the name, dates of training, training agenda, trainers name, and signature.

11.5.4 Equipment maintenance and inspection records shall be maintained by the equipment manager.

## **ATTACHMENT E**

# **HAZARD COMMUNICATION PROGRAM**



## HEALTH & SAFETY POLICIES MANUAL

<b>TITLE: HAZARD COMMUNICATION PROGRAM</b>		<b>NO: HS-16</b>
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### 16.1 GENERAL POLICY STATEMENT

It is Rhēa's policy to provide its employees with a healthy, safe and productive work environment. In an effort to achieve this goal, Rhēa has developed this Hazard Communication Program designed to inform employees of the hazardous chemicals in the work place and to comply with the Federal Occupational Health and Safety Administration (OSHA) regulation, 1910.1200 - Hazard Communication, referred to as the "Worker Right-to-Know Law." This program is also designed to ensure that all employees have adequate training and information about the potential hazards associated with the hazardous chemicals in the work area.

### 16.2 DEFINITIONS

#### 16.2.1 Hazardous Chemical

- 16.2.1.1 OSHA defines a hazardous chemical as any chemical, which is a physical hazard or a health hazard.
- 16.2.1.2 Physical hazards include chemicals, which are combustible liquids, compressed gases, explosive, flammable, organic peroxides, and oxidizers, pyrophoric, unstable, or water-reactive.
- 16.2.1.3 Health hazards include chemicals which are carcinogens, toxic or highly toxic agents: reproductive toxins, irritants, corrosives, sensitizers, hepatotoxins, nephrotoxins, neurotoxins, agents which act on the hematopoietic system, and agents which damage the lungs, skin, eyes, or mucous membranes.
- 16.2.1.4 "Hazardous waste," as defined by RCRA and regulated by the EPA, is exempt from the Hazard Communication Program because it is covered in the HAZWOPER standard 29 CFR 1910.120.
- 16.2.1.5 Consumer products containing hazardous substances are exempt if it can be demonstrated that the products are used in the workplace in the same manner as in normal consumer use, and which use results in no greater exposure than that experienced by consumers.
- 16.2.1.6 A chemical mixture shall be assumed to present the same health hazards as each of its components if the components comprise at least 1% of the mixture (or, for carcinogens, at least 0.1%).

#### 16.2.2 Hazard Warning

A hazard warning refers to any words, pictures, and symbols appearing on a label, which convey the hazard(s) of the chemical(s) in the container.



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### 16.2.3 Material Safety Data Sheet (MSDS)

A MSDS is a written document, prepared in accordance with OSHA requirements, that provides the following information: the material's identity, hazardous ingredients, cancer-causing ingredients, physical and chemical hazards, health hazards, exposure limits, primary entry routes, target organs, medical problems/complications, precautions and safety equipment, and emergency and first aid procedures.

## 16.3 RESPONSIBILITIES

### 16.3.1 Corporate Health & Safety

Corporate Health and Safety (CHS) is responsible for implementing the hazard communication program and reviewing the program to remain current with all Hazard Communication requirements.

CHS is responsible for interpreting the physical and health hazard information specified on materials introduced in the work area.

CHS shall work with the Office Administrator (OA) to maintain a current and complete master MSDS file. All new or revised MSDSs shall be forwarded to CHS, and a working copy shall be maintained for the work area/employees by the Project Manager.

CHS shall conduct periodic inspections of work areas to verify containers of chemicals are properly labeled and that MSDSs are readily available for them.

### 16.3.2 Office Administrator

The Office Administrator (OA) will maintain for each office a binder containing MSDS for chemicals used in the office.

The OA shall establish with the assistance of the HSD, if necessary, a chemical inventory for the office. The chemical inventory will be updated as necessary to ensure it is current and will include any garage or off-site storage areas which are maintained by the office and may have chemical products used or stored there.

The OA shall coordinate providing Hazard Communication training to new Rhēa employees and temporary workers.

### 16.3.3 Project Manager

The Project Manager (PM) shall ensure employees have received adequate training regarding the hazards of the materials used on the project. Any training,



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which is provided to satisfy this requirement, will be documented and a copy will be forwarded to Corporate Health and Safety.

The PM shall maintain a readily available MSDS file for all hazardous materials used in or on jobs for which the PM is responsible.

The PM shall advise employees of the location of Material Safety Data Sheets for the project site.

The PM is responsible for requesting assistance from CHS in addressing any hazardous condition in facilities, equipment, or field operations.

The PM is responsible for informing contractors before beginning work on any hazardous substance that may be encountered during the job and precautions to be taken.

The PM shall ensure that containers of hazardous chemicals used on the project are properly labeled.

### **16.3.4 Employee**

Employees are responsible for knowing the location of the master file of Material Safety Data Sheets.

Employees must verify that containers of hazardous chemicals are properly labeled. Employees transferring hazards to portable containers are responsible for either labeling the portable containers or using up the chemical within the same work shift.

Employees buying chemicals must request a MSDS from the manufacturer, importer, or distributor of any chemical at the time of purchase. Employees must forward all MSDSs to CHS.

Employees are required to read and understand the MSDSs for chemicals they work with.

### **16.3.5 Contractor**

If applicable, Rhēa will provide information and MSDSs to contractor personnel apprising them of hazards in the work place.



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### 16.4 PROCEDURES

#### 16.4.1 Material Safety Data Sheet (MSDS)

- 16.4.1.1 A MSDS must be on-site and readily available for employee review to ensure an understanding of the chemical and physical hazards associated with the chemicals in the work place.
- 16.4.1.2 CHS shall maintain the current MSDSs in a master file along with a list of the chemical inventory. The chemical inventory list must identify the materials as they appear on the MSDSs.
- 16.4.1.3 CHS shall prepare an adequate number of manuals containing copies of the current MSDSs and chemical inventory list to ensure that they are readily available for employees in various work areas (including offices, warehouses, and project sites.) The manuals and chemical inventory list shall be organized (i.e. alphabetically or with identification numbers) to facilitate retrieval of a particular MSDS.
- 16.4.1.4 When new MSDSs are received, they shall be forwarded to CHS review, evaluation, and inclusion in the MSDS master file and manuals.
- 16.4.1.5 If a MSDS is not available for a hazardous chemical present in the work area, the manufacturer or vendor must be notified by request and a MSDS must be forwarded immediately (via fax or e-mail). The request for MSDS should be documented.
- 16.4.1.6 If a MSDS is updated with new information, replace the original MSDS with the revised one and file the outdated MSDS in a separate file.
- 16.4.1.7 Do not discard obsolete MSDSs because they are considered to be employee exposure records and must be retained in accordance with OSHA's recordkeeping requirements.

#### 16.4.2 Hazardous Chemical Labeling

- 16.4.2.1 Each container of hazardous chemicals must be labeled with at least the following information:
  - A. Identity of the hazardous chemical(s); and
  - B. Appropriate hazard warnings. Target organ toxic effect information is not required on the labels as long as MSDSs are readily available.
- 16.4.2.2 Portable containers (that is, containers into which hazardous chemicals are transferred from labeled containers) do not require labeling if the



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container will be used only by the employee who transferred the chemical into it, and the container will be empty by the end of that employee's shift.

16.4.2.3 Existing labels on incoming containers of hazardous chemicals shall not be removed or defaced.

16.4.2.4 If existing labels are damaged or become illegible, then the containers shall be immediately marked with the required information.

### 16.4.3 Chemical Inspections

CHS shall assign an employee in each office to perform audits of chemical use storage container labeling practices. These periodic (i.e., monthly) inspections and audits should be conducted for the work areas and project sites to verify that containers of hazardous chemicals are properly labeled, that MSDSs are readily available, and that employees working with chemicals are knowledgeable of the associated hazards.

### 16.4.4 Hazards of Non-Routine Tasks

Employees and contractors shall be informed of the hazards associated with non-routine tasks in accordance with the site specific Health and Safety Plan (HASP) prepared for the project.

### 16.4.5 Work By Outside Contractors

16.4.5.1 Employees of outside Contractors performing work at Rhēa must be informed of any hazardous substance they may encounter during the job. The Project Manager shall meet with the Contractor and provide such information prior to the initiation of work. This information shall include the possible need for personal protective equipment that the Contractor must provide. Upon request, Rhēa will provide Material Safety Data Sheets, or other hazard information on hazardous materials that may pose an exposure risk to Contractor employees.

16.4.5.2 Contractors using hazardous chemicals that may expose Rhēa employees must have MSDSs available for review. Controls shall also be provided to eliminate unnecessary exposure to Rhēa employees from hazardous chemicals used by the Contractor. When such exposures cannot be effectively eliminated, contract work may have to be performed during nonoperating periods.



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16.4.5.3 It is the responsibility of Rhēa personnel contract outside services to assure that the above is followed.

### 16.5 TRAINING REQUIREMENTS

- 16.5.1 New employees shall be trained on the elements of the hazard communication program and on the hazards associated with the chemicals used in the work area during their initial orientation. This initial Hazard Communication training shall be conducted by CHS (or employee's supervisor), and the subsequent chemical hazard specific to the project shall be provided by the employee's supervisor or Project Manager. All training records should be forwarded to CHS.
- 16.5.2 Annual Hazard Communication training will also be provided for field personnel during the annual 8-hour Hazardous Waste Operations Refresher training.
- 16.5.3 Whenever a new hazard is introduced into the work area, the new information shall be provided to employees during tailgate training or a "Tech-Transfer" session.
- 16.5.5 Each training session shall be fully documented with the date, name of trainer, material covered and employee signature. Documentation must include date of class, persons attending, and material covered. The training records shall be maintained by the CHS.
- 16.5.6 The Hazard Communication training shall include the following elements:
- A. The requirements of this procedure and 29 CFR 1910.1200;
  - B. The location of hazardous chemicals in the work areas, including processes that release hazardous chemicals;
  - C. The location and availability of the following:
    1. The written Hazard Communication Program.
    2. The Chemical Inventory or List of Hazardous Substances for their work area.
    3. Material Safety Data Sheets for their own work area.
  - D. How to observe and detect the release or presence of a hazardous substance;
  - E. An explanation of the physical and health hazards associated with the materials in use;



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- F. Measures to be used to protect oneself against exposure to hazardous substances including the use of proper work practices and the use of personal protective equipment and clothing
- G. Emergency procedures for the handling of accidental releases of hazardous substances including:
  - Leaks and spills;
  - Fire extinguishing (portable extinguisher use);
  - Reporting emergencies; and
  - Use of emergency eye wash/shower and other first aid equipment.
- H. Explanation of the labeling system;
- I. Explanation of the Material Safety Data Sheet; and
- J. A review of the Rhēa Hazard Communication program and its requirements.

## **ATTACHMENT F**

### **HEAT/COLD STRESS MONITORING PLAN**



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### 22.1 GENERAL POLICY STATEMENT

It is the policy of Rhea to establish guidelines for work in environments where exposure to heat and cold stress are encountered and to provide guidance to evaluate and control these stressors.

### 22.2 HEAT STRESS PROCEDURES

- 22.2.1 The effects of heat stress are dependent on a number of factors. These factors include the source of heat, whether it is radiant heat from an industrial process, or ambient temperature with or without sun loads, the type of work performed, duration of work activity, relative humidity, age and physical condition of the worker and the type of clothing worn (e.g., impervious clothing vs. standard Level D work attire).
- 22.2.2 Given the variety of factors which can result in the development of a heat-related disorder, the following guidelines can be used to implement a work/rest regime based on the Permissible Heat Exposure Threshold Limit Value (MV) published by the American Conference of Governmental Industrial Hygienists (ACGIH). The work/rest regime is based on exposure to an acclimatized fully-clothed worker wearing breathable (cotton) attire, with adequate water and dietary salt intake, and capable of functioning effectively under the given working conditions without exceeding a deep body temperature (BT) of 100.4° F. The actual rest periods and frequency will be dependent on the worker's level of acclimatization, the type of heat stress environment encountered (e.g., radiant vs. solar load), use of protective clothing and type of work performed.
- 22.2.3 The permissible heat exposure Threshold Limit Values are presented in Table 22-1 as a guide to monitor and control worker exposure for heat stress environments. Heat stress values presented in parentheses are adjusted for workers wearing impermeable protective clothing. The measurement of body BT is impractical in the field to determine a workers heat load, however, the measurement of environmental factors using the Wet Bulb Globe Temperature (WBGT) index will correlate with BT. Heat stress measurement using the Wet Bulb Globe Temperature index on which the TLV is based is presented in Section 22.3.



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### 23.2.3.1 Definitions of workload categories:

- A. Light Work Load - sitting, standing to control machines, performing light hand and arm work.
- B. Moderate Work Load - walking about with moderate lifting and pushing.
- C. Heavy Work Load - pick and shovel work
- D. Rest periods will involve minimal physical activity and should be taken in shaded areas.

**Table 22-1  
Permissible Heat Exposure Threshold Limit Values Applicable to Workers Wearing Permeable Clothing**

<b>WORK – REST REGIMEN</b>	<b>WORKLOAD</b>		
	<b>Light</b>	<b>Moderate</b>	<b>Heavy</b>
Continuous Work (100%)	86 (76) °F	80 (70) °F	77 (67) °F
75% Work - 25% Rest, each hour	87 (77) °F	82 (72) °F	79 (68) °F
50% Work - 50% Rest, each hour	89 (78) °F	85 (75) °F	82 (72) °F
25% Work - 75% Rest, each hour	89 (80) °F	88 (78) °F	86 (76) °F

Note : Measurements are presented in ° F WBGT

() Represent Heat Exposure TLVs for Workers Wearing Impermeable Protective Clothing

### 22.3 HEAT STRESS MEASUREMENT

The method of heat stress measurement required to assess the permissible heat exposure TLV is by the Wet Bulb Globe Temperature index. This technique is the most practical method to evaluate environmental factors, which most nearly correlate with deep body temperature and other physiological responses to heat.

22.3.1 WBGT measurements can be made with a Reuter-Stokes, or equivalent, direct reading Heat Stress Monitor. This instrument measures dry bulb temperature, natural aspirated wet bulb temperature, and Vernon globe equivalent temperature and calculates the Wet Bulb Globe Temperature



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Index (formula presented in Section 22.3.2). An alternate method of measuring the WBGT Index using dry, natural wet bulb and globe temperature is presented in the ACGIH Threshold Limit Values for Chemical Substances and Physical Agents under *Heat Stress: Evaluation and Control*.

22.3.2 WBGT values are calculated using the following formula:

A. Outdoors with solar load:

$$\text{WBGT} = 0.7\text{NWB} + 0.2\text{GT} + 0.1\text{DB}$$

B. Indoors or Outdoors with no solar load:

$$\text{WBGT} = 0.7 \text{ NWB} + 0.3 \text{ GT}$$

WBGT = Wet Bulb Globe Temperature Index

NWB = Natural Wet Bulb Temperature

DB = Dry Bulb Temperature

GT = Globe Temperature

### 22.4 RECOGNITION AND TREATMENT OF HEAT RELATED ILLNESSES

#### 22.4.1 Heatstroke

22.4.1.1 Condition: (a) hot dry skin: red, mottled, or cyanotic; (b) high and rising core temperature, 105° F and over; (c) brain disorders: mental confusion, loss of consciousness, convulsions, or coma, as core temperature continues to rise. Fatal if treatment delayed.

22.4.1.2 Predisposing Factors: (a) Sustained exertion in heat by unacclimatized workers; (b) obesity and lack of physical fitness (c) recent alcohol intake; (d) dehydration; (e) individual susceptibility; (f) chronic cardiovascular disease in the elderly.

22.4.1.3 Corrective Actions: Immediate and rapid cooling by immersion in chilled water with massage, or by wrapping in wet sheet with vigorous fanning with cool dry air. Avoid overcooling. Treat shock if present. Seek medical attention.

22.4.1.4 Prevention: Medical screening of workers. Selection based on health and physical fitness. Acclimatization for 8 to 14 days by graded work and heat exposure. Monitoring workers during sustained work in severe heat environments.



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### 22.4.2 Heat Syncope

- 22.4.2.1 Clinical Features: Fainting while standing and immobile in heat.
- 22.4.2.2 Predisposing Factors: Lack of acclimatization.
- 22.4.2.3 Treatment: Remove to cooler area. Seek medical attention.
- 22.4.2.4 Prevention: Acclimatization.

### 22.4.3 Heat Exhaustion

- 22.4.3.1 Clinical Features: (a) Fatigue, nausea, headache, giddiness; (b) skin clammy and moist, complexion pale, muddy, or with hectic flush; (c) may faint on standing, with rapid pulse and low blood pressure.
- 22.4.3.2 Predisposing Factors: (a) Sustained exertion in heat, (b) lack of acclimatization, (c) failure to replace water and/or salt lost in sweat.
- 22.4.3.3 Treatment: Remove to cooler environment. Provide salted fluids such as Gatorade or equivalent. Seek medical attention.
- 22.4.3.4 Prevention: Acclimatize workers using a breaking-in schedule or 1 or 2 weeks. Supplement dietary salt only during acclimatization. Ample drinking water (Gatorade or equivalent) is to be available at all times and taken frequently during workday.

### 22.4.4 Heat Cramps

- 22.4.4.1 Clinical Features: Painful spasms of muscles used during work (arms, legs, or abdominal). Onset can occur during or after work hours.
- 22.4.4.2 Predisposing Factors: (1) Heavy sweating during hot work, (2) drinking large volumes of water without replacing salt
- 22.4.4.3 Treatment: Drinking liquids with salt supplement such as Gatorade or equivalent. Seek medical attention.
- 22.4.4.4 Prevention: Adequate salt intake with meals. In unacclimated personnel, provide salted (0.1 percent) drinking water.



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### 22.4.5 Heat Rash

22.4.5.1 Clinical Features: Profuse tiny raised red blisters on affected areas. Pricking sensations during heat exposure.

22.4.5.2 Predisposing Factors: Unrelieved exposure to humid heat with skin continuously wet with unevaporated sweat.

22.4.5.3 Treatment: Seek medical attention

22.4.5.4 Prevention: Cooled resting and sleeping quarters to allow skin to dry between heat exposures.

### 22.5 HEAT STRESS PREVENTION

22.5.1 Working in a hot environment requires that employees take precautions and provide adequate protection to prevent heat stress. The following are guidelines to recognize and prevent heat stress conditions.

22.5.1.1 Make staff assignments for work involving physical labor and/or involving heat stress, based on physical fitness level of available labor pool. Employees newly exposed to heat should begin their work level at 50% of suggested work schedule and increase level by 10% per day to allow for acclimatization.

22.5.1.2 Supervision and "buddy system" should be used to carefully observe workers in heat stress environments to evaluate each individual's susceptibility to heat stress. Any behavior exhibiting signs of heat stress should be promptly investigated.

22.5.1.3 Modified Dry Bulb Index takes into consideration the effects caused by solar load, air temperature and the use of personal protective equipment used under light workload conditions. A mercury thermometer is used to measure ambient air temperature and must be shielded from direct sunlight. The Sunshine Quality Factor (SQF) is estimated as a percentage of sunshine, e.g. 100% sunshine= 1.0 SQF, 75% cloud cover=0.25 SQF. The adjusted temperature, in °F is calculated using the following formula:

$$\text{Temp. (°F, adjusted)} = \text{Temp. (°F, actual)} + (13 \times \text{SQF})$$



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After the adjusted temperature has been calculated, the length of the first work shift can be determined using the following table.

**Table 22-2  
Recommended Frequency of Physiological Monitoring  
for Fit and Acclimated Workers**

Adjusted Temperature	Normal Work Clothes-Level D	Impermeable Protective Clothing
>90 °F	After each 45 minutes of work	After each 15 minutes of work
87.5 - 90 °F	After each 60 minutes of work	After each 30 minutes of work
82.5 - 87.5 °F	After each 90 minutes of work	After each 60 minutes of work
77.5 - 82.5 °F	After each 120 minutes of work	After each 90 minutes of work
72.5 - 77.5 °F	After each 150 minutes of work	After each 120 minutes of work

22.5.1.4 Rest periods should be taken in a shaded area if available, as this will considerably reduce the effects of heat stress.

- A. When temperatures reach above 70° F, the site supervisor or SSO will monitor the heart rate of each working employee. Refer to the above table for the suggested frequency of physiological monitoring and follow the heart rate monitoring procedure described below in Section B.
- B. An individual's radial pulse heart rate should be measured during a 30 second period as early as possible in the rest break. The frequency of physiological monitoring depends on the air temperature adjusted for solar radiation and the level of physical work. Reference the above table for the suggested frequency of physiological monitoring for fit and acclimatized workers. The length of the work cycle will be dependent upon the frequency of the required physiological monitoring.

22.5.1.5 Provide plenty of water and/or other drink, which replenishes electrolytes (e.g.: Gatorade) at each rest period. Generally, salt intake is sufficient from dietary intake; however, the best way to compensate for excessive sweat loss is to drink replacement fluids, which contain electrolytes, including salt, such as



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Gatorade, or equivalent. Alternately, a little extra salt in the diet can accomplish the same thing. Salt tablets should not be used. Workers on a low sodium diet should consult with their physician prior to engaging in work in heat stress environments.

22.5.1.6 Protective clothing inhibits the transfer of heat between the body and the surrounding environment. This can increase the onset of heat stress symptoms. Undergarment selection is typically at the discretion of the employee, however, should heat rash occur it is recommended that long john type cotton underwear be worn which will also minimize any contact between the skin and the protective garment. The following consideration should be evaluated when protective clothing is worn in heat stress environments.

- A. More frequent rest breaks;
- B. Worker rotation to provide frequent breaks in cool areas;
- C. Wear ice vests or vortex tubes, if practical; and
- D. Schedule changes to accommodate work at night or early morning hours.

### **22.6 TRAINING REQUIREMENTS**

Train staff to recognize heat stress conditions and the methods necessary to prevent and treat heat stress.

22.6.1 Proper clothing and PPE requirements.

22.6.2 Recognition, prevention and first aid treatment for heat stress.

22.6.4 Safe work practices and work/rest regimes required in heat stress environments.

### **22.7 COLD STRESS PROCEDURE**

Cold stress can present a significant hazard to workers and can result in a drop in the body's core temperature. At lower body temperatures, the body can react by a reduction in mental awareness, reduced rational decision-making, loss of consciousness and death. Several factors incorporate the harmful effects of cold: wet clothing, smoking, drinking alcoholic beverages, fatigue, emotional stress and certain diseases and medications. Workers exposed to severe cold can suffer hypothermia or frostbite.



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### 22.8 RECOGNITION AND PREVENTION OF COLD RELATED ILLNESSES

The following are the most prevalent and significant cold stress conditions:

**Hypothermia:** The signs and symptoms of hypothermia include shivering, dizziness, numbness, confusion, weakness, impaired judgement, impaired vision, and drowsiness. The stages of hypothermia are: shivering, apathy, loss of consciousness, decreasing pulse rate, and breathing rate and death.

First aid measures for hypothermia are: Call Emergency Medical Services and move the victim to a warm area and into dry clothing.

**Frostbite:** Frostbite is the most common injury caused by cold. It happens when ice crystals form in body tissues, usually the nose, ears, chin, cheeks, fingers, or toes. This restricts blood flow to the injured parts. The effect is worse if the frostbitten parts are thawed and then refrozen.

Signs and symptoms of frostbite may be that the skin is slightly flushed. The skin color then changes to white and then grayish blue. Pain is sometimes felt early but later goes away. The frostbitten parts feel very cold and numb, and the victim may not be aware of the injury. In severe cases, frostbite may result in blisters or gangrene.

First aid measures for frostbite are: Move the victim to a warm area and place the frozen parts in warm water (100 -105° F). Handle them gently and do not rub or massage them. Loosely bandage the injured parts. Seek prompt medical attention.

### 22.9 COLD STRESS PREVENTION

22.9.1 The first signs of cold stress are pain in the extremities. Severe, uncontrollable, shivering may result as body temperature drops.

22.9.1.2 Provisions for insulating dry clothing must be provided

22.9.1.3 Wind chill can substantially reduce the cooling rate experienced by personnel. Prevention of excessive cooling exacerbated by wind chill condition requires increased insulation value of the protective work clothing. Refer to the below table for wind chill equivalent temperatures.



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**Table 22-3  
Equivalent Chill Temperature (under calm conditions)**

Actual Temperature Reading (°F)												
Estimated Wind Speed (in mph)	50	40	30	20	10	0	-10	-20	-30	-40	-50	-60
Calm	50	40	30	20	10	0	-10	-20	-30	-40	-50	-60
5	48	37	27	16	6	-5	-15	-26	-36	-47	-57	-68
10	40	28	16	4	-9	-24	-33	-46	-58	-71	-83	-95
15	36	22	9	-5	-18	-32	-45	-58	-72	-85	-99	-112
20	32	18	4	-11	-25	-39	-53	-67	-82	-96	-110	-121
25	30	16	0	-15	-29	-44	-59	-74	-88	-104	-118	-133
30	28	13	-2	-18	-33	-48	-63	-79	-94	-109	-125	-140
35	27	11	-4	-20	-35	-51	-67	-82	-98	-113	-129	-145
40	26	10	-6	-21	-37	-53	-69	-85	-100	-116	-132	-148
(Wind speeds greater than 40 mph have little additional effect.)	LITTLE DANGER In <hr with dry skin. Maximum danger of false sense of security.			INCREASING DANGER, Danger from freezing of exposed flesh within one minute.				GREAT DANGER Flesh may freeze within 30 seconds.				

Trenchfoot and immersion foot may occur at any point on this chart.

- 22.9.2 The following work practices should be followed to minimize the effects of cold stress conditions:
- 22.9.2.1 Wear adequate layers of insulating dry clothing. Keep a change of dry clothes available in case clothing becomes wet.
  - 22.9.2.2 Use the buddy system to look for signs of cold stress.
  - 22.9.2.3 If appropriate, use windshields to reduce the effects of wind.
  - 22.9.2.4 Heated warming shelters should be available when the Equivalent Chill Temperature (ECT) referenced in section 22.9.1 is less than 20° F (-7° C). The ECT is used for the purpose of assessing the combined effects of wind and low air temperatures on exposed skin.
  - 22.9.2.5 Should the onset of heavy shivering, frostbite, feeling of excessive fatigue, drowsiness, irritability or euphoria, the affected employees should return to the shelter to warm up.
  - 22.9.2.6 To prevent dehydration which can increase the susceptibility of workers to cold injuries, warm sweet drinks, and soups should be



## HEALTH & SAFETY POLICIES MANUAL

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provided. Coffee intake should be limited due to its diuretic effects.

22.9.2.7 The Threshold Limit Values for Work/Warm-up Schedule for Four-Hour Shifts are presented in the table below should work be performed at or below 11° F ECT. The TLV applies to workers in dry clothing.

**Table 22-4  
Threshold Limit Values Work/Warm-up Schedule for Four-Hour Shift**

Air Temperature Sunny (Sky)	No Noticeable Wind		5 mph Wind		10 mph Wind		15 mph Wind		20 mph Wind	
°F(approx.)	Max Work Period	# Of Breaks	Max. Work Period	# Of Breaks						
-15° to -19°	(Norm Breaks) 1		(Norm Breaks) 1		75 min	2	55 min	3	40 min	4
-20° to -24°	(Norm Breaks) 1		75 min	2	55 min	3	40 min	4	30 min	5
-25° to -29°	75 min	2	55 min	3	40 min	4	30 min	5	Non-emergency work should cease	
-30° to -34°	55 min	3	40 min	4	30 min	5	Non-emergency work should cease			
-35° to -39°	40 min	4	30 min	5	Non-emergency work should cease					
-40° to -44°	30 min	5	Non-emergency work should cease							
-45 & below	Non-emergency work should cease									

- Notes:
1. Schedule applied to any 4-hour work period with moderate to heavy work activity, with warm-up periods of ten (10) minutes in a warm location and with an extended break at the end of the 4-hour work period in a warm location. For Light-to-Moderate Work (limited physical movement): apply the schedule one step lower.
  2. The following is suggested as a guide for estimating wind velocity:
    - 5 mph= flag light move
    - 10 mph=light flag fully extended
    - 15 mph=raises newspaper sheet
    - 20 mph=blowing and drifting snow.



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22.9.2.8 When fine motor skills are required with bare hands for more than 10-20 minutes in temperatures below 61 ° F, provisions shall be provided to keep employee's hands warm. Radiant heaters, warm air jets, or heated contact plates may serve this purpose. Insulated gloves shall be worn where fine motor hand movement is not required and to prevent contact frostbite where surface temperatures are < 20°F. If air temperature falls below 0°F, equipment and tools should be designed to allow the use of insulated hand protection.

22.9.2.9 Activities which involve handling solvents, fuels, or other volatile chemicals should involve the use of protective clothing or material handling techniques, which prevent clothing or gloves from being soaked.

### 22.10 TRAINING REQUIREMENTS

22.10.1 Worker training should be provided to discuss the hazards of cold stress environments and to review preventative work practices. The training should include:

- 22.10.1.1 Proper clothing and PPE requirements.
- 22.10.1.2 Recognition, prevention, and first aid treatment of frostbite and hypothermia. Discussion should include rewarming procedures.
- 22.10.1.3 Suggested work/rest regimes and eating/drinking habits.
- 22.10.1.4 Safe work practices in cold stress environments.

**ATTACHMENT G**

**HURRICANE PREPARATION PLAN**

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# HURRICANE PREPARATION PLAN

## MARINE CORPS AIR STATION CHERRY POINT, NC

### 1.0 PURPOSE AND SCOPE

---

Rhēa Engineers & Consultants, Inc. (Rhēa) has prepared this Hurricane Preparation Plan (HPP) to establish the standard operating procedures to follow in the event that impending hurricane weather conditions affects site activities. Our goal is to provide for the safety of personnel and minimize financial loss caused by severe weather conditions.

Hurricanes are most likely to occur along the North Carolina coastline between June 1 and November 30 of each year. Because meteorologists are unable to accurately forecast hurricane storm speed, direction, or intensity, it is important to develop a plan of action to prepare for such events. The emergency procedures described herein apply to all Rhēa team personnel, subcontractors, and visitors associated with this project.

## 2.0 DEFINITIONS

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### 2.1 Tropical Disturbances

Powerful cyclones characterized by destructive sustained winds, water spouts, heavy rain, and flooding are caused by depressions over tropical waters. Tropical disturbances are typically categorized by maximum surface wind velocity. The following describes the various degrees of tropical disturbances:

- + Tropical Depression - Maximum surface winds of 38 miles per hour (mph).
- + Tropical Storm - Maximum surface winds of 39 to 73 mph.
- + Hurricane - Maximum surface winds 74 mph or greater.

### 2.2 Conditions of Readiness

Commander, Naval Base Norfolk, has established five Conditions of Readiness (CORs) for hurricanes and other potentially dangerous tropical storms. The following describes each COR:

- + **Condition V** - Destructive winds are possible at the Marine Corp Air Station (MCAS) Cherry Point within 96 hours.
- + **Condition IV** - Destructive winds are possible at the MCAS Cherry Point within 72 hours.
- + **Condition III** - Destructive winds are possible at the MCAS Cherry Point within 48 hours.
- + **Condition II** - Destructive winds are possible at the MCAS Cherry Point within 24 hours.
- + **Condition I** - Destructive winds are possible at the MCAS Cherry Point within 12 hours.

## 2.3 Hurricane Notification

The National Weather Service will issue either a “watch” or a “warning” depending on the potential time of impact of the storm. These terms are described below:

- + **Hurricane Watch** - A hurricane watch means that there is a threat of hurricane or tropical storm conditions in the coastal North Carolina area in the next 36 hours.
  
- + **Hurricane Warning** - A hurricane warning is issued when a hurricane or tropical storm is expected to affect coastal North Carolina within 24 hours.

The National Weather Service classifications are described here only for reference. Official notification of upgrade or downgrade of condition of readiness will be provided by the Resident Officer In Charge of Construction (ROICC). The Rhēa Team will be prepared to commence site security response action for condition upgrade within two hours of notification from the ROICC, regardless of time of day. For a listing of emergency telephone numbers please see the Site Health and Safety Plan (HASP).

## 3.0 RESPONSIBILITIES

---

Worker safety during a hurricane requires the dedicated team effort from all Navy and Rhēa personnel. The proper organization and coordination of personnel will result in a smooth transition from execution of routine activities to completion of securing operations. Rhēa's Project Manager (PM), Site Health and Safety Officer (SHSO), and site labor forces each have specific responsibilities critical to the execution of this plan.

The ROICC will have the authority to direct the implementation of this plan. The ROICC will also be responsible for authorizing work to commence after the storm event.

### 3.1 Project Manager

The PM is responsible for overall management of site activities. The PM's role in hurricane preparation is to verify that the field crews are adequately trained in the procedures outlined in this plan. The PM will verify that the field staff has adequate funding for resources (e.g., personnel, materials, and equipment) required to perform the response preparation actions. The PM will be supplied with or have record of inventory deemed irreplaceable and will make arrangements for its proper protection.

### 3.2 Site Health and Safety Officer

As described in the HASP for this Project, the SHSO is the Site Superintendent (SS), and he will serve as the Emergency Coordinator (EC). In this role, the EC will be responsible for assuring the proper execution of this HPP in the field. The EC will be responsible for the coordination of personnel, supplies, and equipment necessary to begin securing operations within two hours of notification of condition upgrade from the ROICC. The EC will be the primary liaison between the ROICC, PM, and the site labor forces.

The EC will continue to monitor safety activities during execution of this plan and will retain authority to stop work due to impending weather conditions if, in his opinion, worker safety may be jeopardized.

### 3.3 Site Labor Forces

Site laborers will be responsible for the actual performance of the site preparation at the direction of the EC. Laborers should also offer suggestions and alert the EC of any changing conditions.

## 4.0 RESPONSE ACTIONS

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The following sections describe the requirements expected during each of the five conditions of readiness. The action items described in this plan should be used for guidance only since it is impossible to develop contingency plans for each activity associated with a field project. The handling of specific field situations that are not described in the following action lists will be at the discretion of the EC.

### 4.1 Condition V (Destructive Winds within 96 Hours)

The following activities will be performed at a minimum when Condition V response is required by the ROICC:

- + Continue routine work activities.
- + Perform normal daily job site cleanup and maintain good housekeeping practices, including containerizing waste materials and maintaining clear walkways to prevent tripping hazards.
- + Notify site labor about impending dangers and train site workers on the content of this plan. Refresh work crews on general emergency response procedures (e.g., evacuation routes) as outlined in the HASP.
- + Take inventory of emergency supplies such as first aid kits, sorbent material, polyethylene sheeting, security fencing, sand bags and drums. Replenish supplies as necessary.
- + Inspect the integrity of existing erosion and sedimentation controls (e.g., silt fence, hay bales, and erosion matting) and existing drainage receptor facilities. Make arrangements to repair deficient items.
- + Inspect the office and/or storage trailer tiedowns for wear, pullout, or other damage. Make arrangements to repair deficient workmanship.

- + Arrange to either transport contaminated materials off site or temporarily stage materials in competent containers (e.g., drums, roll-off boxes).
- + Review requirements for Condition IV.
- + Contact ROICC for COR updates and completion of required actions.

## **4.2 Condition IV (Destructive Winds within 72 Hours)**

The following activities will be performed at a minimum when Condition IV response is required by the ROICC:

- + Continue Condition V preparations, if necessary.
- + Continue routine work activities that do not affect preparation requirements described in this plan.
- + Perform normal job site cleanup and maintain good housekeeping practices.
- + Place lumber, piping, and other job materials in neat piles (less than four feet high) in a designated laydown area.
- + Remove and store debris that may become “missile” hazards (i.e., any object that may become airborne in high winds).
- + Review requirements for Condition III.
- + Contact ROICC for COR updates and completion of required actions.

## **4.3 Condition III (Destructive Winds within 48 Hours)**

The following activities will be performed at a minimum when Condition III response is required by the ROICC:

- + Maintain Condition IV requirements.
- + Cease work activities that cannot be completed within 18 hours. Schedule work to minimize open excavations and other low-lying depressions that may collect water.

- + Cease other work activities that interfere with securing operations.
- + Begin stowing and securing portable equipment. Gasoline-powered portable equipment should be placed in a storage trailer when possible to prevent overturning.
- + Secure portable sanitation facilities.
- + Consolidate drums in drum storage area. Where possible, affix content label to the inside lid of the drum before tightening lid brackets. Arrange drums against permanent structure if possible. If this arrangement is not practical, arrange heavier drums around the perimeter of the drum staging area.
- + Dismantle decontamination area and secure supplies.
- + Review requirements for Condition II.
- + Contact ROICC for weather and COR updates and completion of required actions.

#### **4.4 Condition II (Destructive Winds within 24 Hours)**

The following activities will be performed at a minimum when Condition II response is required by the ROICC. Cease routine work activities until securing operations are completed.

- + Cease routine work activities until securing operations are completed. Do not begin new scope of work tasks.
- + Consolidate wood and piping piles and secure to ground using soil/concrete anchors and cables. As an alternative, excess building materials may be stored in an empty roll-off box or other suitable enclosed container sufficiently anchored to the ground surface.
- + If off-site transportation of waste materials is not practical, cover contaminated waste stockpiles with 10 millimeter minimum plastic sheeting. Anchor sheeting

using sandbags at a rate of one bag per 20 square feet of liner and one bag per five lineal feet of stockpile perimeter. Do not use scrap lumber, piping or jagged rocks for this purpose. If practical, park heavy equipment in the anticipated upwind position in front of the waste material stockpile.

- + Band drums together to form a single unit using steel banding equipment or heavy-duty ropes.
- + Refuel heavy equipment. Fuel may be in short supply in the days following a hurricane. Secure temporary fuel storage tank if applicable.
- + Pack all monitoring equipment, fax machine, computers, printers for transport to safe storage.
- + Record storage inventory of all supplies, materials, drums, equipment remaining at the site.
- + Contact ROICC for weather updates and completion of required actions.

## **4.5 Condition I (Destructive Winds within 12 Hours)**

The following activities will be performed at a minimum when Condition I response is required by the ROICC:

- + Perform all remaining actions associated with the previous CORs.
- + Secure tarps on roll-off containers.
- + Arrange heavy equipment in a manner to protect other supplies, equipment and/or stockpiles.
- + Collect site files, plans, records, and drawings and transport to safe storage location.

- + Personnel lodging in a hotel shall be provided with non-perishable food and drinking water for three days, provide flashlight, batteries, transistor radio, personal hygiene supplies, and first aid supplies including bandages, pain relievers, and special medications.
- + Unplug all electrical components and switch external power supply to the “off” position.
- + Document secured site with photographs.
- + Notify ROICC of date and time of departure and anticipated date of return.
- + Lock all doors, account for all personnel, and leave site.

## 5.0 RESUMPTION OF WORK

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The ROICC will retain the authority to commence work activities. Before work begins, the ROICC and EC shall visit the site and assess damages. Inventory of supplies, materials, drums, and equipment will be verified at this time. Scope of work activities will commence as soon as practical after notice to proceed is directed by the ROICC.

A written damage assessment will be prepared by the EC, reviewed and approved by the ROICC, and forwarded to the PM.

## **ATTACHMENT H**

# **PERSONAL PROTECTIVE EQUIPMENT POLICY**



## HEALTH & SAFETY POLICIES MANUAL

<b>TITLE: PERSONAL PROTECTIVE EQUIPMENT</b>		<b>NO: HS-10</b>
<b>DATE: FEBRUARY 2, 2006</b>	<b>SUPERSEDES: JULY 14, 2005</b>	<b>PAGE: 1 OF 7</b>

### 10.1 GENERAL POLICY STATEMENT

It is Rhēa's policy to ensure that all employees wear the appropriate Personal Protective Equipment (PPE) when performing field activities in hazardous conditions as specified in the site specific Health and Safety Plan (HASP).

### 10.2 PROCEDURES

#### 10.2.1 General

- 10.2.1.1 Rhēa provides an allowance for each employee who performs field activities in the amount of \$100.00 for the purchase of steel-toed boots once every two years, if necessary. More frequent purchases may be approved by CHS if boots are worn out or damaged by field activities. Safety Shoe Authorization forms (form HS 10-1) signed by the employee's supervisor or project manager will be submitted to CHS.

#### 10.2.2 PPE Approval

- 10.2.2.1 All PPE used in conjunction with Rhēa field operations must be selected based on its suitability to provide protection for the specific hazard that will be encountered. CHS should be consulted in the selection of all PPE.
- 10.2.2.2 Rhēa will purchase only equipment that has been approved by the American National Standards Institute, as cited below or as the below listed standards are revised by ANSI.
  - Eye Protection - ANSI Z87.1-1989
  - Head Protection - ANSI Z89.1-1986
  - Foot Protection - ANSI Z41-1991
- 10.2.2.3 If PPE integrity is in question for any reason, CHS can consult the manufacturer to determine the appropriateness of PPE proposed for the specific work tasks planned. Given the variability between manufacturers of chemical boots, gloves, and chemical protective clothing, one should not assume that one manufacturer's product will provide the same level of protection as another manufacturer even though the protective clothing appear to be made from the same type of material.



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### 10.2.3 Selection of PPE

- 10.2.3.1 The selection of appropriate PPE will be made by the HSM during the development and approval of the site specific HASP. As conditions change on the job site, or as new contaminants are encountered during site investigation/remediation activities, the HSM should be immediately consulted regarding any new chemical contaminant information to ensure the specified level and type of protective clothing and equipment remains suitable.
- 10.2.3.2 Respiratory protection selection and use procedures are delineated in Rhēa's Respiratory Protection Program (HS-11).
- 10.2.3.3 No one material adequately prevents permeation from all chemical and physical hazards. Consequently, the choice of PPE material used will depend on the specific type of hazardous material encountered and the way the protective clothing will be used.
- 10.2.3.4 The following must be considered when reviewing a manufacturer's permeation information relative to specific hazardous liquids and PPE materials.
- A. The length of time the PPE material was in contact with the hazardous material before permeation occurred.
  - B. The thickness of PPE material upon prolonged exposure.
  - C. The concentration of the contaminant(s) encountered.
  - D. The toxicity of the contaminant(s) encountered.
  - E. The integrity of the PPE material upon prolonged exposure. It should be noted that the PPE material does not necessarily have to lose its integrity for permeation to occur.
- 10.2.3.5 Mixtures are of particular concern. A specific PPE material may provide adequate permeation protection against only one constituent of a mixture. Depending on the factors discussed in section 10.2.3.4 and 10.2.3.7, dual PPE may sometimes be necessary.



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- 10.2.3.6 There is limited permeation information on the variety of PPE materials available. Consequently, all users of PPE must be made aware of this fact and immediately report of any signs of hazardous material breakthrough or PPE degradation.
- 10.2.3.7 These factors must be considered when selecting PPE:
- A. The nature of the hazardous operation.
  - B. The degree and physical state of the hazard.
  - C. Hazards the PPE in itself may create.
  - D. The activities of the workers.
  - E. Heat stress and cold stress.
  - F. The degree of protection afforded.
  - G. Limitations to the workers ability to communicate.
  - H. Primary routes of exposure.

Other factors which must also be considered include such things as temperature and humidity, both of which can effect the longevity of protection provided by PPE and should be evaluated by the HSM at the time of HASP preparation based on site specific operational requirements.

### 10.2.4 PPE Use

- 10.2.4.1 Fieldwork by contractors or Rhēa personnel will not be initiated until all PPE required pursuant to the HASP are available for use.
- 10.2.4.2 All field personnel are responsible for using the PPE specified in the site specific HASP. Alterations in PPE must be made in accordance with the site specific HASP.
- 10.2.4.3 PPE should be inspected prior to donning and periodically during use to verify its integrity and check for signs of degradation.
- 10.2.4.4 Damaged or contaminated PPE must not be used. Reusable PPE shall be thoroughly decontaminated prior to reuse, e.g., wash respirator face-piece at the end of the shift.



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### 10.2.5 PPE Storage

PPE must be stored in a manner that will preclude damage or contamination. Damaged or contaminated PPE must not be used.

### 10.2.6 Decontamination and/or Disposal of PPE

- 10.2.6.1 PPE worn on site must be thoroughly decontaminated if it is intended for reuse or disposed of in accordance with the HASP and project specifications for the site.
- 10.2.6.2 PPE, which will be reused, should be given special consideration due to the difficulty in decontaminating some PPE components, e.g. webbing of a SCRA harness. The selection of a suitable decontamination solution, e.g.alconox, IPA, or other decon solutions, requires careful consideration to ensure the solution selected is in fact effective and secondly, minimises the generation of hazardous waste. PPE decontamination may not be desirable due to the toxicity of the contaminant encountered and/or due to partial permeation upon initial chemical contact with the protective garment. Other preventative methods should be considered to protect difficult to clean PPE and instrumentation. Use of disposable plastic bags, barriers or visqueen wraps which minimize down time due to deconing equipment or down time sustained as a result of damage to a piece of air monitoring equipment.

## 10.3 LEVELS OF PPE

The following provides detail and explanation of the four levels of PPE. Modifications to these levels will be made under the direction of Site Health and Safety Officer, in conjunction with CHS.

### 10.3.1 Level D

Level D PPE will only be selected for protection against nuisance contamination and physical hazards and is not sufficient on a site with respiratory or skin absorption hazards requiring whole body protection. Level D PPE ensemble may be modified by the Site Health and Safety Officer, in conjunction with CHS to provide protection from skin and physical hazards, but not respiratory protection. Basic Level D PPE consists of the following:



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- Coveralls or appropriate work clothes;
- Gloves (discretionary);
- Hard hat;
- Ear protection (based on noise monitoring);
- Eye protection, safety glasses with side shields as a minimum; and
- Leather or chemical resistant boots or shoes with steel toe and shank.

Optional Level D modifications consist of the following:

- Chemical or radiological protective clothing (Tyvek, Saranex, etc.);
- Chemically resistant hand and foot protection (inner/outer gloves, boot liners, over boots, etc.); and
- Any specialized protective equipment (hearing protection, face shields, welding goggles, aprons, etc.).

### 10.3.2 Level C

Level C PPE will be worn when the hazards from chemical and/or radiological contaminants have been well characterized and indicate that personnel are protected from airborne exposure by wearing air-purifying respirators with the appropriate cartridges. Conditions excluding the use of air purifying respirators include oxygen-deficient environments (oxygen <19.5% at sea level), and immediately dangerous to life and health (IDLH) atmospheres. Basic Level C PPE will include a Level D ensemble with the following respiratory and whole body protection upgrades:

- Full-face or half-mask air purifying respirator, equipped with a NIOSH approved cartridge(s);
- Chemical resistant coveralls;
- Chemical resistant outer shoe/boot covers;
- Inner chemical resistant gloves;
- Outer chemical resistant gloves; and
- Any specialized protective equipment (hearing protection, welding lens, aprons, etc.).



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### 10.3.3 Level B

Level B PPE is required under circumstances requiring the highest level of respiratory protection, with some level of skin protection. Conditions may be oxygen deficient. Level B PPE will include a Level D ensemble with the following respiratory and whole body protection upgrades:

- Positive pressure, full-face-piece self-contained breathing apparatus (SCBA), or positive pressure supplied air respirator with escape SCBA (NIOSH approved);
- Hooded chemical-resistant clothing;
- Chemical resistant outer shoe/boot covers;
- Inner chemical resistant gloves;
- Outer chemical resistant gloves; and
- Any specialized protective equipment (hearing protection, welding lens, aprons, etc.).

### 10.3.4 Level A

Level A PPE is required when the greatest level of skin, respiratory, and eye protection is needed. Conditions may be oxygen deficient. Level A PPE will include a Level D ensemble with the following respiratory and whole body protection upgrades:

- Positive pressure, full-face-piece self-contained breathing apparatus (SCBA), or positive pressure supplied air respirator with escape SCBA (NIOSH approved);
- Totally-encapsulating chemical-protective suit;
- Chemical resistant outer shoe/boot covers;
- Inner chemical resistant gloves;
- Outer chemical resistant gloves; and
- Any specialized protective equipment (hearing protection, welding lens, aprons, etc.).

## 10.4 TRAINING REQUIREMENTS

10.4.1 Supervisors will determine that employees assigned to use PPE have received training in the rationale used in the selection of PPE, the specific PPE required for each task, instruction on proper techniques used in PPE donning, doffing, correct adjustment and usage. The training will cover operational care, maintenance, the useful life, and disposal of PPE. The



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user of PPE must be made aware of the limitations prior to its use. Employees will don the required PPE to ensure its proper fit and adjustment, if necessary, prior to use.

- 10.4.2 Site supervision will observe and evaluate each PPE user's understanding of the above training. PPE users will be subject to retraining if they do not demonstrate understanding and skill in the use of the prescribed PPE. Retraining may also be required if the process or task requires new or different PPE from that which the employees have received training.
- 10.4.3 Each employee who has received PPE training will verify that they have received and understood the required training through a written certification that contains the employees name, signature, training date, and the specific elements covered in the certification.
- 10.4.4 Training requirements will be satisfied through Rhēa's Health and Safety Policy (HS 3). Training provided to employees at a job site shall be documented on the Daily Safety Meeting form (HS4-2).

### **10.5 RECORDKEEPING REQUIREMENTS**

- 10.5.1 Each office will designate, as necessary, an employee who will coordinate the PPE purchase and management of PPE and air monitoring instrumentation for each office. This individual will be responsible for tracking, ordering, and storing PPE and will consult with CHS as necessary to ensure PPE stocks are satisfactory and that instrumentation has been calibrated to the manufacturers recommendations.

## **ATTACHMENT I**

# **ACCIDENT PREVENTION PROGRAM POLICY**



## HEALTH & SAFETY POLICIES MANUAL

<b>TITLE: ACCIDENT PREVENTION PROGRAM</b>		<b>NO: HS-6</b>
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### 6.1 GENERAL POLICY STATEMENT

It is the policy of to conduct daily operations in such a manner as to minimize the risk of accidents on project sites and office properties. This is achieved through the establishment of an Accident Prevention Program, which includes accident prevention training and specific safety precautions. Other specific accident prevention precautions and activities are specified throughout the Rhēa Health and Safety manual and in a site specific Health and Safety Plans.

### 6.2 DEFINITIONS

6.2.1 A confined space may have a possibility of oxygen deficiency or an atmosphere that causes loss of consciousness or awareness. Tanks, test chambers, sewers, manholes, pits, sumps, and tunnels are examples of confined spaces. A confined space is a space that is large enough that an individual can bodily enter to perform work, has limited or restricted means of entry or exit, and is not designed for continuous employee occupancy.

6.2.2 Working alone is defined as the performance of work by a person who is out of audio or visual contact with a co-worker (a "buddy").

### 6.3 RESPONSIBILITIES

6.3.1 Corporate Health and Safety (CHS) is responsible for maintaining this policy. CHS is responsible for updating this policy through periodic review and amendments.

6.3.2 CHS is responsible for implementing, documenting, and auditing performance of the Accident Prevention Program.

6.3.3 The Project Manager (PM) is responsible for enforcing the Accident Prevention Program at all times.

6.3.4 The employees are responsible for acting responsibly and practicing safe work procedures at all times. The employees are responsible for performing work responsibilities in accordance with the safety-training course and procedures outlined in this policy.

### 6.4 PROCEDURES

#### 6.4.1 General

6.4.1.1 To avoid injury and fire risk, good housekeeping procedures must be strictly followed.



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- A. Storage space must be physically adequate for the volume of materials being stored. If it is inadequate, and adequate space cannot be obtained, dispose of the material or find an alternate storage location.
- B. Stored materials must be in a stable configuration in order to permit safe access, avoid clutter, and minimize the hazard of falling materials.
- C. Materials stored together must be compatible. This means that the various materials must not contribute to, or cause, ignition of other materials, nor enhance their rate of combustion once ignited.
- D. The fuel load (combustible mass) within the storage areas must be consistent with the fire detection system for the area and the building.
- E. Storage must be in accordance with local fire and building codes/ordinances as well as NFPA, EPA, DOT and local agency regulations and guidelines.

6.4.1.2 Work areas will be maintained neat and orderly.

6.4.1.3 An accident is an unplanned, unwanted event that may or may not result in damage to equipment or injury to people, such as:

- A. Unsafe conditions - people fail to follow site safety rules, fail to wear their PPE, or do not follow the Safe Operating Procedures (SOP). Corrected by diligence, changing attitude, training, and finally, disciplinary action may be necessary.
- B. Unsafe conditions - typically occur when people fail to clean up or repair their equipment promptly.

Corrected by management inspections. Correct on the spot, if possible. If the problem is not immediately remediable, then rope off, barricade, and inform people of the hazard.

### 6.4.2 Back Injury Prevention

6.4.2.1 Lifestyle, poor body mechanics, posture, and wellness may encourage or create back injury. Back pain is often caused by strained muscles. Strengthen stomach muscles by performing isometric exercises. Strengthen the leg muscles through an exercise using the "wall sit".



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6.4.2.2 Improve posture: Pelvic tilt.

6.4.2.3 Correct lifting: Bend knees, straighten lower back, get as close to the load as possible and use legs to lift.

6.4.2.4 No twisting - When lifting, do not twist the torso, move feet in direction of hands at the same time. Never twist sideways to lift an object.

6.4.2.5 Push, pull, reach - Lock or stabilize the lower back using the pelvic tilt, prior to lifting an object. Never reach over or out to lift a heavy object.

6.4.2.6 Get help with heavy or awkward objects.

### **6.4.3 Barricades and Safety Lanes**

6.4.3.1 Safety lanes and safe-access lanes must be clearly marked with either clear yellow or yellow-and-black striped lines, or by plastic tape affixed to the floor. Such lanes serve to indicate the normal traffic lanes through shops, warehouses, and similar locations. They also serve to identify access lanes to power control panels, such lanes must be kept free and unobstructed.

6.4.3.2 Barricades are used to deny access to hazardous areas. The following precautions are to be taken when barricades are used:

- A. Excavations, breaks in roads or in floors, and similar conditions must be barricaded to prevent injury to personnel and reduce the possibility of moving equipment being damaged.
- B. Barricades must be provided with appropriate flashing lights during nighttime hours and during periods of reduced visibility.
- C. Barricades must be placed far enough in advance of the actual working area to prevent traffic congestion.
- D. Adequate signs (such as "Aisle Blocked") must be used in conjunction with barricades.
- E. Break-away links must be used in all chains that barricade an area in order to permit ready access by fire fighting equipment. Such chains must be by identified "international orange" paint.



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- F. Persons who perform work at elevated locations can jeopardize themselves as well as persons at floor level due to falling objects. Such floor-level areas must be barricaded.
- G. Areas where ladders or staging are being used must be barricaded as a protection against falling objects. Toe boards, standard guard rails will be installed as required by OSHA code.
- H. Areas where explosives are being used must be barricaded.

### 6.4.4 Basic Site Safety Requirements

#### 6.4.4.1 Working with tools and heavy equipment is a major hazard at sites.

Injuries can result from equipment hitting or running over employees, impacts from flying objects, burns from hot objects, and damage to protective equipment such as airline respirator systems. The following precautions will help preclude these hazards:

- A. Train employees in proper operating procedures.
- B. Install adequate on-site roads, signs, lights, and devices.
- C. Install appropriate equipment guards and engineering controls on tools and equipment. These include rollover protection structures (RODS), seat belts, emergency shutoff in case of rollover, and back-up warning lights.
- D. Use intrinsically safe (non-sparking) tools in hazardous (explosive) locations.
- E. In hydraulic power tools, use fire-resistant fluid that is capable of retaining its operating characteristics at the most extreme temperatures.
- F. Use three-wire grounded extension cords with portable electric tools and appliances. All damaged power cords shall be red tagged and removed from service.
- G. At the start of each workday, inspect brakes, hydraulic lines, light signals, fire extinguishers, fluid level, steering, and splash protection.
- H. Keep all nonessential or unauthorized people out of the work area



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- I. Prohibit loose fitting clothing or loose long hair around moving machinery.
  - J. Keep the cab free of all nonessential items and secure all loose items.
  - K. Do NOT exceed the rated load capacity of a vehicle.
  - L. Instruct equipment operators to report their supervisor any abnormalities such as equipment failure, leaking liquids, unusual odors, etc.
  - M. When an equipment operator must negotiate in tight quarters, provide a second person to ensure adequate clearance
  - N. Have a signalman direct backing of vehicles as necessary.
  - O. All on-site internal combustion engines shall have spark arresters that meet requirements for hazardous atmospheres. Refuel in safe areas. Do not fuel engines while vehicle is running.
  - P. Lower all blades and buckets to the ground and set parking brakes before shutting off the vehicle.
  - Q. Inspect all tools and moving equipment regularly to ensure that all parts are secured and intact with no evidence of cracks or areas of weakness, that the equipment turns smoothly with no evidence of wobble, and that it is operating according to manufacturer's specifications. Promptly repair or replace any defective items. Keep a repair log on selected equipment.
  - R. Store tools in clean, secure areas so that they will not be damaged, lost, or stolen.
- 6.4.4.2 For employees entering a Contamination Reduction Zone (CRZ):
- A. No smoking, eating or drinking in the CRZ.
  - B. Sign in at the entrance Access Control Point before you enter this zone.
  - C. Sign out at the exit Access Control Point before you leave this Zone.
- 6.4.4.3 For employees entering an Exclusion Zone (EZ):
- A. No smoking, eating, or drinking in this zone.



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B. Sign in at the entrance Access Control Point in the Support Zone before you enter the EZ and sign out at the exit Access Control Point before you leave this zone, when required.

NOTE: If you discover any signs of radioactivity, explosivity, or unusual conditions such as dead animals at the site, exit immediately and report these findings to your Field Supervisor/SSO.

6.4.4.4 Refer to Health and Safety Policy HS- 4 for further details on Health and Safety Plans

### **6.4.5 Chemical Safety**

The following provisions should be utilized when working with chemicals.

6.4.5.1 NEVER work with chemicals ALONE. Always work in chemical areas with a "buddy" who can come to your aid in an emergency.

6.4.5.2 Proper safety equipment MUST be worn when working with corrosives and solvents. Proper methods for checking safety equipment should be followed: safety glasses MUST be worn, arm guards and aprons should be discarded and replaced immediately.

6.4.5.3 If part of your job is to mix acids, make sure that you have received proper training for mixing, pouring, and handling acids. Use ONLY the correct disposal method for each waste chemical.

6.4.5.4 Always read the labels on chemical containers and use them in well-ventilated areas. If you suspect that the ventilation system is NOT working properly, immediately notify your Supervisor. Always make sure that proper ventilation is present when handling chemicals to prevent the accumulation of excessive fumes in the room.

6.4.5.5 Always read the MSDS before using any chemical.

6.4.5.6 Initially treat all spills of liquids as though they might be solvents - Hazard Class - FLAMMABLE.

6.4.5.7 Do not eat, drink, or smoke in any chemical area

6.4.5.8 Do not wear contact lenses in chemical areas.



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- 6.4.5.9 The immediate first aid for chemical burns is to proceed to the nearest shower and place the affected area under cold running water for 15 to 20 minutes.
- 6.4.5.10 In the event of contact with corrosives, use the safety showers and/or eyewashes, which are located in every chemical use area. It is wise to become familiar with the operation of these systems before an accident occurs, to speed up the washing of the contact area, and minimize the chemical burn.
- 6.4.5.11 Always carry acids and solvent bottles in an appropriate container, such as a bottle carrier or chemical cart.
- 6.4.5.12 Check all chemical bottles before using them to be sure that the proper acid or solvent is being used
- 6.4.5.13 NEVER touch any part of your face or body with your safety equipment on. Remove the safety equipment and wash and check your hands before scratching your ear or rubbing your eye, to prevent injuries.
- 6.4.5.14 Always rinse safety equipment and wipe dry before removing. This is in case you may have unknowingly spilled acid on your safety equipment. Dispose of PPE in appropriate containers
- 6.4.5.15 Do not lean against sinks. The plastic absorbs a certain amount of acid, which cannot be cleaned off.
- 6.4.5.16 Keep highly reactive chemicals separated when in storage (acids, alkalis, and oxidizers must never be stored near solvents, fuels, or toxic chemicals
- 6.4.5.17 Whenever possible, store acids, and bases below eye level to minimize the risk of a splash injury
- 6.4.5.18 Should skin contact ever occur with any chemical, WASH the affected area thoroughly and IMMEDIATELY with water. If your clothing comes into contact with chemicals, change your clothes at once
- 6.4.5.19 Make sure ALL chemical containers are labeled and dated correctly and accurately with the chemical name, hazard class, and first aid information



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- 6.4.5.20 When carrying chemical bottles, support them from below, as well as at the neck, to guard against breakage
- 6.4.5.21 Properly discard (and dispose) of old chemicals and/or containers, which may contain unknown decomposition products. If you are unsure of the most appropriate disposal method, contact CHS.
- 6.4.5.22 Check for sources of ignition before pouring flammable liquids. In the event of spill, increase ventilation. **DO NOT** operate light switches
- 6.4.5.23 **NEVER MIX** two or more chemicals together unless you are completely sure of the reaction that will occur, and that you can control the results. Many chemicals will react **VIOLENTLY** when mixed together. Others will release poisonous fumes when mixed. Examples:
- Flammable Solvent + Acid = **EXPLOSION!**
- Flammable Solvent + Oxidizer = **EXPLOSION!**

### 6.4.6 Heat Stress

Practical measures for controlling heat stress (reference Health and Safety Policy HS-22):

- 6.4.6.1 Provide plenty of liquids. To replace body fluids (water and electrolytes) lost because of sweating, use regular drinking water, more heavily salted foods, or commercial mixes. In hot environments, fluid intake must be forced because under conditions of heat stress, the normal thirst mechanism is not adequate to bring about voluntarily a replacement of the fluids lost.
- 6.4.6.2 Provide cooling devices to aid natural body ventilation. These devices, however, add weight, and their use should be balanced against worker efficiency. Long cotton underwear acts as a wick to help absorb moisture and protect the skin from direct contact with heat-absorbing protective clothing.
- 6.4.6.3 Install mobile showers and/or hose-down facilities to reduce body temperature and cool protective clothing.
- 6.4.6.4 In extremely hot weather, conduct non-emergency response operations in the early morning or evening.



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6.4.6.5 Ensure that adequate shelter is available to protect personnel from direct sun exposure if possible and exposure to cold, rain, snow, etc., which can decrease physical efficiency and increase the probability of accidents.

6.4.6.6 In hot weather, rotate shifts of worker wearing impervious clothing.

See ACGIH TLV Booklet for further heat stress prevention guidelines.

### 6.4.7 Cold Stress Safety

6.4.7.1 For exposed skin, continuous exposure should not be permitted when the air speed and temperature results in an equivalent temperature of 25° F.

6.4.7.2 At air temperature of 35° F or less, it is imperative that workers who become immersed in water or whose clothing becomes wet be immediately provided a change of clothing and be treated for hypothermia.

6.4.7.3 Warm clothing, such as mittens, heavy socks, etc., are required when the air temperature is below 40-45° F. Protective clothing may be used to insulate the employee from cold exposure.

6.4.7.4 When the air temperature is below 30-40° F (depending upon employee comfort), clothing for warmth, in addition to chemical protective clothing, include:

- A. Insulated suits, such as whole-body thermal underwear.
- B. Wool socks or polypropylene socks to keep moisture off the feet if there is a potential of work activity, which would cause sweating
- C. Insulated gloves (when air temperatures are extremely low (less than 5-10 degrees F), gloves with reflective surfaces, which reflect body heat back to the hand, should be used
- D. Chemical protective boots over steel toe boots
- E. Insulated head cover, such as knit caps (ski caps), dark safety glasses,

6.4.7.5 At air temperature below 35° F the following work practices must be followed:



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- A. If the clothing of an employee might become wet on a job site, the outer layer of the clothing must be impermeable to water.
- B. If an employee's underclothing (socks, mittens, etc.) becomes wet in any way, the employee must change into dry clothing immediately. If the clothing becomes wet from sweating, the employee may finish the task, which caused the sweating before changing into dry clothing.
- C. Employees must be provided a warm area (65° F or above) to change from work clothing into street clothing.
- D. Employees must be provided a warm break area (above 60° F).
- E. If appropriate and safe from an explosion standpoint, space heaters may be provided in the work area to warm the hands, feet, etc.
- F. Hot liquids, such as soups, sweet drinks, etc. shall be provided in the break area. The intake of coffee shall be limited because of the attendant diuretic and Circulatory effects. Under no conditions may alcohol be consumed on the project, or during breaks or during lunch.
- G. The buddy system shall be practiced at all times. Any employee observed with severe shivering shall leave the cold area immediately.
- H. Employees should layer their clothing, i.e., wear thinner, lighter clothing next to the body with heavier clothing layered outside the inner clothing.
- I. Avoid overdressing when going into warm areas or when performing activities, which are strenuous. This could lead to heat stress problems.
- J. Auxiliary heated versions of hand wear, footwear, etc., can be used in lieu of mittens, insulated socks, etc. if extremely cold conditions exist.
- K. Employees handling evaporator liquids (gasoline, hexane, alcohol, etc.) shall take special precautions to avoid soaking of clothing or gloves with the liquids because of the added danger of cold injury to evaporate cooling.
- L. Work shall be arranged in such a way that sitting still or standing for long periods is minimized.



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6.4.7.6 Clothing for warmth, which is worn under chemical protective clothing, can be laundered in normal fashion, without the wash water being collected as contaminated water. If there is a rip or tear in the chemical protective clothing in a contaminated area, the clothing for-warmth must be handled as potentially contaminated, and the water in which it is washed must be collected as potential contaminated water. More rigorous steps may be required if materials handled are extremely toxic (dioxin, etc.).

### **6.4.8 Construction Safety Hazards**

6.4.8.1 Make sure the operator is aware of your presence on the ground.

6.4.8.2 Be alert to rotating machinery and equipment. Keep body parts and loose clothing away.

6.4.8.3 When operating equipment, be alert of your surroundings, especially personnel.

6.4.8.4 Use back-up alarms.

### **6.4.9 Drill Rig and Heavy Equipment Safety**

6.4.9.1 Most accidents are caused by falling, being struck by falling objects, being pinched in machinery, or back strain.

6.4.9.2 Use caution around drill rigs as this equipment has tail masts, cables and drill casings that tend to swing freely and may easily strike someone. The equipment is moving and rotates and footing is often slippery.

6.4.9.3 A positive attitude toward safety and awareness is the best defense to prevent these potential accidents. Frequent tailgate meetings and close supervision by management to follow SOP and the wearing of PPE is necessary.

6.4.9.4 Death by electrocution is a hazard when moving tall masted rigs near high voltage lines. Keep at least 20 feet away from electrical lines.

### **6.4.10 Electrical Safety**

6.4.10.1 Routinely inspect hand power tools and cords. Defects often occur at the point where the cord attaches to the tool.



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6.4.10.2 Extension cords should only be used when alternatives are not feasible. Inspect them regularly. Never use them as permanent wiring.

6.4.10.3 Do not make electrical wiring repairs yourself unless you are qualified.

6.4.10.4 Ground Fault Circuit Interrupters (GFCI's) are used in particularly hazardous situations, such as wet locations and construction sites. The GFCI detects a short and shuts off power within 1/40th of a second.

6.4.10.5 Cords with their grounding prongs removed or damaged should not be used.

6.4.10.6 Always disconnect power, pull the plug, or take other steps to de-energize equipment or tools before making repairs or even to examine a piece of electrical equipment

6.4.10.7 Lockout procedures are mandatory prior to work on or around hazardous electrical powered or chemical conducting equipment.

### **6.4.11 Fire Safety**

6.4.11.1 Three components of fire safety:

- A. Restrict the amount of "fuels" on-site. Keep only what is necessary on-site, such as equipment fuels and other flammables (trash, etc.). This includes "hazardous wastes" which are flammable
- B. Properly store and contain all "fuels."
- C. Control and inspect for "spark" and other heat sources.

6.4.11.2 Eliminate potential fire of fuels by storing flammables in suitable storage cabinets or buildings.

- A. Ventilate to reduce or eliminate vapors;
- B. Cover fuel with non-flammable substance to prevent mixture with air;
- C. Control vapor trails to prevent flashback; and
- D. Control vapor emissions.



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6.4.1.1.3 Restrict the amount of fuel kept on site.

- A. Limit to that which is necessary; and
- B. Limit the amount of flammable hazardous waste buildup.

6.4.11.4 Remove or control the ignition source

- A. Use explosion-proof lighting and space resistant tools;
- B. Prohibit open flames;
- C. Bond and ground all equipment; and
- D. Minimize use of common ignition sources:

- Welding;
- Pilot lights;
- Cigarette lighters;
- Grinders;
- Electrical equipment; and
- Static electricity from liquid transfer.

6.4.11.5 Oxygen-rich atmospheres (>23.5%) must be avoided. If an O<sub>2</sub> rich atmosphere occurs:

- A. The environment shall be considered explosive;
- B. Ventilation should proceed immediately using intrinsically safe means;
- C. The source should be identified and shut down if possible; and
- D. If necessary, oxygen oxidizers may be used by a qualified and experienced person who has used O<sub>2</sub> levels.

6.4.1.1.6 Common control measures for flammable solvents

- A. Isolate solvents from reactive chemicals;
- B. DO NOT store more than a total of five gallons of solvents in glass in a laboratory;
- C. Use an inert atmosphere, if possible, when using solvents;
- D. Transfer solvents in a working fume hood;
- E. Eliminate sources of ignition;
- F. Store solvents in a cool area, maximum temperature of 80°F;



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- G. Transport solvents in metal other protective containers;
- H. Ground all drums and transfer vessels when handling solvents (grounding clips must contact bare metal);
- I. Thoroughly acquaint workers with the hazards of flammable solvents;
- J. Have fire-fighting equipment close at hand AND KNOW HOW TO USE IT; and
- K. Work with and transport solvents only in a well ventilated area.

6.4.11.7 Dust explosion hazards can be minimized by:

- A. Isolation from ignition sources;
- B. Frequent cleaning with vacuum or brush;
- C. Using dust-tight containers;
- D. Using adequate ventilation;
- E. Using external dust collectors;
- F. Introducing an inert gas - but beware of creating O<sub>2</sub> deficient atmospheres;
- G. Constructing a facility to preclude dust buildup on walls, beams, etc; and
- H. Using proper fire extinguishers, arresters, blowout walls, etc.

### 6.4.12 Gas Cylinder Safety

6.4.12.1 Safe handling of gas cylinders is enhanced by following the practices listed below:

- A. Never drop cylinders or permit them to strike each other.
- B. Cylinders may be stored in the open, but in such cases, the cylinders should be protected against extremes of weather and from the dampness of the ground to prevent rusting. During the summer cylinders stored in the open should be shaded against the continuous direct rays of the sun.
- C. The valve protection cap should be left on each cylinder until it has been secured against a wall or bench, or placed in a cylinder stand, and is ready to be used.



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- D. Avoid dragging, rolling, or sliding cylinders, even for a short distance. They should be moved by using a suitable hand dolly.
- E. Never tamper with safety devices in valves or cylinders.
- F. Do not store empty cylinders on a system where full cylinders are in use. A serious vacuum can occur when an empty cylinder is attached to a pressurized system.
- G. No part of a cylinder should be subjected to a temperature higher than 125° F. A flame should never be permitted to come in contact with any part of a compressed gas cylinder.
- H. Do not place cylinders where they may become part of an electric circuit. When electric are welding, precautions must be taken to prevent striking an arc against a cylinder.
- I. Regulator should be used for gas dispenses. Wear safety glasses while turning on regulators.
- J. Oxygen cylinders should not be stored near highly combustible materials, especially oil and grease.
- K. Compressed gas cylinders shall be transported in suitable hard trucks, securely fastened in racks to other rigid structures.

### 6.4.13 Hand Tools

- 6.4.13.1 All employees are responsible for the safe conditions of hand tools and equipment used
- 6.4.13.2 Non-Powered tools - Non-powered hand tools are required to meet, as a minimum, the following restrictions. This is not a complete listing of such hand tools, but the same principles apply to other tools of the type.

#### A. Hammers:

1. Hammer heads must be securely mounted on handles, and hammer faces must be free of cracks or irregularities.
2. Hammers must not be used as prying tools, and must be used for their intended purpose. Driving nails with a machinist's hammer is prohibited. Use soft -faced hammers or tempered tools, etc.



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### B. Wrenches and pliers:

1. Wrench and plier jaws must be in good condition.
2. Excessively worn tools must be discarded.

### C. Screwdrivers:

1. Keep screwdriver blades in good condition. Do not use a broken or bent blade.
2. Do not use screwdrivers as chisels, punches, or for prying.
3. Use screwdrivers with insulated handles for electrical work.

### D. Files:

1. Files other than Swiss files must be equipped with handles.
2. Files must be kept clean.
3. Do not use files as, punches, or chisels, or for prying.

### E. Knives:

1. Knives must be kept sharp and clean.
2. Keep knives in protective containers or sheathed when not in use.
3. Do not use knives in place of saws, chisels, etc.
4. Cutting with knives requires complete concentration and care. Employees must not use knives when safer tools will do the job.

#### 6.4.13.3 Powered tools

The comments about hand tools in 6.4.12.2 above also apply to powered hand tools. In addition, powered tools must be used only when in safe mechanical condition.

### A. Electrically-powered tools:

1. Electrical tools must be equipped with a three-wire (grounded) power cable and a three-pronged (grounded)



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plug unless they are double insulated by the manufacture and equipped with a two-prong plug.

2. Attachments used with electrically powered hand tools must conform to the rating, RPM, etc. of the tool. Operating limits must not be exceeded.
3. Electrically-powered tools must not be used if arcing is noted.
4. Electrically-powered tools must not be used in areas where there are combustible gases or vapors.
5. Cords of electrically powered tools must be safeguarded against crushing, pinching, cutting, and crimping. Any break in the insulation is cause for discarding the cord. Patching or taping is not permitted.
6. Electrically-powered tools must not be lifted by the cord.

#### B. Air-powered tools:

1. Attachments to air-powered tools must conform to the tool rating with respect to RPM.
2. All safety devices must be kept on air-powered tools. For example, a rivet gun must be equipped with a rivet set retaining spring at all times.

### **6.4.14 Personal Protective Equipment (Refer to H&S Policy HS-10).**

Protective equipment for protection of eyes, face, head, and extremities, including protective clothing, respiratory devices, and protective shields shall be provided by the company. Personal protective equipment must be used and maintained in a sanitary and reliable condition.

#### 6.4.14.1 Eye Protection

- A. Employees working in locations where eye hazards due to flying particles, hazardous substances, or injurious light rays are inherent in the work or environment must be safeguarded by means of eye protection.
- B. It is the responsibility of the Project Managers to follow the Health and Safety Plan or work with a Health and Safety Manager to provide the type of safety goggles or visors



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required for proper eye protection of employees and transients in work area. Areas where the work performed or the nature of the environment makes eye protection necessary all or most of the time must be designated "eye protection areas" and clearly placarded as such. If visitors are permitted in such areas, they must be provided with appropriate eye protection.

C. Safety glasses must comply with ANSI Standards.

D. Cutting and welding operations.

The requirements for appropriate shades of helmet or goggle lenses are as follows:

- a. Clear lenses and filter lenses up to and including Shade No. 2 filter lenses may be used for resistance welding and for stray light from nearby cutting and welding operations. Metal pouring and furnace work, and reflected light from snow and water and similar injurious ray of low intensity;
- b. Shade No. 5 filter lenses are intended for light gas cutting and gas welding;
- c. Shade No. 6 filter lenses are intended for gas cutting, medium gas welding, and for arch welding up to 30 amperes;
- d. Shade No. 8 filter lenses are intended for heavy gas welding and for arch cutting and welding exceeding 200 amperes;
- e. Shade No. 10 filter lenses are intended for arc welding and cutting exceeding 200 but not exceeding 400 amperes;
- f. Shade No. 12 filter lenses are intended for arc welding and cutting exceeding 200 but not exceeding 400 amperes; and
- g. Shade No. 14 filter lenses are intended for arc welding and cutting exceeding 400 amperes.

NOTE: The shade of lens to use in any instance may well be determined by the individual operator who is using the helmet, hand shield or goggles; but the shade selected should not vary more than two consecutive numbers from the shades specified above. The principal object is to diminish the intensity of the light



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to a point where there will be no injurious visible, infrared, or ultra-violet rays or glare.

### 6.4.14.2 Safety Showers and Eye-Wash Fountains

- A. Quick-acting deluge (safety) showers and bubble-fountain eye wash fountains for simultaneous washing of both eyes are required in all locations (within fifty (50) feet) where accidental body or eye contact may occur with corrosive liquids, acids, powder, dust, or other injurious or irritant substances.
- B. CHS must determine that employees are instructed in the proper and effective use of this equipment
- C. Access to deluge showers and eyewash fountains must be unobstructed at all times
- D. Deluge showers/eye wash must be capable of operating at full capacity (with reserve) for a minimum of fifteen (15) minutes

### 6.4.14.3 Hearing Protection

Hearing Protection is required whenever the steady, or equivalent, noise level exceeds 90 dba. See Rhēa's Hearing Conservation Program in Health and Safety Policy HS 17 for specific requirements.

### 6.4.14.4 Protective Headgear

- A. The requirements for protective headgear are as follows:
  - 1. In locations where the hazard of flying or falling objects or substances is inherent in the work or the environment, employees must be safeguarded by means of approved head protection.
  - 2. Where there is the risk of injury from hair entanglement in moving parts of machinery, employees must confine their hair to eliminate the hazard.
  - 3. It is the responsibility of the Project Manager to follow the Site Safety and Health Plan or consult a Health and Safety Manager to determine PPE requirements.
- B. Types of protective headgear.



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1. The Bump Cap is a soft, pliable plastic cap with an adjustable suspension headband. It is designed for persons who need protection from sharp projections such as door edges, flanges, brackets, and for persons who are working under aircraft and in close quarters. It is designed to prevent head cuts, bumps, and abrasions. It will not provide adequate protection from falling object.
2. The Hard Hat is a hard, plastic type cap with an adjustable suspension headband. It is designed to protect against heavy impacts of a force sufficient to cause fracture, concussion, or unconsciousness. The hard hat is to be worn when there is danger from tools, parts, etc., falling from above, and on all construction and building demolition jobs.

### 6.4.14.5 Safety Shoes

- A. To help prevent foot injuries such, crushed toes, broken bones, all field employees must wear safety shoes.
- B. Rhēa will reimburse the employee for one (1) pair of safety footwear per employee (up to \$100) at the discretion of the CHS upon employment and every two years. See Health & Safety Policy HS 10 for further detail.

### 6.4.14.6 Protective Clothing

It is the responsibility of the company to distribute all necessary protective equipment (see Health & Safety Policy HS 10). It is the responsibility of the Project Manager to provide the types of protective clothing necessary to protect employees. Assistance in identifying acceptable protective clothing may be obtained from CHS. The general requirements for protective clothing are as follows:

#### A. Body Protection

1. Body protection may be required for employees whose work exposes parts of their body, not otherwise protected, to hazardous or flying substances or objects.



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2. Clothing appropriate for the work being done must be worn. Tails, ties, lapels, cuffs, or other loose clothing that can be entangled in moving machinery must not be worn.
3. Clothing saturated or impregnated with flammable liquid corrosive substances, irritants, or oxidizing agents must be removed immediately and not worn until properly cleaned.

### B. Hand Protection

1. Hand protection may be required for employees whose work regularly exposes their hands to hazardous substances, hot or sharp objects.
2. The Project Manager must exercise great care in the direction and supervision of employees with respect to the wearing of gloves when working around machinery. The wearing of gauntlet-type or loose-cuff type gloves around moving machinery should not be permitted, as it may get caught and cause a greater safety hazard.

### C. Foot Protection

1. Foot protection may be required for employers who are exposed to foot injuries from hot, corrosive, or toxic substances or falling objects that may cause injuries, or who are required to work in abnormally wet locations.
2. Under no circumstances shall field employees wear open-toed or canvas shoes.
3. Smooth leather steel toe boots are permitted only in locations where contact with hazardous materials and the boots is not anticipated.

### D. Personal Protective Equipment

1. Personal protective equipment that is defective or inappropriate to the extent that its ordinary use creates the possibility of injuries must not be worn.
2. Refer to Rhēa's Personal Protective Equipment Policy in Health and Safety Policy HS 10.



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### 6.4.14.7 Respiratory Protection

Refer to Rhēa's Respiratory Protection Program in Health and Safety Policy HS 11.

### 6.4.15 Safety Hazards Associated with the Site Features

6.4.15.1 Site hazards may include, but are not limited to the following:

- A. Holes or ditches, uneven terrain, sharp objects, slippery surfaces, steep grades, unstable surfaces.
- B. Excavation and trenching have special hazards (see Health and Safety Policy HS ).
  - a. "Cave-in" of walls: shoring or sloping is needed if 3' or more;
  - b. Pay attention to soil stability and location of heavy equipment on top (nearby);
  - c. Depth to groundwater should be known.;
  - d. Confined Spaces hazard: proper entry required. (See Health and Excavation inspections should be made daily by the competent person as specified in Health & Safety Policy HS .
- C. Equipment or objects overhead or underground
  - a. Electrical power lines;
  - b. Buried power cables or gas or water lines; and
  - c. Buried waste containers

### 6.4.16 Stopping Work: Unsafe Operations

6.4.16.1 In the absence of the PM from the field site, the PM will delegate authority to the Field Supervisor and/or SSO to suspend site operation whenever there is reason to believe that continuing will lead to injury of personnel or damage to property.

6.4.16.2 The Field Supervisor is responsible for stopping the operation whenever they have reason to believe that continuing will led to injury of personnel or damage to property.

6.4.16.3 The SSO is authorized to request that the Field Supervisor stop any operations that is believed to present an imminent hazard,



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may lead to injury of personnel or property damage. A report shall be issued by the SSO to the Project Manager and HSD after each instance of stop work.

6.4.16.4 Small projects often do not have separate individuals acting as Field Supervisor and SSO. In such cases where the Field Supervisor has responsibility as the SSO, they will be responsible for making field decision with respect to suspension of field activities.

6.4.16.5 Employees will report situations that they believe are imminent hazards, may lead to injury of personnel or property damage to the Field Supervisor or SSO upon recognition of the hazard.

6.4.16.6 The SSO is authorized to directly contact the HSD, or CHS to consult on conditions, which may warrant a work stoppage.

### **6.4.17 Transportation Safety**

6.4.17.1 Unsafe Conditions:

- A. Tires - low pressure, bald;
- B. Windows - dirty or frosty;
- C. Steering - pulling to one side
- D. Brakes – need pumping, worn out;
- E. Lights -not working; and
- F. Seat belts - non-operational or not present

6.4.17.2 Unsafe Acts:

- A. Bumper jack - wheels not chocked;
- B. Hot Radiator - opening before cooling;
- C. Not wearing seat belt; and
- D. Jumping battery and shorting out on your metal wristwatch band.

### **6.4.18 Excavations, Trenching, and Shoring**

6.4.18.1 Any excavation over five (5) feet deep which a person is required to descend must be evaluated by a competent person to determine applicable regulations.



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- A. Permits - may be required by specified agencies;
- B. The local city, county or other agencies may require additional permits;
- C. All work in an excavation must be approved by a competent person prior to entry. State law requires evaluation and approval by a Registered Engineer in some states. Check state and local regulations;
- D. If benching at a safe angle can be done, shoring is not necessary;
- E. If shoring is done, planks must be at least 2 inches thick and plywood 1-1/8 inches thick; and
- F. Ladders to exit must be less than 25 feet apart.

### **6.4.19 Working Alone**

6.4.19.1 Working alone is not permitted under hazardous conditions.

Examples of hazardous conditions are:

- A. Work under 29 CFR 1910.120, Hazardous Waste Operations;
- B. Electrical work on high voltages (over 500V), on switching equipment, or in remote or inaccessible areas;
- C. Work on high- pressure equipment (pressures above 155 psi, excluding shop air or instrument supply air up to 140 psi in lines not exceeding 112 inch diameter);
- D. Activities using explosives;
- E. Work involving machine tools (as in machine shops), heavy equipment, and/or moving equipment;
- F. Confined areas or spaces;
- G. Work in remote or inaccessible area; and
- H. A supervisor may place additional limitations on working alone whenever, in their judgment, the work situation constitutes an undue risk of the employee's safety.

### **6.4.20 Office Safety (Refer to Health & Safety Policy HS-24).**

6.4.20.1 Office Safety Precautions

- A. Every office occupant must know the locations of emergency exits, fire extinguishers, emergency communication equipment (and procedures for its use), first aid equipment, and other



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emergency equipment that may be necessary for the particular office and location. An emergency plan for the office must be posted in a general work area and should be distributed to or discussed with each new employee.

- B. In offices where smoking is permitted, smoking is allowed only in specifically designated areas. Only ashtrays are to be used for discarded smoking materials.
- C. Extension cords are not permitted in offices except for temporary conditions such as using an overhead or slide projector to make a presentation. Do not overload outlets or circuits by using extension cords or outlet multipliers. Multiple outlet bars with circuit breaker protection are permissible in most locations.
- D. All electrical equipment used in the office must be grounded or double insulated and Underwriter's Laboratory approved. Do not remove grounding pins or plugs. Report defective equipment immediately.
- E. Cords on office machines and equipment must be kept in good repair and protected from damage.
- F. Electrical cords, wastebaskets, boxes, etc., must not be located in walkways or other areas where they may cause a person to trip or fall.
- G. Floors shall be kept clear of objects; spills shall be cleaned up promptly
- H. Desk drawers and file cabinet drawers must be closed when not in use.
- I. Desks, tables, bookcases, etc., must be positioned so as not to block aisle-ways or exits. Aisle-ways must have a minimum width of 30 inches.
- J. Occupants must not read or carry objects blocking their view while walking. Be alert at corners or stepping into passageways for pedestrian or vehicle traffic. Use a cart or hand truck to move large or heavy packages.



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- K. File cabinets and bookshelves should have heavier materials stored in bottom drawers or lower shelves. Open only one drawer of a file cabinet at a time.
- L. The tops of bookcases or file cabinets should not be used for storage of loose papers, magazines, or materials, which could fall or cause the bookcase to tip over.
- M. Climbing on chairs, boxes, or desks to reach overhead objects is not permitted. Use approved steps or ladders and avoid storing items above head level.
- N. Items stored in closets and other storage areas must be stacked or shelved securely.
- O. Objects hanging on walls, cabinets, etc., must be properly secured. Objects with sharp edges or edges that protrude more than one inch from the wall must not present a hazard to passersby
- P. Sharp or pointed objects such as pins, knives, shears, scissors, etc., must be used with care. When stored in drawers, they must be stored safely so as not to present a hazard when reaching into the drawer.
- Q. When sitting in a chair, do not tilt the chair back onto its back legs or off of a stable base.
- R. While sitting at a video display terminal, be sure to adjust the chair and screen to comfortable position with minimal glare. To avoid eyestrain, do not increase the screen brightness too much. Take breaks and opportunities to change body position and to flex muscles.
- S. Samples and sampling equipment brought into the office must be externally clean and free of contamination.
- T. Samples must be stored in a designated closet, storage area, or refrigerator. Samples requiring refrigeration are not permitted in refrigerators used for food storage, and food is not permitted in sample storage areas. Refrigerators used for the purpose of sample storage must be labeled "No Food Permitted".



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- U. Samples may be stored only either overnight or over a weekend prior to shipment to a laboratory or to an archive. Repackaging of samples from the original sample container is not permitted in the office.
- V. Employees are advised to be aware of hazards associated with products or chemicals used in the course of their activities in the office. Consult the manufacturer's labels, instructions, or Material Safety Data Sheers (MSDSs), or ask your HSD or Corporate Health and Safety about possible health or safety hazards.

### 6.4.20.2 Emergency/Evacuation Procedures

Every office will have an evacuation plan developed to cope with emergencies (fire, explosion, toxic fumes, bomb threat, natural disasters, etc.) Which could endanger personnel or property. This plan will include procedures and instructions regarding signals and alarms, evacuation routes, and assemble points for office personnel. Each plan will be implemented with the following general considerations in mind:

- A. The evacuation procedure will be posted throughout the office.
- B. All personnel must know exactly what action to take in the event alarms sound.
- C. One person will be assigned to each assembly point to make a "head count."
- D. A monitor will gather all lists from assembly points and report to the Evacuation Coordinator.
- E. No effort should be made to re-enter evacuated areas to persons must be reported to the Evacuation Coordinator.

### 6.4.2. Environmental Auditing - Health and Safety Requirements

6.4.21.1 Employees engaged in environmental auditing of client facilities must exercise appropriate precautions to protect themselves from injury or potential exposure to toxic or hazardous materials. Appropriate precautions will include but not be limited to minimum standards set forth in this section. Client health and safety requirements will serve as a minimum standard. The



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Health and Safety Manager will be consulted to discuss specific projects.

- A. The Project Manager will be responsible for obtaining health and safety requirements from clients. The Project Manager should inquire about potential safety hazards, chemical hazards, and exposure to hazardous agents.
- B. Appropriate personal protective equipment will be worn by employees conducting audits. This includes, at a minimum:
  1. Safety shoes/boots with steel toes and chemical resistant leather;
  2. Safety glasses with side shields;
  3. Hard hat as necessary; and
  4. Other PPE requirements that protect against potential exposure including gloves, clothing, hearing protection, and others should be investigated with the client representative by the Project Manager.
- C. The Project Manager will assure that all employees are notified of health and safety requirements, wear appropriate PPE and observe prescribed precautions.
- D. Environmental auditing projects may require a Health and Safety Plan as described under Health & Safety Policy HS 5. Discuss specific projects with the Health and Safety Manager.

6.4.21.2 Employees should be trained in protective measures that are utilized while at client facilities and emergency procedures that may be implemented including

- A. Characteristics of hazardous chemical/agents;
- B. Recognition of leaks or exposures to hazardous chemicals/agents;
- C. Emergency evacuation and assembly procedures;
- D. Protective measures to prevent or mitigate personal exposure to hazardous chemicals/agents; and
- E. Emergency reporting requirements.