

## FINAL SITE SPECIFIC HEALTH AND SAFETY PLAN

**Site:** PHASE II - PCB-CONTAMINATED SOILS AND CONCRETE  
REMEDATION

**Location:** GOULD ISLAND, NAVAL STATION NEWPORT,  
NEWPORT, RHODE ISLAND

**Prepared by:** FOSTER WHEELER ENVIRONMENTAL CORP.

**Date Prepared:** June 5, 2002

**Revision:** 2

**Task Description:** CONCRETE DEMOLITION AND PCB CONTAMINATED CONCRETE AND  
SOIL REMOVAL

**Contract Task Order #:** 0069

**Waste Types:** Solid

**Characteristic:** Status: Inactive, Military

**Overall Hazard:** Moderate

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CONTRACTOR DRAWINGS & INFORMATION SUBMITTAL  
EFANENAVFACENGCOM 4335/3 (Rev. 6/80)

CONTRACT NO. <b>N62472-99-D-0032</b>	CONTRACT TASK ORDER NO. <b>0069</b>	ACTIVITY LOCATION <b>Gould Island – Newport, RI</b>
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PROJECT TITLE:  
**PCB Characterization and Removal – Gould Island**

FROM: <b>Foster Wheeler Environmental Corp.: Program QC Manager Thomas Kelly</b>	DATE July 16, 2002
TO: <b>C. Davis (E-Copy)</b>	DATE July 16, 2002

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<b>NSNPT:</b>	M. Griffin
<b>NSNPT:</b>	W. Monaco, CRMC, Two Extra (Sent to M. Griffin for Distribution)
<b>USEPA:</b>	K. Tisa
<b>RIDEM:</b>	P. Kulpa

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 \_\_\_\_\_ *Thomas Kelly*                     
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TO: ROICC	DATE

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COPY TO:

ROICC                     
  DESIGNER                     
 \_\_\_\_\_  
 SIGNATURE AND DATE

FROM: ROICC	DATE
TO: CONTRACTOR	DATE

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 DATE  
 ACTIVITY NORTHEAST - NAVAL FACILITIES ENGINEERING  
 COMMAND

ITEM NO.	SUBMITTAL DESCRIPTION	PREPARED/SUBMITTED BY	APPROVED	DISAPPROVED	REMARKS
1	SD-08, Statements; Final Site-Specific Health and Safety Plan for Phase II PCB Contaminated Soils and Concrete Remediation – Gould Island	Thomas Kelly			

**APPROVALS**

By their signature, the undersigned hereby certify that the Site Specific Health and Safety Plan (SHSP) has been reviewed and approved for use during the remedial actions involving the removal of PCB contaminated soil and concrete at Gould Island, Naval Station Newport, Newport, RI.

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CONTRACT TASK ORDER MANAGER

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DATE

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SITE SUPERINTENDENT

---

DATE

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PROJECT ENVIRONMENTAL AND SAFETY MANAGER

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DATE

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SITE HEALTH AND SAFETY OFFICER

---

DATE

**GOULD ISLAND, NAVAL STATION NEWPORT  
NEWPORT, RHODE ISLAND**

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## **1.0 INTRODUCTION**

This Site Specific Health and Safety Plan (SHSP) for the Gould Island, Naval Station Newport, Newport, RI addresses the health and safety practices that will be employed by all site workers participating in field operations associated with the Phase II waste remediation project. This SHSP takes into account the specific hazards inherent to the site work and presents procedures to be followed by Foster Wheeler Environmental Corporation, its subcontractors and all other on-site personnel in order to avoid and, if necessary, protect against health and/or safety hazards. Activities performed under this SHSP will comply with OSHA Regulations 29 CFR Parts 1910 and 1926, USACE EM 385-1-1, the Final Master Site Health and Safety Plan for Gould Island, Naval Station Newport, Newport, RI, dated July 22, 1999, and revision 2, dated 3/7/01 as well as the Foster Wheeler Environmental Corporation Health and Safety Program. The Master Site Health and Safety Plan will be maintained on site. Modifications to this SHSP may be made with the approval of the PESM and the Navy using the Field Change Request Form in Appendix A.

### **1.1 Purpose**

The purpose of this remedial action is to remediate the areas with PCB contamination on Gould Island delineated in the Phase I Sampling. Also, to obtain an interim clean up goal of 10 ppm in specific locations and 1 ppm in areas adjacent to the former Building 54 transformer vault (shoreline). Remediation includes the proper off-site transportation and removal of PCB contaminated soils, sediment, concrete and liquids.

### **1.2 Scope of Work**

The work shall include, but not be limited to the following:

- Mobilization/Demobilization
- Site Preparation
- Phase II Site Activities
  - Excavation of Soil
  - Demolition and Removal of Concrete
  - Confirmation Sampling
- Site Restoration Activities

#### **1.2.1 Project Description**

Under CTO 069, this SHSP has been prepared to focus on the health and safety of personnel during remediation based upon the results of the Phase I Sampling associated with the characterization of PCB contaminated soil/sediment associated with the Transformer Vaults and concrete roadways on the Site. The transformer vaults are identified as Buildings 53, 54, 56, 60, 61, and the switch house/ transformer vault, Building 59.

This SHSP presents the health and safety precautions to be used during this remediation project. More information on procedures is available in the Work Plan.

### 1.2.2 Mobilization

FWENC personnel will include a Site Superintendent, Site Engineer, Site Health and Safety Officer (SHSO), subcontract personnel and craft workers.

FWENC will utilize the existing office trailer at the Gould Island Site. All utilities at the work Site will be temporary. Electricity will be provided by portable generators, and water will be obtained from the mainland and transported to the island via barge, if required. Sanitary facilities will be available at the FWENC office trailer.

Additionally, FWENC will mobilize all necessary equipment and material required for the remedial actions.

### 1.2.3 Site Preparation

Site zones will be established in preparation of intrusive activities and are intended to control the spread of contamination throughout Gould Island. Specific zones (an exclusion zone, a contamination reduction zone, and a support zone) shall be established for each work area including the six transformer vaults, the Grid F2 removals and the three Rapid Assay Test Location removals within the Site. Refer to Figure 1 in Appendix B for a map of the Site Zones to be established for each specific work area. Note that the SHSO may need to adjust the boundaries of the specific zones prior to commencement of work. Should the configurations of the zones change, the changes will be incorporated into the SHSP. A description of each zone is as follows:

- All intrusive activities that may involve exposure to hazardous materials and/or conditions will be contained within an exclusion zone (EZ). This zone includes each specific work area and within a minimum of 20-feet around each vault. The area will be prepared to accommodate all excavations, field personnel, and emergency equipment.
- The area just beyond the EZ is called the contamination reduction zone (CRZ). The CRZ contains the contamination reduction corridor (CRC) which is an area for decontamination of heavy equipment, hand-held equipment, and personnel. The CRC will be used for EZ entry and egress in addition to access for heavy equipment and emergency support services.
- The support zone (SZ) is the uncontaminated area following the CRZ and will be the field support area for most operations. The SZ provides for field team communications and staging for emergency response. Safety equipment will be located in this zone.

During the Site preparation, the existing hay bales used for sedimentation and erosion control will be inspected. Following the inspection, the proper repairs will be completed and any controls needing replacement will be completed.

#### 1.2.4 Phase II Site Activities

Remediation at the Gould Island Site will include the excavation and off-site disposal of PCB contaminated concrete/soil/sediment. A delineation of the waste was completed using the results from the Phase I sampling effort.

The concrete/soil/sediment whose sample results were greater than 50 ppm will be taken off-site to a TSCA regulated facility for ultimate disposal. The TSCA regulated material will be sent to the CWM in Model City, New York. Confirmatory samples will be taken from the removal areas to ensure that the interim removal goal has been met at that location. Based upon the confirmatory results, if the interim clean up goal of either 10 ppm or 1 ppm is not met, the excavation will be expanded and re-sampled until the goals are met.

Concrete removal must be performed on specific sections of the concrete roadway, and Building 53, Building 56, Building 59, and Building 60 foundations. The Building 54 foundation has been removed and will require soil removal only. The concrete will be demolished using an excavator with a hydraulic hammer. A second excavator with a thumb will be used to place the removed concrete into the appropriate stockpile or container for off-site disposal.

The soil/sediment will be segregated using the results of the Phase I Sampling that was performed at the Site. There are three (3) anticipated stockpiles of material. The proposed location for soil/sediment stockpiles will be the Building 32 floor slab. FWENC may choose to direct load soils into lined roll off containers if the quantity is minimal to eliminate stockpiling. Waste characterization sampling will then be accomplished by taking the sample from the roll off container rather than a soil stockpile. Each stockpile will be properly sampled and characterized prior to off-site disposal as outlined in Section 6.0, the Field Sampling and Analysis Plan. One (1) stockpile will contain material (assumed dry) with less than 10 ppm which will be removed and stockpiled to be used as a backfill supplement. This material will be properly sampled prior to using it as backfill. Another stockpile will contain the material with results greater than 10 ppm PCBs and less than 50 ppm PCBs which will be ultimately placed into dump trucks or dump trailers for disposal to a non-TSCA regulated facility. The third stockpile will be for soil greater than 50 ppm PCB. Any excavated wet soil/sediment may require drying. Consequently, a temporary staging area will be created using hay bales and an appropriate liner (30 mil) to construct a bermed area. The bermed area will be used to gravity separate the solids and liquids from the excavated material. A pump or vacuum truck will be used to decant the water from the soil/sediment. RCRA waste characterization sampling will be performed from the three stockpiles to confirm proper disposal. All collected liquids will be stored in an on-site storage tank, sampled and disposed of accordingly.

**TABLE 1-1 SUMMARY OF SAMPLING RESULTS**

<b>RESULTS OF SOIL SAMPLES COLLECTED BENEATH ROADWAY</b>				
<b>SAMPLE ID</b>	<b>DATE COLLECTED</b>	<b>PCB METHOD</b>	<b>RESULT (ppm)</b>	
GIPI-RD-F1	2/7/02	3550/8082	2.3	
GIPI-RD-F1-E	2/20/02	3550/8082	1.35	
GIPI-RD-F2	12/20/01	3550/8082	291	
GIPI-RD-F2-N	1/24/02	3550/8082	14.6	
GIPI-RD-F2-W	1/24/02	3550/8082	244	
GIPI-RD-Q26B-TOP	1/3/02	3550/8082	1.36	
GIPI-RD-Q35B9-TOP	12/28/01	3550/8082	4.71	
GIPI-F2-E-B1-2	3/6/02	3545/8082	30.8	
GIPI-F2-E-B1-3	3/6/02	3545/8082	0.038	
GIPI-F2-E-B1-4	3/6/02	3545/8082	1.7	
GIPI-F2-E-B1-5	3/6/02	3545/8082	0.07	
GIPI-F2-E-B1-6	3/6/02	3545/8082	0.035	
GIPI-F2-E-B1-7	3/6/02	3545/8082	0.213	
GIPI-F2-E-B1-8	3/6/02	3545/8082	0.15	
GIPI-F2-W-B1-1	2/25/02	3545/8082	658	
GIPI-F2-W-B1-2	2/25/02	3545/8082	1.64	
GIPI-F2-W-B1-3	2/25/02	3545/8082	0.434	
<b>BUILDING 53 RESULTS OF SOIL SAMPLING</b>				
<b>SAMPLE ID</b>	<b>DATE COLLECTED</b>	<b>PCB METHOD</b>	<b>IA RESULT</b>	<b>RESULT (ppm)</b>
GIPI-53-B1-NW	1/10/02	3550/8082	Not Performed	2.45
GIPI-53-B1-7	1/10/02	3550/8082	Not Performed	2.12
GIPI-53-B1-8	1/10/02	3550/8082	Not Performed	1.24
GIPI-53-B1-9	1/10/02	3550/8082	Not Performed	11.6
GIPI-53-B2-1	1/9/02	3550/8082	Not Performed	6.71
GIPI-53-B4-1	1/17/02	3550/8082	0.18	1.46
GIPI-53-B15-1	1/15/02	3550/8082	Non-detect	1.12
GIPI-53-B19-1	1/9/02	3550/8082	3.64	15.8
GIPI-53-B19-8	1/9/02	3545/8082	Not Performed	1.19
GIPI-53-B22-1	1/8/02	3550/8082	0.3	3.06
<b>BUILDING 54 RESULTS OF SOIL SAMPLING</b>				
GIPI-54-B1-SW	1/10/02	3550/8082	Not Performed	4020
GIPI-54-B1-SW-8	1/10/02	3550/8082	Not Performed	2810
GIPI-54-B1-SW-9	1/10/02	3550/8082	Not Performed	7660
GIPI-54-B1-SW-10	1/10/02	3550/8082	Not Performed	124
GIPI-54-B1-SW-11	1/17/02	3545/8082	Not Performed	22.9
GIPI-54-B1-SW-13	1/17/02	3545/8082	Not Performed	6.28
GIPI-54-B18-7	1/22/02	3545/8082	Not Performed	2.18
GIPI-54-B20-5	1/25/02	3545/8082	Not Performed	1.77
GIPI-54-B20-7	1/25/02	3545/8082	Not Performed	3.68
GIPI-54-B24-1	2/6/02	3545/8082	Not Performed	1.25
GIPI-54-B26-1	1/25/02	3545/8082	Not Performed	4.32
GIPI-54-B26-2	1/25/02	3545/8082	Not Performed	4.41
GIPI-54-B26-3	1/25/02	3545/8082	Not Performed	3.96
GIPI-54-B26-4	1/25/02	3545/8082	Not Performed	1.87
GIPI-54-B26-5	1/25/02	3545/8082	Not Performed	12.2
GIPI-54-B29-1	1/30/02	3545/8082	Not Performed	1.39
GIPI-54-B31-3	1/22/02	3545/8082	Not Performed	4.82
GIPI-54-B31-5	1/22/02	3545/8082	Not Performed	161
GIPI-54-B31-6	1/22/02	3545/8082	Not Performed	23600
GIPI-54-B31-7	1/24/02	3545/8082	Not Performed	7540

**TABLE 1-1 SUMMARY OF SAMPLING RESULTS (Continued)**

<b>BUILDING 54 RESULTS OF SOIL SAMPLING (Continued)</b>				
<b>SAMPLE ID</b>	<b>DATE COLLECTED</b>	<b>PCB METHOD</b>	<b>IA RESULT</b>	<b>RESULT (ppm)</b>
GIPI-54-B31-8	1/24/02	3545/8082	Not Performed	163
GIPI-54-B31-9	1/24/02	3545/8082	Not Performed	17.7
GIPI-54-B31-10	1/25/02	3545/8082	Not Performed	11.7
GIPI-54-B31-11	1/25/02	3545/8082	Not Performed	1.11
GIPI-54-B34-5	1/22/02	3545/8082	Not Performed	1.02
GIPI-54-B35-2	1/29/02	3545/8082	Not Performed	5.45
GIPI-54-B36-1	1/17/02	3545/8082	1.75	1.54
GIPI-54-B36-2	1/17/02	3545/8082	0.77	1.01
GIPI-54-B36-11	1/24/02	3545/8082	Not Performed	6.07
GIPI-54-B38-12	1/24/02	3545/8082	Not Performed	1.84
GIPI-54-B39-1	1/28/02	3545/8082	Not Performed	5.99
GIPI-54-B45-1	1/31/02	3545/8082	Not Performed	3.45
GIPI-54-B45-3	1/31/02	3545/8082	Not Performed	8.88
<b>BUILDING 54 RESULTS OF SEDIMENT SAMPLING</b>				
GIPI-54-B40-1	1/14/02	3545/8082	Not Performed	3.04
GIPI-54-B40-2	1/14/02	3545/8082	Not Performed	2.79
GIPI-54-B42-1	1/14/02	3545/8082	Not Performed	1.61
GIPI-54-B48-1	1/29/02	3545/8082	Not Performed	1.48
<b>BUILDING 56 RESULTS OF SOIL SAMPLING</b>				
GIPI-56-B1-CTR	1/10/02	3550/8082	Not Performed	7
GIPI-56-B1-8	1/10/02	3550/8082	Not Performed	15.6
GIPI-56-B9-1	2/11/02	3545/8082	Not Performed	1.84
GIPI-56-B13-1	2/14/02	3545/8082	Not Performed	1.76
GIPI-56-B14-1	2/12/02	3545/8082	Not Performed	2.84
GIPI-56-B16-1	2/8/02	3545/8082	Not Performed	3.06
GIPI-56-B22-1	2/8/02	3545/8082	Not Performed	2.16
GIPI-56-B26-1	2/8/02	3545/8082	Not Performed	7.84
<b>BUILDING 59 RESULTS OF SOIL SAMPLING</b>				
GIPI-59-B3-1	2/27/02	3545/8082	Not Performed	2.81
GIPI-59-B6-1	2/27/02	3545/8082	Not Performed	2.96
GIPI-59-B10-1	2/27/02	3545/8082	Not Performed	19.2
GIPI-59-B11-1	3/4/02	3545/8082	Not Performed	354
GIPI-59-B12-1	2/27/02	3545/8082	Not Performed	1.16
GIPI-59-B19-1	2/28/02	3545/8082	Not Performed	1.304
GIPI-59-B25-1	2/27/02	3545/8082	Not Performed	1.74
GIPI-59-B26-1	3/4/02	3545/8082	Not Performed	2.84
<b>BUILDING 60 RESULTS OF SOIL SAMPLING</b>				
GIPI-60-B1-CTR	1/14/02	3550/8082	Not Performed	134
GIPI-60-B1-6	1/14/02	3550/8082	Not Performed	23.6
GIPI-60-B1-8	1/14/02	3550/8082	Not Performed	2.15
GIPI-60-B14-1	2/22/02	3545/8082	Not Performed	14.2
GIPI-60-B15-1	2/21/02	3545/8082	Not Performed	29.2
GIPI-60-B15-3	2/21/02	3545/8082	Not Performed	7.68
<b>BUILDING 60 RESULTS OF SOIL SAMPLING</b>				
GIPI-61-B2-1	2/28/02	3545/8082	Not Performed	2.34
GIPI-61-B2-2	2/28/02	3545/8082	Not Performed	2.68
GIPI-61-B15-2	3/4/02	3545/8082	Not Performed	2.29

Based upon the analytical results of the Phase I Sampling performed on the concrete roadway at the site, it was determined that the concrete roadway associated with grid F2 and the concrete slabs adjacent to Building 56 and Building 59, would be removed and disposed of as TSCA waste. The F2 grid location will be removed and disposed of as TSCA waste based on the elevated PCB result at sample GIPI-RD-F2 of 291 ppm. The concrete adjacent to Buildings 56 and 59 will be sent off site as TSCA waste based on adjacent soil results from each specific vault. The remaining concrete will be removed and sent off site for recycling per the Concrete Roadway Demolition Work Plan prepared in June 2001. The limits of PCB contamination and areas of concrete removal will be spray painted directly on the concrete based upon sample locations established during the Phase I sampling effort. These areas will include the F2 grid location (TSCA), Building 56 (grid Q26B, TSCA) and Building 59 (grid Q35B9, TSCA). All remaining concrete will be sent off site for recycling. See the Work Plan for more detail.

The area of F2 grid is approximately 1,400 square feet. This section of concrete when removed will be sent to a TSCA regulated facility for proper disposal.

The areas of concrete adjacent to Building 56 and Building 59, are both approximately 200 square feet. These sections of concrete when removed will be sent to a Non-TSCA regulated facility for proper disposal. The areas of concrete near Building 56 and Building 59 to be disposed of at the Non-TSCA regulated facility had sample results that were greater than 1 ppm PCBs but less than 50 ppm PCBs.

Confirmatory soil sampling in the areas of concrete removed during previous remedial actions indicate that no soil excavation beneath the previously removed concrete roadway is necessary. The results ranged from non-detect to 1.94 ppm PCBs.

Based upon the results of the Phase I soil sampling performed beneath grid F2, an approximate 40-foot by 40-foot by 8-foot deep excavation would be required to remediate the soil. See the Work Plan for detailed limits of removal.

The sample results for the soil, as shown in Table 1-1, indicate that the soil beneath the concrete roadway at grid F2 exceeded the removal criteria of greater than 10 ppm PCBs. Therefore, the area 10-feet horizontally west of sample location F2-W will be overly excavated to the limits of the grid G-2 concrete sample location. Additionally, the area 10-feet horizontally east of sample location F2-E will be overly excavated to the limits of the grid E-2 concrete sample location. The area 10-feet horizontally south of sample location F2-B1 will be overly excavated to the limits of the F2 grid. Lastly, soil will be excavated to the northern limits of the concrete roadway in grids E-1, F-1, and G-1. An approximate 40-foot by 40-foot square area of soil beneath grid F2 will be excavated to approximately 8-feet bgs. The soil removed during the excavation will be taken off-site as TSCA regulated material.

Confirmatory samples are required for this excavation. The sidewalls of the excavation will be sampled every 10-feet horizontally at approximately 4-feet below the surface (the vertical midpoint of the sidewall) and the base will be sampled every 100 square feet (sf) in approximately 10 x 10 foot grids. Samples will be taken from the bucket of the backhoe or excavator. If it is necessary for workers to enter the excavation then the side of the excavation must be sloped to proper angle as per FWENC EHS 6-3.

#### 1.2.4.1 – Building 53

Based upon the results of the Phase I Sampling and data from previous remedial actions at Building 53, it was determined that the footprint and the existing foundation of Building 53 will be removed. Additionally, one (1) hot spot excavation at sample location GIPI-53-B19 will be completed as part of the remedial effort. See the Work Plan for more details.

Sampling performed during the previous remedial action of removing the building slab indicated elevated levels of PCBs. Consequently, the existing foundation including minimal associated soils will be taken off-site to a TSCA regulated facility.

The sample results for Building 53, as shown in Table 1-1, indicate that the soil at sample location GIPI-53-B1 is greater than the interim goal of 10 ppm PCBs. This sample location is included within the limits of the building foundation, which will be excavated during the removal and disposed of as TSCA waste. Due to the depth of the sample detection, the limits of excavation will be extended to approximately 10-feet bgs to the GIPI-B1-10 location. Additionally, the soil at sample location GIPI-53-B19 must be excavated. A 10-foot by 10-foot square area around the hot spot will be excavated to 2-feet below ground surface (bgs). The soil removed during the hot spot excavation will be taken off-site as TSCA regulated material.

Two (2) sets of confirmatory samples are required for this excavation. The sidewalls of the building excavation will be sampled every 10-feet horizontally at approximately 5-feet below the surface (the vertical midpoint of the sidewall) and the base will be sampled every 100 square feet (sf) in approximately 10 x 10 foot grids. One base sample will be collected every 100 sf from the approximate center of the 10 x 10 foot grid. The GIPI-53-B19 location will be sampled every 10-feet horizontally and one base sample will be collected in the center of the excavation. Samples will be taken from the bucket of the backhoe or excavator. If it is necessary for workers to enter the excavation then the side of the excavation must be sloped to proper angle as required by FWENC EHS 6-3, “Excavation and Trenching”.

#### 1.2.4.2 - Building 54

Based upon the results of the Phase I Sampling and data from previous remedial actions at Building 54, it was determined that the approximate size of the excavation would be 40-foot by 40-foot to the depth of 13-feet bgs. Additionally, the excavation will include the soil from boring location GIPI-54-B26 and GIPI-54-B31. The proposed limits of the excavation are several borings around the perimeter of the former vault that contain less than 10 ppm PCBs.

See the Work Plan for details. For PCB contaminated soil located in an ecologically sensitive area, an interim removal goal of less than 1 ppm has been established. For purposes of this project, an ecologically sensitive area is defined as an area 10 horizontal feet from the shoreline and or the normal high tide elevation. Additionally, a profile of the shoreline depicting the sediment locations relative to the high tide elevation will be used to determine the extent of soil/sediment removal. From the high tide elevation / shoreline location 13-feet horizontally up the slope will separate the limits of removal. Within that 13-feet, the interim clean-up criteria will be 1 ppm PCBs and up gradient of the 13-feet will be 10 ppm PCBs. Consequently, there will be five (5) hot spot excavations, involving soil/sediment, which will require excavation to meet an interim clean up goal of 1 ppm PCBs. All activities during Building 54 excavation will occur at low tide. A turbidity barrier will be installed for erosion and sedimentation control during any intrusive activities along the shoreline.

Sampling performed during the previous remedial action of removing the building slab indicated elevated levels of PCBs. Consequently, all soils / sediment from Building 54 will be taken off-site to a TSCA regulated facility. Additionally, the sample results for Building 54, as shown in Table 1-1, indicate that the soil at sample locations GIPI-54-B26 and GIPI-54-B31 must be excavated and removed as TSCA waste. These sample locations will fall within the 40-foot by 40-foot excavation.

The five (5) hotspot excavations are at sample locations GIPI-54-B29, GIPI-54-B45 for soil removal and GIPI-54-B40, GIPI-54-B42, and GIPI-54-B48 for sediment removal. For sample location GIPI-54-B45, a 10-foot by 10-foot square around the hot spot will be excavated to 4-feet bgs. Sample locations GIPI-54-B29, GIPI-54-B42 and GIPI-54-B48, a 10-foot by 10-foot square around each hot spot will be excavated to 2-feet bgs. Sample location GIPI-54-B40, a 10-foot by 10-foot square around the hot spot will be excavated to 3-feet bgs. These soils will be placed in a bermed area in order to allow the soil to drain. All recovered liquids will be removed, stored in on-site containers, sampled and disposed of properly. The soil removed during the hot spot excavation will be taken off-site as TSCA regulated material.

Six (6) sets of confirmatory samples are required for this area. The sidewalls of the 40-foot by 40-foot excavation will be sampled every 10-feet horizontally at approximately 6-feet below the surface (the vertical midpoint of the sidewall) and the base will be sampled every 100 square feet (sf) in approximately 10 x 10 foot grids. One base sample will be collected every 100 sf from the approximate center of the 10 x 10 foot grid. The remaining five (5) sediment hot spot excavations will be sampled every 10-feet horizontally and one base sample will be collected in the center of the excavation. Samples will be taken from the bucket of the backhoe or excavator. If it is necessary for workers to enter the excavation then the side of the excavation must be sloped to proper angle as required by FWENC EHS 6-3, "Excavation and Trenching".

#### 1.2.4.3 – Building 56

Based upon the results of the Phase I Sampling and data from previous remedial actions at Building 56, it was determined that the existing foundation of Building 56 will be removed.

See the Work Plan for more detail. Sampling performed during the previous remedial action of removing the building slab indicated elevated levels of PCBs. Consequently, the existing foundation including minimal associated soils will be taken off-site to a TSCA regulated facility. Additionally, the sample results for Building 56, as shown in Table 1-1, indicate that the soil at sample location GIPI-56-B1 is greater than the 10 ppm PCBs interim clean up goal. This sample location is included within the limits of the foundation and will be included in the excavation. Due to the depth of the sample detection, the limits of excavation will be extended to approximately 9-feet bgs to the GIPI-56- B1-9 sample location.

One (1) set of confirmatory samples is required for this excavation. The sidewalls of the excavation will be sampled every 10-feet horizontally at approximately 4-feet below the surface (the vertical midpoint of the sidewall) and the base will be sampled every 100 square feet (sf) in approximately 10 x 10 foot grids. One base sample will be collected every 100 sf from the approximate center of the 10 x 10 foot grid. Samples will be taken from the bucket of the backhoe or excavator. If it is necessary for workers to enter the excavation then the side of the excavation must be sloped to proper angle as required by FWENC EHS 6-3, "Excavation and Trenching".

#### 1.2.4.4 – Building 59

Based upon the results of the Phase I Sampling and data from previous remedial actions at Building 59, it was determined that it would not be necessary to remove the existing foundation as contaminated waste. However, the Navy has chosen to remove the existing foundation as part of the Concrete Roadway Demolition project. The existing foundation and associated minimal soils will be disposed of as TSCA waste if soil PCB results in the immediate area are greater than 1 ppm. Prior to the removal of the existing foundation, Foster Wheeler will close the sump located within the switch house side of the vault in accordance with the RIDEM Underground Injection Control Program. Two (2) hot spot excavations at sample locations GIPI-59-B10 and GIPI-59-B11 will be completed as part of this remedial effort.

Additionally, the sample results for Building 59, as shown in Table 1-1, indicate that the soil at sample locations GIPI-59-B10 and GIPI-59-B11 contain elevated PCB levels above 10 ppm interim clean up goal. These sample locations will be excavated using a 10-foot by 10-foot square around each hot spot to a depth of 2-feet bgs. The soil removed during the hot spot excavation will be taken off-site as TSCA regulated material.

Two (2) sets of confirmatory samples are required for these two areas. The sidewalls of each excavation will be sampled every 10-feet horizontally at approximately 1-foot below the surface (the vertical midpoint of the sidewall) and the base will be sampled every 100 square feet (sf) in approximately 10 x 10 foot grids. One base sample will be collected every 100 sf from the approximate center of the 10 x 10 foot grid.

Samples will be taken from the bucket of the backhoe or excavator. If it is necessary for workers to enter the excavation then the side of the excavation must be sloped to proper angle as required by FWENC EHS 6-3, "Excavation and Trenching".

#### 1.2.4.5 – Building 60

Based upon the results of the Phase I Sampling and data from previous remedial actions at Building 60, it was determined that the existing foundation of Building 60 will be removed. Sample locations GIPI-60-B1-CTR. and GIPI-60-B1-6 collected during Phase I indicated levels above the interim goal of 10 ppm PCBs. Additionally, two (2) hot spot excavations at sample locations GIPI-60-B14 and GIPI-60-B15 will be completed as part of the remedial effort.

Sampling performed during the previous remedial action indicated elevated levels of PCBs. Consequently, the existing foundation including minimal associated soils will be taken off-site to a TSCA regulated facility.

Additionally, the sample results for Building 60, as shown in Table 1-1, indicate that the soil at sample locations GIPI-60-B14 and GIPI-60-B15 are hot spots that must be excavated. These sample locations will be excavated using a 10-foot by 10-foot square around each hot spot. At sample location GIPI-60-B14, the soil will be excavated to a minimum of 2-feet bgs. At sample location GIPI-60-B15, the soil will be excavated to a minimum of 4-feet bgs. The soil removed during these hot spot excavations will be taken off-site as TSCA regulated material.

Three (3) sets of confirmatory samples are required for this excavation. The sidewalls of the building excavation will be sampled every 10-feet horizontally at approximately 4-feet below the surface (the vertical midpoint of the sidewall) and the base will be sampled every 100 square feet (sf) in approximately 10 x 10 foot grids. One base sample will be collected every 100 sf from the approximate center of the 10 x 10 foot grid. The two (2) hot spot excavations will be sampled every 10-feet horizontally and one base sample will be collected in the center of the excavation. Samples will be collected from the bucket of the backhoe/excavator. The sides of all excavations will be properly sloped as required by FWENC EHS 6-3, "Excavation and Trenching".

#### 1.2.4.6 – Building 61

Based upon the results of the Phase I Sampling and data from previous remedial actions at Building 61, it was determined that it may not be necessary to remove the existing foundation as contaminated waste. However, the Navy has chosen to remove the existing foundation and minimal associated soils as part of the Concrete Roadway Demolition project. These materials will be disposed of as TSCA waste due to soil PCB levels in the immediate area are greater than 1 ppm.

### 1.2.5 Site Restoration Activities

Foster Wheeler will return the work areas to their original condition prior to demobilization as required under this contract.

### 1.2.6 Demobilization

Upon approval from the Navy, Foster Wheeler will begin demobilization of all equipment, site facilities, and personnel from the site. Foster Wheeler will submit to the Navy all required record drawings and reports required by this Contract Task Order prior to final demobilization.

## 1.3 Application

The SHSP applies to all personnel involved in the above tasks who wish to gain access to active work areas, including but not limited to:

- Client representatives - The Navy is responsible for ensuring that its personnel comply with OSHA and USACE EM 385-1-1 applicable requirements.
- Federal, state or local representatives
- Foster Wheeler Environmental subcontractors will develop activity hazard analyses that will be reviewed by FWENC prior to start of work.

## 2.0 PROJECT ORGANIZATION

Names and positions are defined below:

### 2.1 Project Manager (PM)-Rick Woodworth

- Ensures implementation of this program through coordination with the responsible Project Environmental and Safety Manager (PESM);
- Conducts monthly inspections;
- Participates in major incident investigations;
- Ensures the SHSP has all of the required approvals before any site work is conducted;
- Ensures that the PESM or Site Health and Safety Officer (SHSO) is informed of project changes which require modifications of the site safety plan; and,
- Has overall project responsibility for Project Health and Safety.

### 2.2 Project Environmental and Safety Manager (PESM)- Grey Coppi, CIH, CSP

The PESM is an individual certified by the American Board of Industrial Hygiene as a Certified Industrial Hygienist (CIH) or by the Board of Certified Safety Professionals as a Certified Safety Professional (CSP) with experience in hazardous waste site remediation activities.

- Provides for the development and approval of the SHSP
- Serves as the primary contact to review health and safety matters that may arise
- Approves revised or new safety protocols for field operations
- Approves individuals who are assigned SHSO responsibilities
- Approves SHSOs to fulfill other project roles
- Coordinates revisions of this SHSP with field personnel
- Coordinates upgrading or downgrading of personal protective equipment with the SHSO
- Assists in the investigation of all accidents
- Conducts quarterly inspections for compliance with the SHSP

### **2.3 The Site Supervisor (SS) - Jon Cary**

- Ensures that the SHSP is implemented in conjunction with the designated PESM and SHSO
- Ensures that field work is scheduled with adequate personnel and equipment resources to complete the job safely
- Ensures that adequate communication between field crews and emergency response personnel is maintained
- Ensures that field site personnel are adequately trained and qualified to work at the site;
- Enforces site health and safety rules
- Investigates all incidents
- Conducts daily safety briefings
- Conducts weekly site inspections
- Acts as Emergency Coordinator

### **2.4 Site Health and Safety Officer – Paul Anderson**

The SHSO is a person knowledgeable in appropriate safety and health regulations with at least one year of experience or specialized training in serving in an H&S staff role on hazardous waste remediation sites.

- Works as a member of the project team to ensure implementation of site safety plans
- Ensures that all health and safety activities identified in site safety plans are conducted and/or implemented
- Identifies operational changes which require modifications to health and safety procedures and site safety plans, and ensures that the procedure modifications are implemented and documented through changes to the site safety plan
- Directs and coordinates health and safety monitoring activities
- Ensures that proper personal protective equipment is utilized by field teams
- Assists in conducting and documenting daily safety briefings
- Monitors compliance with this SHSP
- Notifies PESM of all accidents/incidents
- Coordinates with the construction superintendent and PM in any accident/incident investigation
- Maintains Accident/Incident Report Forms
- Determines upgrades or downgrades of personal protective equipment (PPE) based on site conditions and/or real-time monitoring results

- Ensures that monitoring instruments are calibrated
- Reports to PESH to provide summaries of field operations and progress
- Maintains health and safety field log books

## **2.5 Site Personnel**

- Report any unsafe or potentially hazardous conditions to the SHSO
- Maintain knowledge of the information, instructions and emergency response actions contained in the SHSP
- Comply with rules, regulations and procedures as set forth in this SHSP and any revisions
- Prevent admittance to work sites by unauthorized personnel
- Inspect all tools and equipment, including PPE, daily prior to use

## **3.0 SITE LOCATIONS AND DESCRIPTIONS**

The site is located on the northern end of Gould Island, in the East Passage of Narragansett Bay, approximately 1.5 miles off the coast of Middletown, Rhode Island. The Gould Island complex of facilities was constructed in the early 1940s for the production and testing of torpedoes. The complex was abandoned in the early 1970s. The facilities have not been maintained since their closure and were demolished by Foster Wheeler Environmental in 2000. A Navy torpedo testing range remains active and is located on the northern tip of the island.

## **4.0 POTENTIAL HAZARDS**

This section presents an assessment of the chemical, biological and physical hazards that may be encountered during the tasks specified under SHSP section 1.0. Additional information can be found in Appendix E- Material Safety Data Sheets or in Appendix F-Activity Hazard Analyses.

### **4.1 Chemical Hazards**

The primary contaminants of concern are, PCBs from contaminated soil and possible Silica exposure from concrete demolition. The toxicological and chemical properties are described in Table 4-1.

The route of exposure to PCBs is inhalation, absorption, ingestion, or skin contact and presents a hazardous potential for exposure to personnel. Symptoms of exposure include irritated eyes, chloracne, liver damage, reproductive effects (Carcinogenic).

The route of exposure to Silica is inhalation, or skin contact and presents a moderate potential for exposure to personnel. Acute effects include cough, wheeze and respiratory symptoms. Chronic effects include chest pain, dyspnea (difficulty breathing), and progressive respiratory symptoms (silicosis)(Carcinogenic).

## 4.2 Biological Hazards

It is considered unlikely there will be much animal contact on the island. The Activity Hazard Analysis found in Appendix F will include specific hazards and control measures for each task.

### 4.2.1 Insects

Insects, such as mosquitoes, ticks, bees and wasps may be present during certain times of the year. Workers will be encouraged to wear repellents (DEET for Ticks) when working in areas where insects are expected to be present. If insects are prevalent, efforts will be made to remove them from the site by contacting a licensed pest control technician.

#### 4.2.2.1 Lyme Disease

Since the site is located in the northeast, the potential for coming into contact with deer ticks exists. Lyme disease is caused by an infection from a deer tick that is about the size of the head of a pin. During the painless tick bite, a microorganism (spirochete) may be transmitted into the bloodstream that may lead to Lyme disease. The effects of the disease vary from person to person, which often makes it difficult to diagnose. Typically, the incubation period ranges from two days to two weeks. In most cases, the infected area will resemble a red bulls' eye with concentric rings. Within the same period, flu-like symptoms may develop. If left untreated, the red ringed area will eventually fade and Lyme disease may further develop into an arthritis-like condition.

Control measures to prevent Lyme Disease include the following:

- Self/Buddy check of neck, hairline, groin and body after working in areas that may contain deer ticks;
- Wear light colored tyvek or clothing;
- If a tick is found, remove it by pulling gently at the head with tweezers; and,
- Report any of the above symptoms and all tick bites to the SHSO for evaluation. Employees bitten by deer ticks during the course of employment, will be given a medical examination.

### 4.2.3 Plants

Plants such as poison ivy and poison oak may be prevalent at the site during certain times of the year.

Workers will be trained to recognize these plants and to minimize contact with them. PPE may be worn by employees in order to reduce the potential for exposure. Pre-exposure topical lotions such as Tecuu may be applied prophylactically.

### 4.3 Physical Hazards

Most safety hazards are discussed in the Activity Hazard Analysis (AHA) in Appendix F for the different phases of the project. In addition to the AHAs, general work rules and other safety procedures are described in Section 10 of this SHSP.

#### 4.3.1 Heat Stress

Heat stress is a significant potential hazard, which is greatly exacerbated with the use of PPE in hot environments. A heat stress prevention program will be implemented when ambient temperatures exceed 70° F for personnel wearing impermeable clothing and for other personnel when the WBGT index exceeds the ACGIH TLVs. The following are the main elements of the Foster Wheeler Environmental Corporate Health and Safety Program (EHS 4-6).

- Selection of PPE to reduce the risk of heat related illness
- Hydration
- Cool rest areas
- Engineering Controls (i.e. air conditioned cabs, drenching)
- Administrative Controls (work schedules, acclimatization, work/rest regimens)
- PPE (i.e. ice vests, vortex tubes)
- Monitoring (body core temperature, pulse rate).
- Identification of heat related illnesses (heat cramps, heat exhaustion, and heat stroke)
- Employee training

#### 4.3.3 Noise

Noise is a potential hazard associated with the operation of heavy equipment, power tools, pumps and generators. Suspected high noise operations will be evaluated to determine if protective measures are warranted. Pre-employment audiograms are provided as part of the entrance physical. Workers shall wear hearing protection when working in the proximity of pumps, generators, motors and heavy equipment.

**Table 4-1****Chemical Data**

<b>Compound</b>	<b>CAS #</b>	<b>ACGIH TLV</b>	<b>OSHA PEL</b>	<b>Routes of Exposure</b>	<b>Symptoms of Exposure</b>	<b>Target Organs</b>	<b>Physical Properties</b>
PCBs	11097-69-1	0.5 mg/m <sup>3</sup>	0.5 mg/m <sup>3</sup>	Inhalation Absorption Ingestion Skin Contact	Irritated eyes, chloracne, liver damage, reproductive effects, (Ca.)	Skin, eyes, liver, reproductive system effects. (Ca.)	Colorless to pale yellow, viscous liquid or solid.
Silica	14808-60-7	0.1 mg/m <sup>3</sup>	10mg/ m <sup>3</sup> / %SiO <sub>2</sub> +2	Inhalation Skin Contact	Cough, difficulty breathing, wheeze, decreasing pulmonary function. (Ca.)	Eyes, skin, respiratory system, CNS. (Ca.)	Colorless, odorless solid.

## **5.0 ACTIVITY HAZARD ANALYSES (AHAs)**

Activity Hazard Analyses (AHAs) have been developed for each major phase of work during the concrete demolition and soil excavation. The AHAs take into account the hazards discussed in Section 4.0 and lists control measures.

Additional or expanded AHAs shall be developed by the SHSO, or subcontractors, for all unanticipated phases of work and/or prior to working on a new task.

The AHAs will be used to instruct workers on the hazards of the associated activities during a phase preparatory meeting.

AHAs are included in Appendix F for the following phases of work:

- Mobilization/Demobilization
- Site Preparation
- Phase II Site Activities
  - Excavation of Soil
  - Demolition and Excavation of Concrete
  - Confirmation Sampling
  - Site Restoration Activities
  - Heavy Equipment Decontamination

Subcontracted work will be evaluated for hazards in a manner consistent with self-performed work. The SS and SHSO are responsible to obtain AHAs from subcontractors and will review subcontractor AHAs and Work Plans for accuracy or develop accurate AHAs for subcontracted work.

## **6.0 PERSONAL PROTECTIVE EQUIPMENT**

For the purposes of PPE selection, the PESH and SHSO are considered competent persons. The signatures on the front of this Attachment constitute certification of the hazard assessment. As established in this SHSP, the initial level of personal protective equipment (PPE) will be modified Level D for all activities. Sampling data and past experience indicate a relatively low hazard for exposure. Level C PPE may be required if action levels indicate the need to upgrade. For activities not covered by AHAs, the SHSO will conduct the hazard assessment and select the PPE using the form provided in Appendix G and shall certify the assessment by signing the form. PPE selection will be made in consultation with the PESH. Modifications for initial PPE selection may also be made by the SHSO in consultation with the PESH. A written justification for downgrades will be provided to the PESH for approval as a field change request.

Table 6-1 describes PPE for site tasks.

**TABLE 6-1  
PERSONAL PROTECTIVE EQUIPMENT SELECTION**

<b>TASK</b>	<b>HEAD</b>	<b>EYES/FACE</b>	<b>FEET</b>	<b>HANDS</b>	<b>BODY</b>	<b>HEARING</b>	<b>RESPIRATORY</b>
<b>Mobilization</b>							
Mobilize equipment, supplies	HH	SG	STB	LWG	WC	EP as needed	Level D
<b>Site Preparation</b>							
Inspect and repair Soil erosion controls	HH	SG	STB	LWG	WC	EP as needed	Level D
Establish Site Zones	HH	SG	STB	LWG	WC	EP as needed	Level D
<b>Phase II Activities</b>							
Excavation of Soil	HH	SG	STB	LWG	WC	EP as needed	Level D*
Breaking and Excavation of Concrete	HH	SG	STB	LWG	WC	EP as needed	Level D*
Sampling	HH	SG	STB	Nit. or Surg.	WC	EP as needed	Level D*
<b>Site Restoration Activities</b>							
Return excavated area to grade level	HH	SG	STB	LWG	WC	EP as needed	Level D
Restore site to previous condition	HH	SG	STB	LWG	WC	EP as needed	Level D
<b>Equipment Decontamination</b>							
Heavy Equipment	HH	SG and PFS	STB	LWG	WC	EP as needed	Level D
<b>Demobilization</b>							
Demobilization	HH	SG	STB	LWG	WC	EP as needed	Level D

\*- Level C if air monitoring shows Silica, or PCB hazard.

**Legend:**

HH = Hard Hat

WC = Work Clothes

EP = Ear Plugs

Nit. = Nitrile Gloves

SG = Safety Glasses

STB = Steel Toe Boots

Surg. = Surgical Gloves

PFS = Plastic Face Shield

LWG = Leather Work Gloves

## 7.0 AIR MONITORING

The following sections contain information describing the types, frequency and location of real time and integrated air monitoring.

### 7.1 Real-Time Air Monitoring

Based on real time readings and site conditions, the SHSO or designee may increase/decrease the frequency at which the readings are taken using professional judgment. Table 7-1 provides the real-time air monitoring action levels. A Mini-ram dust monitor or equivalent, will be used for real time air monitoring during Phase II activities.

Real-time air monitoring results for on-site activities will be reviewed with craft labor periodically by the SHSO and compared with Integrated Air Monitoring results in daily site health and safety briefings.

**Table 7-1  
Real-Time Air Monitoring Action Levels/Silica Monitoring**

AIR MONITORING INSTRUMENT	MONITORING LOCATION	ACTION LEVEL	SITE ACTION	REASON
Miniram	Work area; other areas if determined visually	2.5 mg/m <sup>3</sup>	Work upwind, use water for dust suppression as needed; wait for dust to settle before continuing work in area	Prevent exposure to dust ½ OSHA PEL for respirable dust
NIOSH Method 7602, sampling for Silica				
NIOSH 7602 for crystalline silica.	Work area; other areas if determined visually	2.5 mg/m <sup>3</sup>	Work upwind, use water for dust suppression as needed; wait for dust to settle before continuing work in area	Prevent exposure to concrete dust ½ OSHA PEL for respirable dust

Calculations for the PCBs in soil using 23,000 ppm as a contaminant level and a PEL of 0.5 mg/m<sup>3</sup> gave a level of 5 mg/m<sup>3</sup> as an action level. This is greater than the action level for respirable dust above. See Appendix C.

### 7.2 Frequency and Location of Real-Time Air Monitoring

Table 7-2 provides the frequency and location of real-time air monitoring.

**Table 7-2  
Frequency and Location of Real-Time Air Monitoring/Silica Monitoring**

<b>ACTIVITY</b>	<b>AIR MONITORING INSTRUMENT</b>	<b>FREQUENCY AND LOCATION</b>
Soil Sampling	Mini ram	BZ; every 30 minutes or when visible dust is present.
Soil Excavation and Removal	Mini ram	BZ, every 30 – 60 minutes or when visible dust is present.
Concrete Slab Demolition and Excavation	Mini ram  NIOSH Method 7602, sampling for Silica - pump with cyclone attachment.	BZ, every 30 minutes  Continuous during 8 hour shift.
Other Dust Causing Activities	Mini ram	BZ, every 30 minutes or when visible dust is present.

### **7.3 Integrated Air Monitoring**

Integrated air monitoring will be conducted for silica during concrete demolition. An AIHA accredited laboratory will be utilized for silica analysis.

AIHA accredited laboratories in Connecticut:

Cromwell Environmental Health Laboratory, contact James Kenny (860)635-6475

Hartford - The Hartford Insurance Group, contact Ann McClure, CIH (860)547-2805

AIHA accredited laboratories in Massachusetts:

Hopkinton - Liberty Mutual Insurance Co., contact Ethel Patricio 800-230-6263 X252

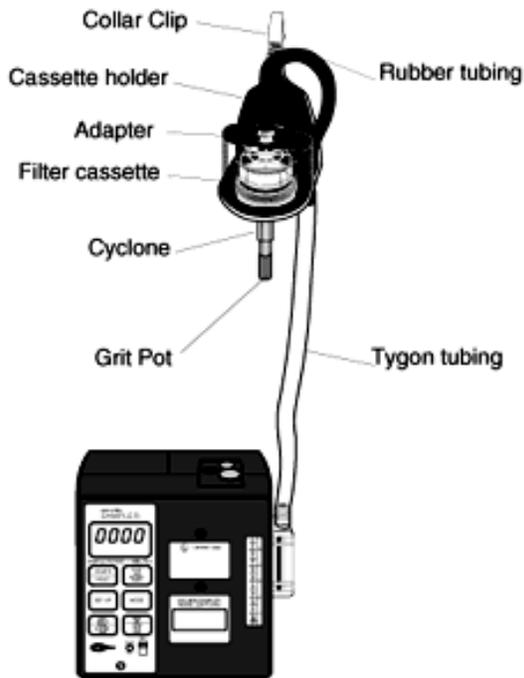
#### **7.3.1 Silica Monitoring**

Crystal Silica personal sampling will be conducted using OSHA method 7602. This method utilizes a nylon cyclone and filter with a flow rate of 1.7 L/min. An excerpt from the method can be found in Appendix D.

### **7.4 Data Quality Assurance**

#### **7.4.1 Calibration**

Instrument calibration shall be documented and included in a dedicated safety and health logbook or on separate calibration pages. All instruments shall be calibrated before and after each shift. Calibration checks may be used during the day to confirm instrument accuracy. Duplicate readings may be taken to confirm individual instrument response.



Sampling train with cyclone and filter for respirable dust.

Personal air pumps shall be calibrated before and after each sampling event using the Personal Air Monitoring calibration form.

#### 7.4.2 Operations

All instruments shall be operated in accordance with the manufacturer's specifications. Manufacturers' literature, including an operations manual for each piece of air monitoring equipment will be maintained on-site by the SHSO for reference.

#### 7.4.3 Data Review

The SHSO will interpret all monitoring data based on Table 7-1 and his professional judgment.

The SHSO shall review the data with the PESM to evaluate the potential for worker exposure, upgrades/downgrades in LOP, comparison to direct reading instrumentation. Periodically, personnel exposure results will be tabulated and posted at the site and discussed in daily safety briefings.

Monitoring and sampling data, along with all sample documentation will be periodically reviewed by the PESM.

## **8.0 ZONES, PROTECTION, AND COMMUNICATION**

### **8.1 Site Control**

Site zones are intended to control the potential spread of contamination throughout the site and to assure that only authorized individuals are permitted into potentially hazardous areas. A three-zone approach will be utilized. It shall include an Exclusion zone (EZ), Contamination Reduction zone (CRZ) and a Support Zone (SZ). Specific zones shall be established on the work site when operations begin. A map showing these zones is located in Appendix B. All maps will be posted at the site and used during initial site-specific training.

This project is a hazardous waste remediation project, and any person working in an area where the potential for exposure to site contaminants exists, will only be allowed access after providing the SHSO with evidence of proper training and medical documentation.

The zones are based upon current knowledge of proposed site activities. It is possible that the zone configurations may be altered due to work plan revisions. Should this occur, the Site Zones will be adjusted accordingly, and documented through use of a field-change request form.

The following shall be used for guidance in revising these preliminary zone designations, if necessary.

***Support Zone*** - The SZ is an uncontaminated area (trailers, offices, etc.) that will be the field support area for most operations. The SZ provides for field team communications and staging for emergency response. Appropriate sanitary facilities and safety equipment will be located in this zone. Potentially contaminated personnel/materials are not allowed in this zone. The only exception will be appropriately packaged/decontaminated and labeled samples.

***Contamination Reduction Zone*** - The CRZ is established between the EZ and the SZ. The CRZ contains the contamination reduction corridor and provides for an area for decontamination of personnel and portable hand-held equipment, tools and heavy equipment. A personnel decontamination area will be prepared at each exclusion zone. The CRZ will be used for Exclusion Zone entry and egress in addition to access for heavy equipment and emergency support services.

***Exclusion Zone*** - All activities that may involve exposure to site contaminants, hazardous materials and/or conditions should be considered an exclusion zone (EZ). This zone will be clearly delineated by cones, tapes or other means. The SHSO may establish more than one EZ where different levels of protection may be employed or different hazards exist. The size of the EZ shall be determined by the site SHSO allowing adequate space for the activity to be completed, field members and emergency equipment.

Any site personnel or visitor that enters the EZ or CRZ shall log in and out on a daily basis.

## 8.2 Contamination Control

Decontamination areas will be established for the following activities.

### 8.2.1 Personnel Decontamination Station

Personnel hygiene, coupled with diligent decontamination, will significantly reduce the potential for exposure of off-site areas to contaminants from the site. When participating in potentially dust-raising activities, such as excavating PCBs in soil and sampling of material, it will be crucial for field personnel to adhere to the following personal hygiene guidelines:

- Wash hands and face after leaving the contamination reduction zone.
- Every effort will be made to reduce dust production through engineering controls (i.e., watering, if deemed necessary based on weather conditions).

### 8.2.2 Minimization of Contact With Contaminants

During completion of all site activities, personnel should attempt to minimize contact with contaminated materials. This involves a conscientious effort to keep “clean” during site activities. This may ultimately minimize the degree of decontamination required and the generation of waste materials from site operations.

### 8.2.3 Personnel Dry Decontamination Sequence

When decontamination of Tyvek or poly protective clothing is needed a dry decon will be used whenever possible.

1. Perform wet or dry decon if contact with contaminants occurred.
2. Remove exterior protective clothing carefully and dispose of same.
3. Remove respirator if applicable, clean and dry.
4. Remove gloves without touching outside surface of gloves and dispose of same.
5. Wash hands and face thoroughly.

### 8.2.4 Heavy Equipment Decontamination

A temporary equipment decontamination pad will be constructed to decontaminate heavy equipment, as necessary, with a portable water tank, vacuum truck and a high pressure washer. The pad will be constructed of an impervious barrier consisting of one (1) layer of 30-mil polyethylene sheeting with hay bales forming a berm around the perimeter. The pad will be sized so as to accommodate the largest piece of equipment to be used at the Site. A submersible electrical pump will be placed inside the pad, and all rinsate will be pumped into an on-site storage tank, sampled and disposed of accordingly. Any solids that accumulate in the pad will be placed in a roll-off for proper off-site disposal. The material used to construct the pad will be handled and disposed of along with the PPE.

The following procedure will be used by FWENC personnel for the decontamination of equipment that has come in contact with the contaminated soil:

- Place the contaminated portion of the equipment over the decontamination pad;
- Remove all visible contaminated material from the portion of the equipment that came in contact with contamination using clean water, working from top to bottom; and,
- Inspect equipment to verify that all visible contaminated material has been removed.

Heavy equipment will not be permitted to leave the EZ unless it has been thoroughly decontaminated and visually inspected by the SHSO or his designee.

### **8.3 Communication**

- Hand-held two-way radios are utilized as appropriate by field teams for communication with the Command Post.
- Telephones - A telephone will be located in the Command Post in the SZ for communication with emergency support services/facilities.
- Air Horns - Air horns shall be carried by field teams or be strategically located within the EZ and shall be maintained as the means for announcing emergency evacuation procedures and backup for other forms of communication.
- Hand Signals - Hand signals shall be used by field teams along with the buddy system. They shall be known by the entire field team before operations commence and their use covered during site-specific training. Typical hand signals are the following:

#### **SIGNAL**

Hand gripping throat

Grip on a partner's wrist or placement of both hands around a partner's waist.

Hands on top of head

Thumbs up

Thumbs down

#### **MEANING**

Out of air, can't breathe

Leave the area immediately, no debate.

Need assistance

Okay, I'm all right, I understand.

No, negative.

### **9.0 MEDICAL SURVEILLANCE PROCEDURES**

All contractor and subcontractor personnel performing field work where potential exposure to contaminants exists at the site are required to have passed a medical surveillance examination in accordance with 29 CFR 1910.120(f).

The Foster Wheeler Environmental Corporate Medical Surveillance Program is described in detail in Section 4.5 of the Health and Safety Program. The Corporate Medical Consultant is Work Care in Anaheim, California. Dr. Peter Greaney, the Director, is Board certified in occupational medicine.

### **9.1 Medical Surveillance Requirements**

A physician's medical release for work will be confirmed by the SHSO before an employee can work in the exclusion zone. The examination will be taken annually at a minimum and upon termination of hazardous waste site work if the last examination was not taken within the previous six months. Additional medical testing may be required by the PESM in consultation with the Corporate Medical Consultant and the SHSO if an over-exposure or accident occurs, if an employee exhibits symptoms of exposure, or if other site conditions warrant further medical surveillance.

### **9.2 Medical Data Sheet**

A medical data sheet is provided in Appendix H. This medical data sheet is voluntary and should be completed by all on-site personnel and will be maintained at the site. Where possible, this medical data sheet will accompany the personnel needing medical assistance. The medical data sheet will be maintained in a secure location, treated as confidential, and used only on a need-to-know basis.

## **10.0 SAFETY CONSIDERATIONS**

### **10.1 General Health and Safety Work Rules**

A list of work rules and general safe work practices has been included in the Foster Wheeler Environmental Health and Safety Program, Section 3-6. These rules have been incorporated into the SHSP as Appendix I. The work rules will be posted in a conspicuous location at the site.

### **10.2 General Construction Hazards**

The following is a list of applicable safety considerations for the major tasks. Further information is provided in the specific Activity Hazard Analysis and the specific Foster Wheeler Environmental Health and Safety Program.

- Heavy Equipment
- Hand and Power Tool Usage
- Fire Hazards
- Electrical Equipment
- Slips/Trips/Falls
- Punctures/Cuts

- Lifting/Materials Handling
- Handling Storage of Fuels

### **10.3 High Loss Potential Hazards**

#### **Excavation and Trenching**

Excavation will be conducted in accordance with the Excavation and Trenching Program, EHS 6-4 of the Foster Wheeler Environmental Corporation Health and Safety Program. Procedures in this document incorporate the requirements of 29 CFR 1926, Subpart P-Excavations. It provides for the designation of a "Competent Person" and general requirements for safe excavating practices. The program also incorporates company standards for the monitoring of potentially hazardous atmospheres; protection from water hazards; analyzing and maintaining the stability of adjacent structures; daily competent person inspections; soil classification; sloping and benching; protective systems; and training.

The Competent Person will be the Site Supervisor. The Competent Person will be assisted in his/her duties by other Foster Wheeler Environmental technical personnel such as the SHSO, PESM, geologists, structural engineers and soils engineers.

Trenches 4 feet or greater in depth will require atmospheric monitoring and ladders for safe entry/egress. The Competent Person will determine the need for cave-in protection. If trenches exceed 5 feet in depth, cave-in protection will be implemented in accordance with the Excavation and Trenching Program, EHS 6-4 of the Foster Wheeler Environmental Corporation Health and Safety Program.

### **11.0 WASTE DISPOSAL PROCEDURES**

All discarded materials, waste materials or other objects shall be handled in such a way as to preclude the potential for spreading contamination, creating a sanitary hazard or causing litter to be left on site. All potentially contaminated materials, e.g., clothing, gloves, etc., will be bagged or drummed as necessary, labeled and segregated for disposal. All non-contaminated materials shall be collected and bagged for appropriate disposal as non-hazardous solid waste. Additional waste disposal procedures may be developed in conjunction with the Foster Wheeler Environmental regulatory affairs department as applicable.

## **12.0 EMERGENCY RESPONSE PLAN**

This section establishes procedures and provides information for use during a project emergency. Emergencies happen unexpectedly and quickly, and require an immediate response; therefore, contingency planning and advanced training of staff is essential. Specific elements of emergency support procedures which are addressed in the following subsections include communications, local emergency support units, preparation for medical emergencies, first aid for injuries incurred on site, record keeping, and emergency site evacuation procedures.

### **12.1 Responsibilities**

#### **12.1.1 Project Environmental and Safety Manager (PESM)**

The PESH is Grey Coppi, CIH, CSP.

The PESH oversees and approves the Emergency Response/Contingency Plan and performs audits to determine that the plan is in effect and that all pre-emergency requirements are met. The PESH acts as a liaison to applicable regulatory agencies and notifies OSHA of reportable accidents.

#### **12.1.2 Site Health and Safety Officer (SHSO)**

The SHSO is Paul Anderson.

The SHSO is responsible for ensuring that all personnel are evacuated safely and that machinery and processes are shut down or stabilized in the event of a stop work order or evacuation. The SHSO is required to immediately notify the PESH of any fatalities or catastrophes (three or more workers injured and hospitalized) so that the PESH can notify OSHA within the required time frame. The PESH will be notified of all OSHA recordable injuries, fires, spills, releases or equipment damage in excess of \$500 within 24 hours. The SHSO also serves as the Alternate Emergency Coordinator.

#### **12.1.3 Emergency Coordinator**

The Emergency Coordinator is Jon Cary.

The emergency coordinator shall make contact with Local Emergency Response personnel prior to beginning work on site. In these contacts the emergency coordinator will inform interested parties about the nature and duration of work expected on the site and the type of contaminants and possible health or safety effects of emergencies involving these contaminants. The emergency coordinator shall locate emergency phone numbers and identify hospital routes prior to beginning work on site. The emergency coordinator shall make necessary arrangements to be prepared for any emergencies that could occur.

The Emergency Coordinator shall implement the Emergency Response/Contingency Plan whenever conditions at the site warrant such action

#### 12.1.4 Site Personnel

Site personnel are responsible for knowing the Emergency Response/Contingency Plan and the procedures contained herein. Personnel are expected to notify the Emergency Coordinator of situations that could constitute a site emergency.

## **12.2 Communication**

A variety of communication systems may be utilized during emergency situations. These are discussed in the following sections.

### 12.2.1 Radio Communication

The primary form of communication during an emergency between field groups in the exclusion zone and the Emergency Coordinator will be radio communications. Each field team within the exclusion zone shall have a radio. During an emergency situation, the lines will be kept clear so that instructions can be received by all field teams.

### 12.2.2 Telephone Communication

A telephone will be maintained in the command post/office trailer.

### 12.2.3 Air Horns

Air horns will be used to alert site personnel of emergencies. The following signals will be used:

- Two short blasts - shut down equipment, clear radio channels, await instructions
- Three short blasts - injured employee, first-aid providers respond
- One continuous blast - site evacuation

Air horns can be found in the office trailer. The procedure to activate the air horns consists of depressing the air horn button or switch while pointing it in the direction of the area to be signaled. Air horns should be tested at least monthly to ensure that they are working properly.

### 12.2.4 Hand Signals

Hand signals will be employed by downrange field teams where necessary for communication during emergency situations. Hand signals are found in SHSP section 8.3.

### 12.3 Local Emergency Support Units

In order to be able to deal with any emergency that might occur during remedial activities at the site, Table 12.1 will be posted prominently in the field office and in all places where telephone service is available.

A route map from the site to the nearest hospital is located in Appendix J. This map will be posted adjacent to the above emergency telephone numbers in the field office and in all places where telephone service is available. It should also be placed in all on site vehicles.

**Table 12-1  
Emergency Telephone Numbers**

<b>Contact</b>	<b>Firm or Agency</b>	<b>Telephone Number</b>
Police	NETC Portsmouth State	(401) 841-3241 (401) 683-0300 (401) 894-4444
Fire	NETC Portsmouth	(401) 841-3333 (401) 683-1155
Hospital	Newport Hospital	(401) 845-1640
Ambulance	Newport Fire Department	(401) 846-2211
Project Manager - Rick Woodworth	Foster Wheeler Environmental	(215) 702-4049
Site Superintendent – Jon Cary	Foster Wheeler Environmental	(401) 965-8675
PESM – Grey Coppi, CIH,CSP	Foster Wheeler Environmental	(215) 702-4079
SHSO – Paul Anderson	Foster Wheeler Environmental	(617) 794-8610
State Emergency Response Commission (SERC)	N/A	(401) 277-3039
Portsmouth Emergency Planning Committee.	N/A	(401) 683-5510
USEPA Spill Response Hotline	USEPA (Region 1)	(617) 223-7265
RIDEM Spill Response Contact	Rhode Island	(800) 498-1336 (401) 277-2284
Emergency Line (Security)	NETC	(401) 841-3456
Bob Krivinkas (ROICC)	Navy	(401) 841-1761
Response Contractor	Clean Harbors	(401) 461-1300
Captain of the Port	US Coast Guard, Providence	(401) 421-4291
Poison Control Center	Regional Center for Poison Control and Prevention Serving Massachusetts and Rhode Island	(800) 222-1222
Chemtrec		(800)424-9300
National Response Center		(800)424-8802

## 12.4 Pre-Emergency Planning

Foster Wheeler Environmental will communicate directly with administrative personnel from the emergency room at the hospital in order to determine whether the hospital has the facilities and personnel needed to treat cases of trauma resulting from exposure to any of the contaminants expected to be found on the site. Instructions for finding the hospital will be posted conspicuously in the site office and in each site vehicle.

Before the field activities begin, the local emergency response personnel will be notified of the schedule for field activities and about the materials that are thought to exist on the site so that they will be able to respond quickly and effectively in the event of a fire, explosion, or other emergency.

## 12.5 Emergency Medical Treatment

The procedures and rules in this SHSP are designed to prevent employee injury. However, should an injury occur, no matter how slight, it will be reported to the SHSO immediately. First-aid equipment will be available on site at the following locations:

First Aid Kit:	Office Trailer
Emergency EyeWash (Meets ANSI Z.358.1-1990):	Office Trailer

During the site safety briefing, project personnel will be informed of the location of the first aid station(s) that has been set up. Unless they are in immediate danger, severely injured persons will not be moved until paramedics can attend to them. Some injuries, such as severe cuts and lacerations or burns, may require immediate treatment. Any first aid instructions that can be obtained from doctors or paramedics, before an emergency-response squad arrives at the site or before the injured person can be transported to the hospital, will be followed closely.

Foster Wheeler Environmental will provide at least two personnel with current First Aid and CPR certification on each active work shift. When personnel are transported to the hospital, the SHSO will provide a copy of the Medical Data Sheet to the paramedics and treating physician.

Only in **non-emergency** situations will an injured person be transported to the hospital by means other than an ambulance.

## **12.6 Emergency Site Evacuation Routes and Procedures**

In order to mobilize the manpower resources and equipment necessary to cope with a fire or other emergency, a clear chain of authority will be established. The EC will take charge of all emergency response activities and dictate the procedures that will be followed for the duration of the emergency. The EC will report immediately to the scene of the emergency, assess the seriousness of the situation, and direct whatever efforts are necessary until the emergency response units arrive. At his/her discretion, the EC also may order the closure of the site for an indefinite period.

All project personnel will be instructed on proper emergency response procedures and locations of emergency telephone numbers during the initial site safety meeting. If an emergency occurs, including but not limited to fire, explosion or significant release of toxic gas into the atmosphere, an air horn will be sounded on the site. The horn will sound continuously for one blast, signaling that immediate evacuation of all personnel is necessary due to an immediate or impending danger. All heavy equipment will be shut down and all personnel will evacuate the work areas and assemble at the assigned locations.

The EC will give directions for implementing whatever actions are necessary. Any project team member may be assigned to be in charge of emergency communications during an emergency. He will attend the site telephone specified by the EC from the time the alarm sounds until the emergency has ended.

After sounding the alarm and initiating emergency response procedures, the EC will check and verify that access roads are not obstructed. If traffic control is necessary, as in the event of a fire or explosion, a project team member, who has been trained in these procedures and designated at the site safety meeting, will take over these duties until local police and fire fighters arrive.

The EC will remain at the site to provide any assistance requested by emergency-response squads as they arrive to deal with the situation. A map showing evacuation routes, meeting places, and location of emergency equipment will be developed on site and will be posted in all trailers and used during site-specific training.

### **12.6.1 Evacuation Drills**

Evacuation drills will be conducted periodically to test the emergency system. Even on short term projects this drill will occur at least once.

The drills will simulate situations that may be likely to occur onsite. A critique of the drill according to Foster Wheeler Environmental Health and Safety Program EHS 2-1 will be conducted.

## **12.7 Fire Prevention and Protection**

In the event of a fire or explosion, procedures will include immediately evacuating the site (air horn will sound for a single continuous blast), and notification of local fire and police

departments. No personnel will fight a fire beyond the stage where it can be put out with a portable extinguisher (incipient stage).

#### 12.7.1 Fire Prevention

The major workplace fire hazards are flammable liquids and fuels, motorized vehicles/equipment.

Fires will be prevented by adhering to the following precautions:

- Good housekeeping and storage of materials
- Storage of flammable liquids and gases away from oxidizers
- No smoking in the exclusion zone or any work area
- No hot work without a properly executed hot work permit
- Shutting off engines to refuel
- Grounding and bonding metal containers during transfer of flammable liquids
- Use of UL approved flammable storage cans
- Fire extinguishers rated at least 10 pounds ABC located on all heavy equipment, in all trailers and near all hot work activities
- Monthly inspections of all fire extinguishers

A map of all fire extinguisher locations will be developed on site and posted in the command post.

The person responsible for the maintenance of fire prevention and/or control equipment is the SHSO.

The person responsible for the control of fuel source hazards is the SHSO.

### **12.8 Overt Chemical Exposure**

The following are standard procedures to treat chemical exposures. Other, specific procedures detailed on the Material Safety Data Sheet or recommended by the Corporate Medical Consultant will be followed, when necessary.

**SKIN AND EYE CONTACT:** Use copious amounts of soap and water. Wash/rinse affected areas thoroughly, then provide appropriate medical attention. Eyes should be rinsed for 15 minutes upon chemical contamination. Skin should also be rinsed for 15 minutes if contact with caustics, acids or hydrogen peroxide occurs.

**INHALATION:** Move to fresh air. Decontaminate and transport to hospital or local medical provider.

**INGESTION:** Decontaminate and transport to emergency medical facility.

**PUNCTURE WOUND OR LACERATION:** Decontaminate and transport to emergency medical facility.

## **12.9 Decontamination During Medical Emergencies**

If emergency life-saving first aid and/or medical treatment is required, normal decontamination procedures may need to be abbreviated. The SHSO or designee will accompany contaminated victims to the medical facility to advise on matters involving decontamination, when necessary. The outer garments can be removed if they do not cause delays, interfere with treatment or aggravate the problem. Respiratory equipment must always be removed. Protective clothing can be cut away. If the outer contaminated garments cannot be safely removed on-site, a plastic barrier placed between the injured individual and clean surfaces should be used to help prevent contamination of the inside of ambulances and/or medical personnel. Outer garments may then be removed at the medical facility. No attempt will be made to wash or rinse the victim if his/her injuries are life threatening, unless it is known that the individual has been contaminated with an extremely toxic or corrosive material which could also cause severe injury or loss of life to emergency response personnel. For minor medical problems or injuries, the normal decontamination procedures will be followed.

## **12.10 Accident/Incident Reporting**

As soon as first aid and/or emergency response needs have been met, the following parties are to be contacted by telephone:

- Project Environmental and Safety Manager- Grey Coppi, CIH, CSP, 215-702-4079
- Project Manager – Rick Woodworth, 215-702-4049
- The employer of any injured worker who is not a Foster Wheeler Environmental employee.

Written confirmation of verbal reports are to be submitted within 24 hours. The accident/incident report is found in the Foster Wheeler Environmental Corporate Health and Safety Program EHS 1-7. If the employee involved is not a Foster Wheeler Environmental employee, his employer shall receive a copy of the report.

## **12.11 Adverse Weather Conditions**

In the event of adverse weather conditions, the SHSO or designee will determine if work can continue without potentially risking the safety of all field workers. Some of the items to be considered prior to determining if work should continue are:

- Potential for heat stress and heat-related injuries
- Treacherous weather-related working conditions (hail, rain, snow, ice, high winds)
- Limited visibility (fog)
- Potential for electrical storms
- Other incidents

Site activities will be limited to daylight hours, or when suitable artificial light is provided, and acceptable weather conditions prevail. The SHSO will determine the need to cease field operations or observe daily weather reports and evacuate, if necessary, in case of severe inclement weather conditions.

### **12.12 Spill Control and Response**

All small hazardous spills/environmental releases shall be contained as close to the source as possible. Whenever possible, the MSDS will be consulted to assist in determining the best means of containment and cleanup. For small spills, sorbent materials such as sand, sawdust or commercial sorbents should be placed directly on the substance to contain the spill and aid recovery. Any acid spills should be diluted or neutralized carefully prior to attempting recovery. Berms of earthen or sorbent materials can be used to contain the leading edge of the spills. Drains or drainage areas should be blocked. All spill containment materials will be properly disposed as hazardous waste. An exclusion zone of 50-100 feet around the spill area should be established depending on the size of the spill.

The following seven steps should be taken by the Emergency Coordinator:

1. Determine the nature, identity and amounts of major spill components.
2. Make sure all unnecessary persons are removed from the spill area.
3. Notify appropriate response teams and authorities.
4. Use proper PPE in consultation with the SHSO.
5. If a flammable liquid, gas or vapor is involved, remove all ignition sources and use nonsparking and/or explosive proof equipment to contain or clean up the spill (diesel only vehicles, air operated pumps, etc.).
6. If possible, try to stop the leak with appropriate material.
7. Remove all surrounding materials that can react or compound with the spill.

### **12.13 Emergency Equipment**

The following minimum emergency equipment shall be kept and maintained on-site:

- Industrial first aid kit
- Burn kit
- Portable eye washes (one per field team)
- Air horns (one per field team)
- Fire extinguishers (one per trailer/vehicle, trailers and located at hot work stations)
- Two-way radios
- Absorbent Material

## **12.14 Postings**

The following information shall be posted at various, conspicuous locations throughout the site:

- Emergency telephone numbers
- Diagrams showing the location of fire extinguishers and emergency equipment
- Emergency exit, evacuation routes and staging area

## **12.15 Restoration and Salvage**

After an emergency, prompt restoration of utilities, fire protection equipment, medical supplies and other equipment will reduce the possibility of further losses. Some of the items that may need to be addressed are:

- Refilling fire extinguishers;
- Refilling medical supplies;
- Recharging eyewashes and/or showers
- Replenishing spill control supplies
- Replacing used air horns

## **13.0 TRAINING**

### **13.1 General Health and Safety Training**

In accordance with Foster Wheeler Environmental corporate policy, and pursuant to 29 CFR 1910.120, hazardous waste site workers shall, at the time of job assignment, have received a minimum of 40 hours of initial health and safety training for hazardous waste site operations unless otherwise noted in the above reference. At a minimum, the training shall have consisted of instruction in the topics outlined in the standard. Personnel who have not met the requirements for initial training shall not be allowed to work in any site activities in which they may be exposed to hazards (chemical or physical).

#### **13.1.1 Three Day Supervised On the Job Training**

In addition to the required initial hazardous waste operations training, each employee shall have received three days of directly supervised on-the-job training. This training will address the duties the employees are expected to perform.

### **13.2 Annual Eight-Hour Refresher Training**

Annual eight-hour refresher training will be required of all hazardous waste site field personnel in order to maintain their qualifications for field work. The training will cover a review of 1910.120 requirements and related company programs and procedures.

### **13.3 Supervisory Training**

Personnel acting in a supervisory capacity shall have received 8 hours of instruction in addition to the initial 40 hours training.

### **13.4 Site-Specific Training**

Prior to commencement of field activities, all field personnel assigned to the project will have completed training that will specifically address the activities, procedures, monitoring, and equipment used in the site operations. It will include site and facility layout, hazards and emergency services at the site and will highlight all provisions contained within this SHSP and the FWENC “Project Rules Handbook” which is attached as Appendix L. This training will also allow field workers to clarify anything they do not understand and to reinforce their responsibilities regarding safety and operations for their particular activity.

### **13.5 On-Site Safety Briefings**

Project personnel and visitors will be given on-site health and safety briefings daily by the Site Supervisor or SHSO to assist site personnel in safely conducting their work activities. The briefings will include information on new operations to be conducted, changes in work practices or changes in the site's environmental conditions, as well as periodic reinforcement of previously discussed topics. The briefings will also provide a forum to facilitate conformance with safety requirements and to identify performance deficiencies related to safety during daily activities or as a result of safety inspections. The meetings will also be an opportunity for the SHSO to periodically update the workers on air monitoring results. Prior to starting any new activity, a training session using the Activity Hazard Analysis will be held for crew members involved in the activity.

### **13.6 First Aid and CPR**

The SHSO will identify those individuals requiring first aid and CPR training in order to ensure that emergency medical treatment is available during field activities. The training will be consistent with the requirements of the American Red Cross Association and shall include “Bloodborne Pathogens” training as required by 29 CFR 1910.1030.

### **13.7 Hazard Communication**

Hazard communication training will be provided in accordance with the requirements contained in the Foster Wheeler Environmental Health and Safety Program, 4-2.

## **14.0 LOGS, REPORTS AND RECORDKEEPING**

The following is a summary of required health and safety logs, reports and recordkeeping.

### **14.1 Field Change Request**

To be completed for initiating a change to the SHSP. The PESM and Project Manager or designee approval is required. The original will be kept in the project file. Approved changes will be reviewed with affected field personnel at a safety briefing. Copies will be distributed to the Client Representative.

### **14.2 Medical and Training Records**

Copies or verification of training (40 hour, 8 hour, supervisor, site specific training and documentation of three day OJT) and medical clearance for hazardous waste site work and respirator use will be maintained onsite. Records for all subcontractor employees will also be kept onsite. All employee medical records will be maintained by the Corporate Medical Consultant – Work Care in accordance with Foster Wheeler Environmental Corporation Health and Safety Program, EHS 1-9.

### **14.3 On-site Log**

A log of personnel on-site each day will be kept by the Project Superintendent or designee.

### **14.4 Weekly Safety Reports**

The SHSO shall complete and submit weekly safety reports to the PESM. The report is provided in Appendix K.

### **14.5 Exposure Records**

All personal air monitoring results, laboratory reports, calculations and air sampling data sheets are part of an employee exposure record. These records will be maintained by the SHSO during site work. At the end of the project they will be maintained according to 29 CFR 1910.20 and Foster Wheeler Environmental Corporation Health and Safety Program, EHS 1-9.

### **14.6 Accident/Incident Reports**

The incident and investigation reports will follow Foster Wheeler Environmental Corporation Health and Safety Program, EHS 1-7.

#### **14.7 OSHA Form 300**

An OSHA Form 300 will be kept at the project site. All recordable injuries or illnesses will be recorded on this form. At the end of the project, the original will be sent to Regional Health and Safety Manager for maintenance. Subcontractor employers must also meet the requirements of maintaining an OSHA 300 form. The incident report form referenced in section 12.10 meets the requirements of the OSHA Form 301(supplemental record) and must be maintained with the OSHA Form 300 for all recordable injuries or illnesses.

#### **14.8 Health and Safety Logbook**

The SHSO will maintain a logbook during site work. The daily site conditions, personnel, air monitoring results and significant events will be recorded. The original logbook will become part of the exposure records file.

#### **14.9 Hazard Communication Program/MSDS**

Material Safety Data Sheets (MSDS) will be obtained for applicable substances and included in the site hazard communication file. The hazard communication program will be maintained onsite in accordance with 29 CFR 1910.1200 and Foster Wheeler Environmental Corporation Health and Safety Program EHS 4-2.

#### **14.10 Work Permits**

All work permits, including confined space entry, hot work, lockout/tagout, and line breaking permits will be maintained in the project files.



## 16.0 REFERENCES

Foster Wheeler Environmental, Master Site Health and Safety Plan for Gould Island, Naval Station Newport, Newport, Rhode Island, June 1999.

Foster Wheeler Environmental Work Plan for PCB Contaminated Soils and Concrete Remediation at Naval Station Newport, Newport, RI.

29 CFR 1910.120 Hazardous Waste Operations and Emergency Response. USDOL - OSHA.

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**APPENDIX A**

**FIELD CHANGE REQUEST FORM**

**FOSTER WHEELER ENVIRONMENTAL  
FIELD CHANGE REQUEST FORM**

**PROJECT:**

**CHANGE NUMBER:**

**PROJECT LOCATION:**

**DESCRIPTION OF CHANGE:**

**REASON FOR CHANGE:**

**RECOMMENDED DISPOSITION:**

**SITE MANAGER:** \_\_\_\_\_  
Signature Date

**PROGRAM ENVIRONMENTAL and SAFETY MANAGER:**  
\_\_\_\_\_  
Signature Date

**DISTRIBUTION:** Program Environmental and Safety Manager \_\_\_\_\_  
Site Health and Safety Officer \_\_\_\_\_  
Quality Assurance Representative \_\_\_\_\_  
Field Operation Leader \_\_\_\_\_

SHSP FIELD CHANGE

Field Change Number: \_\_\_\_\_ Date Effective: \_\_\_\_\_

Pen and Ink changes to be made in the SHSP to alert the reader of this change:

Reason for the change to be incorporated into the SHSP:

**TEXT OF CHANGE TO BE INCORPORATED:**



## **APPENDIX B**

### **MAP OF SITE ZONES**



## **APPENDIX C**

### **ACTION LEVEL CALCULATIONS**

DUST EXPOSURE CALCULATION WORKSHEET					
South Bay III	Safety Factor for this site = 4				
Chemical	Exposure Limit (mg/m3)	Maximum Soil Concentration (mg/kg)	Exposure Limit Based on Single Compound (EL Mix, mg/m3)	Dust Quotient for Each Compound (level/limit)	Problem from Single Compound [5mg/m3)/ELmix]
Aluminum	5	1.E-9	1.25E+15	2.00E-10	0.000
Cadmium	0.005	1.E-9	1.25E+12	2.00E-07	0.000
Chlordane	1	1.E-9	2.5E+14	1.00E-09	0.000
Chromium	0.5	1.E-9	1.25E+14	2.00E-09	0.000
Chrome (hex)	0.01	1.E-9	2.5E+12	1.00E-07	0.000
Cobalt	0.02	1.E-9	5.E+12	5.00E-08	0.000
Copper	1	1.E-9	2.5E+14	1.00E-09	0.000
Cyanides	5	1.E-9	1.25E+15	2.00E-10	0.000
Endosulfan	0.1	1.E-9	2.5E+13	1.00E-08	0.000
Fluorides	2.5	1.E-9	6.25E+14	4.00E-10	0.000
Lead	0.05	1.E-9	1.25E+13	2.00E-08	0.000
Manganese	1	1.E-9	2.5E+14	1.00E-09	0.000
Mercury	0.05	1.E-9	1.25E+13	2.00E-08	0.000
Nickel	1	1.E-9	2.5E+14	1.00E-09	0.000
Oil Mist	5	1.E-9	1.25E+15	2.00E-10	0.000
PCBs	0.5	23,000	5.43	4.60E+04	0.920
PNAs	0.2	1.E-9	5.E+13	5.00E-09	0.000
Phthalates	5	1.E-9	1.25E+15	2.00E-10	0.000
RDX	1.5	1.E-9	3.75E+14	6.67E-10	0.000
Selenium	0.2	1.E-9	5.E+13	5.00E-09	0.000
Silica	0.05	1.E-9	1.25E+13	2.00E-08	0.000
			Sum	4.60E+04	
		Dust Exposure Level at Mixture PEL =	5.435		0.920

EQUATIONS USED IN THIS CALCULATION

Dust action level =  $(1E+6)(\text{Exposure Limit mg/m3})$   
 (For one dust)

$$\frac{\text{Concentration mg/kg}(\text{Safety Factor})}{(1E+6) / (\text{Safety Factor})}$$

Dust action level =  $(1E+6) / (\text{Safety Factor})$   
 (For mixed dusts)

$$\frac{\text{Sum of } [( \text{Concentration mg/kg} ) / (\text{Exposure Limit})]}{}$$

Spreadsheet:  
Dustlevl.xls

Author: Chris Marlowe

## **APPENDIX D**

### **EXCERPT FROM NIOSH METHOD 7602 FOR CRYSTALLINE SILICA**

## SILICA, CRYSTALLINE by IR 7602

SiO<sub>2</sub> MW: 60.08 CAS: 14808-60-7 (quartz) RTECS: VV7330000 (quartz)

14464-46-1 (cristobalite) VV7325000 (cristobalite)

15468-32-3 (tridymite) VV335000 (tridymite)

**METHOD: 7602, Issue 2 EVALUATION: Issue 1: 15 February 1984**

**Issue 2: 15 August 1994**

**OSHA :** quartz (respirable): 10 mg/m<sup>3</sup>/(% SiO<sub>2</sub> + 2); cristobalite and tridymite (respirable): 1/2 the above

**NIOSH:** 0.05 mg/m<sup>3</sup>; carcinogens

**ACGIH:** quartz (respirable) 0.1 mg/m<sup>3</sup>

cristobalite (respirable) 0.05 mg/m<sup>3</sup>

tridymite (respirable) 0.05 mg/m<sup>3</sup>

**PROPERTIES:** solid; crystalline transformations: quartz to tridymite @ 867 °C; tridymite to cristobalite @ 1470 °C; a-quartz to b-quartz @ 573 °C

**SYNONYMS:** free crystalline silica; silicon dioxide

### SAMPLING

**SAMPLER:** CYCLONE + FILTER

(10-mm nylon, or Higgins-Dewell (HD) + 0.8-µm or 5-µm PVC or MCE membrane)

**FLOW RATE:** nylon cyclone: 1.7 L/min HD cyclone: 2.2 l/min

**VOL-MIN:** 400 L

**-MAX:** 800 L

**SHIPMENT:** routine

**SAMPLE STABILITY:** stable

**BLANKS:** 2 to 10 field blanks per set

**BULK SAMPLE:** required; area respirable or settled dust

### MEASUREMENT

**TECHNIQUE:** INFRARED ABSORPTION SPECTROPHOTOMETRY

**ANALYTE:** quartz

**ASH:** muffle furnace or RF plasma asher

**PELLET:** mix residue with KBr; press 13 mm pellet

**IR:** scan absorbance from 1000 to 600 cm<sup>-1</sup>

**CALIBRATION:** quartz diluted in KBr

**RANGE:** 10 to 160 µg quartz

**ESTIMATED LOD:** 5 µg quartz

**PRECISION (S<sub>r</sub>):** < 0.15 @ 30 µg quartz per sample, in coal dust [1]

### ACCURACY

**RANGE STUDIED:** not studied

**BIAS:** unknown

**OVERALL PRECISION (S<sup>^</sup><sub>rT</sub>):** not determined

**ACCURACY:** not determined

**APPLICABILITY:** The working range is 0.025 to 0.4 mg/m<sup>3</sup> for a 400-L air sample. Cristobalite and tridymite also have major absorbance peaks at 800 cm<sup>-2</sup> which can be used for their determination [1-6].

**INTERFERENCES:** Amorphous silica, calcite, cristobalite, kaolinite and tridymite interfere; see APPENDIX.

**OTHER METHODS:** This is P&CAM 110 [1]. It is similar to Method 7603, except for sample preparation (KBr pellet vs. redeposition). Crystalline silica can also be determined by X-ray diffraction (Method 7500) and spectrophotometry (Method 7601).

XRD can distinguish the three polymorphs and does not detect amorphous silica. Silicates, which interfere with XRD, are removed by phosphoric acid cleanup.

NIOSH Manual of Analytical Methods (NMAM), Fourth Edition, 8/15/94

**EQUIPMENT:**

1. Sampler:
  - a. Filter: 37-mm diameter, 5.0- $\mu$ m pore size, polyvinyl chloride filter supported with backup pad in a two-piece, 37-mm cassette filter holder (preferably, conductive) held together by tape or cellulose shrink band.
  - b. Cyclone: 10-mm nylon or Higgins-Dewell (HD), or equivalent.
  - c. Sampling head holder: Holder must keep the cassette, cyclone and coupler together rigidly so that air enters only at the cyclone inlet.
2. Area air sampler: PVC membrane filter, 37-mm, 5- $\mu$ m pore size in two piece filter cassette. Sample closed-face at 3 L/min.
3. Sampling pumps for HD cyclone, 2.2 L/min; nylon cyclone, 1.7 L/min; and area sampler, 3 L/min.
4. Infrared spectrophotometer; laboratory press for preparing KBr pellets; 13-mm KBr pellet die (evacuable).
5. Low-temperature (RF Plasma) asher and aluminum weighing pans or muffle furnace and porcelain crucibles.
6. Mortar and pestle, 50 mm agate or mullite metal microspatula; non-serrate, non-magnetic forceps; desiccator, camel's hair brush, glassine paper.
7. Analytical balance (0.01 mg) for preparing standards.  
Membrane filtration apparatus, 37-mm.

**SPECIAL PRECAUTIONS:** Avoid inhaling silica dust [1].  
Ethanol is flammable. Keep away from flames.

**SAMPLING:**

1. Calibrate each personal sampling pump with a representative sampler in line.
  2. Sample at  $1.7 \pm 5\%$  L/min with nylon cyclone or  $2.2 \pm 5\%$  with HD cyclone for a total sample size of 400 to 800 L. Do not exceed 2 mg total dust loading on the filter.
- NOTE: Do not allow the sampler assembly to be inverted at any time when using a cyclone. Turning the cyclone to anything more than a horizontal orientation may deposit oversized material from the cyclone body onto the filter.

**APPENDIX E**

**MATERIAL SAFETY DATA SHEETS**

ENVIRONMENTAL RESOURCE ASSOCIA -- PCB'S IN OIL, PT58

=====  
MSDS Safety Information  
=====

FSC: 6665  
MSDS Date: 01/09/1996  
MSDS Num: CBPZR  
LIIN: 00N072174  
Product ID: PCB'S IN OIL, PT58  
MFN: 01  
Responsible Party  
Cage: 1R664  
Name: ENVIRONMENTAL RESOURCE ASSOCIATES  
Address: 5540 MARSHALL ST  
City: ARVADA CO 80002  
Info Phone Number: 303-431-8454  
Emergency Phone Number: 303-431-8454  
Published: Y

=====  
Contractor Summary  
=====

Cage: 1R664  
Name: ENVIRONMENTAL RESOURCE ASSOCIATES  
Address: 5540 MARSHALL STREET  
City: ARVADA CO 80002  
Phone: 303-431-8454

=====  
Ingredients  
=====

Name: AROCHLOR (ONLY ONE OF THE FOLLOWING AROCHLORS (INGS 2 - 10) WILL BE  
PRESENT IN EACH SAMPLE)  
OSHA PEL: N/K (FP N)  
ACGIH TLV: N/K (FP N)

-----  
Cas: 12674-11-2  
RTECS #: TQ1351000  
Name: POLYCHLORINATED BIPHENYL (AROCLOR 1016) (SARA 313) (CERCLA)  
% Wt: <0.05  
OSHA PEL: N/K (FP N)  
ACGIH TLV: N/K (FP N)  
EPA Rpt Qty: 1 LB  
DOT Rpt Qty: 1 LB

-----  
Cas: 11104-28-2  
RTECS #: TQ1352000  
Name: POLYCHLORINATED BIPHENYL (AROCLOR 1221); (MFR CAS #11104-16-2)  
% Wt: <0.05  
OSHA PEL: N/K (FP N)  
ACGIH TLV: N/K (FP N)  
EPA Rpt Qty: 1 LB  
DOT Rpt Qty: 1 LB

-----  
Cas: 11141-16-5  
RTECS #: TQ1354000  
Name: POLYCHLORINATED BIPHENYL (AROCLOR 1232) (SARA 313) (CERCLA)  
% Wt: <0.05

OSHA PEL: N/K (FP N)  
ACGIH TLV: N/K (FP N)  
EPA Rpt Qty: 1 LB  
DOT Rpt Qty: 1 LB

-----  
Cas: 53469-21-9  
RTECS #: TQ1356000  
Name: POLYCHLORINATED BIPHENYL (AROCLOR 1242) (SARA 313) (CERCLA)  
% Wt: <0.05  
OSHA PEL: 1 MG/M3, S  
ACGIH TLV: 1 MG/M3, S  
EPA Rpt Qty: 1 LB  
DOT Rpt Qty: 1 LB

-----  
Cas: 12672-29-6  
RTECS #: TQ1358000  
Name: POLYCHLORINATED BIPHENYL (AROCLOR 1248) (SARA 313) (CERCLA)  
% Wt: <0.05  
OSHA PEL: N/K (FP N)  
ACGIH TLV: N/K (FP N)  
EPA Rpt Qty: 1 LB  
DOT Rpt Qty: 1 LB

-----  
Cas: 11097-69-1  
RTECS #: TQ1360000  
Name: POLYCHLORINATED BIPHENYL (AROCLOR 1254) (SARA 313) (CERCLA)  
% Wt: <0.05  
OSHA PEL: 0.5 MG/M3, S  
ACGIH TLV: 0.5 MG/M3, S  
EPA Rpt Qty: 1 LB  
DOT Rpt Qty: 1 LB

-----  
Cas: 11096-82-5  
RTECS #: TQ1362000  
Name: POLYCHLORINATED BIPHENYL (AROCLOR 1260) (SARA 313) (CERCLA)  
% Wt: <0.05  
OSHA PEL: N/K (FP N)  
ACGIH TLV: N/K (FP N)  
EPA Rpt Qty: 1 LB  
DOT Rpt Qty: 1 LB

-----  
Cas: 37324-23-5  
RTECS #: TQ1364000  
Name: POLYCHLORINATED BIPHENYL (AROCLOR 1262)  
% Wt: <0.05  
OSHA PEL: N/K (FP N)  
ACGIH TLV: N/K (FP N)

-----  
Cas: 11100-14-4  
RTECS #: TQ1366000  
Name: POLYCHLORINATED BIPHENYL (AROCLOR 1268)  
% Wt: <0.05  
OSHA PEL: N/K (FP N)  
ACGIH TLV: N/K (FP N)

-----  
RTECS #: 1000092SS  
Name: SOLVENT; (INDUSTRIAL GRADE TRANSFORMER OIL)  
% Wt: 99.9

OSHA PEL: N/K (FP N)  
ACGIH TLV: N/K (FP N)

=====  
Health Hazards Data  
=====

LD50 LC50 Mixture: NONE SPECIFIED BY MANUFACTURER.

Route Of Entry Inds - Inhalation: YES

Skin: YES

Ingestion: YES

Carcinogenicity Inds - NTP: YES

IARC: YES

OSHA: NO

Effects of Exposure: SEVERAL COMPONENTS ARE ANIMAL POSITIVE, HUMAN SUSPECTED CARCINOGENS. PRIMARY IRRITANT. IRRITATES AND DAMAGES ALL TISSUES. MAY CAUSE LIVER, KIDNEY AND LUNG DAMAGE. MAY CAUSE CARDIAC ARRHYTHMIA, MAY SENSITIZE HEART TO EPINEPHRINE. MAY CAUSE A LLERGIC DERMATITIS OR CHLORACNE. MAY CAUSE CANCER OF LIVER, OR HEMATOPOETIC SYS.

Explanation Of Carcinogenicity: AROCHLOR 1254:IARC MONOGRAPHS, SUPP, VOL 7, PG 322, 1987:GRP 2A. NTP 7TH ANNUAL RPT ON CARCINS, 1994:ANTIC TO BE(SUPDAT)

Signs And Symptions Of Overexposure: RED, DRY SCALY SKIN; CRACKING AND WEAPING SKIN; COUGH AND WHEEZING. JAUNDICE; NAUSEA AND VOMITING; UREMIA. MAY CAUSE CHLORACNE.

Medical Cond Aggravated By Exposure: DERMATITIS. LIVER DISEASE, KIDNEY DISEASE, ANEMIAS AND LEUKOPENIAS.

First Aid: INHALATION:REMOVE TO FRESH AIR. SUPPORT BREATHING (GIVE O\*2/ARTF RESP) (FP N). EYES:IMMEDIATELY FLUSH W/RUNNING WATER FOR AT LEAST 15 MINUTES.

SKIN:WASH W/SOAP & WATER. REMOVE AND ISOLATE CONTAMINATED CLOTHING AND

SHOES AT THE SITE. INGESTI ON:GIVE SYRUP OF IPECAC 60CC WITH 180CC WATER IF SWALLOWED.

=====  
Handling and Disposal  
=====

Spill Release Procedures: DAM UP AND ABSORB. VENTILATE THE AREA. CALL CLEAN UP TEAM. DO NOT WASH TO DRAIN.

Neutralizing Agent: NONE SPECIFIED BY MANUFACTURER.

Waste Disposal Methods: DISPOSAL MUST BE I/A/W FEDERAL, STATE & LOCAL

REGULATIONS (FP N). ABSORB AND INCINERATE OR DISPOSE AS HAZARDOUS WASTE.

Handling And Storage Precautions: USE OR STORE ONLY IN AREAS WHERE SPILLS CAN BE CONTAINED.

Other Precautions: HANDLE WITH CARE! MATERIAL CONTAINS CARCINOGENS.

=====  
Fire and Explosion Hazard Information  
=====

Flash Point Method: COC

Flash Point Text: 300F,149C

Extinguishing Media: DRY CHEMICAL, CO\*2, WATER SPRAY OR REGULAR FOAM.

Fire Fighting Procedures: USE NIOSH APPRVD SCBA & FULL PROT EQUIP (FP N). MOVE CNTNR FROM FIRE AREA IF YOU CAN DO IT W/OUT RISK. DO NOT SCATTER SPILLED MATL W/HIGH PRESS WATER (SUPDAT)

Unusual Fire/Explosion Hazard: MAY FORM CARBON MONOXIDE, PHOSGENE AND CARBONYL BROMIDE IN FIRE.

=====  
Control Measures  
=====

Respiratory Protection: NIOSH APPROVED ORGANIC VPAOR CARTRIDGE, FULL FACE PIECE OR SELF CONTAINED OR AIR SUPPLIED RESPIRATOR.

Ventilation: LOCAL EXHAUST &/OR MECHANICAL: USE IN HOOD. VENTILATE SPILL.

Protective Gloves: VITON OR NEOPRENE GLOVES.

Eye Protection: ANSI APPROVED CHEM WORKERS GOGGS (FP N).  
Other Protective Equipment: EYE WASH FOUNTAIN & DELUGE SHOWER WHICH MEET ANSI DESIGN CRITERIA (FP N). CHEM IMPERVIOUS CLTHG IF LG AMTS IN (SUPDAT)  
Work Hygienic Practices: USE CAREFUL LABORATORY TECHNIQUE. AVOID CONTACT.  
Supplemental Safety and Health: FIRE FIGHT PROC:STREAMS. DIKE FIRE CONTROL WATER FOR LATER DISP. EXPLAN OF CARCIN:CARCIN. ANIMAL:LIVER. AROCLOR 1260:NTP 7TH ANNUAL RPT ON CARCINS, 1994:ANTIC TO BE CARCIN. ANIMAL:LIVER. OTHER PROT EQUIP:USE. LAB COAT, IMPERVIOUS APRON W/SL EEVES AND CLOSED SHOES.

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

Spec Gravity: 0.889 (H\*20=1)  
Solubility in Water: INSOLUBLE  
Appearance and Odor: CLEAR YELLOWISH LIQUID; ODORLESS.  
=====

Reactivity Data  
=====

Stability Indicator: YES  
Stability Condition To Avoid: NONE.  
Materials To Avoid: NONE SPECIFIED BY MANUFACTURER.  
Hazardous Decomposition Products: MAY FORM CARBON MONOXIDE, PHOSGENE AND CARBONYL BROMIDE IN FIRE.  
Hazardous Polymerization Indicator: NO  
Conditions To Avoid Polymerization: NOT RELEVANT  
=====

Toxicological Information  
=====

Ecological Information  
=====

MSDS Transport Information  
=====

Regulatory Information  
=====

Other Information  
=====

HAZCOM Label  
=====

Product ID: PCB'S IN OIL, PT58  
Cage: 1R664  
Company Name: ENVIRONMENTAL RESOURCE ASSOCIATES  
Street: 5540 MARSHALL STREET  
City: ARVADA CO  
Zipcode: 80002  
Health Emergency Phone: 303-431-8454  
Label Required IND: Y  
Date Of Label Review: 08/15/1996  
Status Code: C  
Label Date: 08/15/1996  
Origination Code: G  
Chronic Hazard IND: Y  
Eye Protection IND: YES  
Skin Protection IND: YES  
Signal Word: DANGER

Respiratory Protection IND: YES

Health Hazard: Severe

Contact Hazard: Severe

Fire Hazard: Slight

Reactivity Hazard: Slight

Hazard And Precautions: DECOMPOSITION PRODUCTS MAY BE HARMFUL. ACUTE:PRIMARY IRRITANT. IRRITATES AND DAMAGES ALL TISSUES. RED, DRY SCALY SKIN; CRACKING AND WEAPING SKIN; COUGH AND WHEEZING. JAUNDICE; NAUSEA AND VOMITING; UREMIA. MAY CAUSE CHLORACNE. CHRONIC:CANCER HAZARD. CONTAINS AROCHLORS, WHICH ARE LISTED AS AN ANIMAL LIVER CARCINOGEN (FP N). SEVERAL COMPONENTS ARE HUMAN SUSPECTED CARCINOGENS. MAY CAUSE LIVER, KIDNEY AND LUNG DAMAGE. MAY CAUSE CARDIAC ARRYTHIMIA, MAY SENSITIZE HEART TO EPINEPHRIN E. MAY CAUSE ALLERGIC DERMATITIS OR CHLORACNE. MAY CAUSE CANCER OF LIVER, OR HEMATOPOETIC SYSTEM.

=====  
Disclaimer (provided with this information by the compiling agencies): This information is formulated for use by elements of the Department of Defense. The United States of America in no manner whatsoever expressly or implied warrants, states, or intends said information to have any application, use or viability by or to any person or persons outside the Department of Defense nor any person or persons contracting with any instrumentality of the United States of America and disclaims all liability for such use. Any person utilizing this instruction who is not a military or civilian employee of the United States of America should seek competent professional advice to verify and assume responsibility for the suitability of this information to their particular situation regardless of similarity to a corresponding Department of Defense or other government situation.

# SAND, WASHED AND DRIED

MSDS Number: S0722 --- Effective Date: 09/14/00

---

## 1. Product Identification

**Synonyms:** Agate; Onyx; **Quartz; Silica, crystalline quartz;** Silicon dioxide

**CAS No.:** 14808-60-7

**Molecular Weight:** 60.08

**Chemical Formula:** SiO<sub>2</sub>

**Product Codes:**

J.T. Baker: 3382, 7023

Mallinckrodt: 7062

---

## 2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
-----	-----	-----	
Quartz	14808-60-7	90 - 100%	Yes

---

## 3. Hazards Identification

### Emergency Overview

-----  
**WARNING! HARMFUL IF INHALED. OVEREXPOSURE MAY CAUSE LUNG DAMAGE. MAY CAUSE EYE IRRITATION. INHALATION CANCER HAZARD. CONTAINS QUARTZ WHICH CAN CAUSE CANCER. Risk of cancer depends upon duration and level of exposure.**

**J.T. Baker SAF-T-DATA<sup>(tm)</sup>** Ratings (Provided here for your convenience)

-----  
Health Rating: 3 - Severe (Cancer Causing)

Flammability Rating: 0 - None

Reactivity Rating: 0 - None

Contact Rating: 1 - Slight

Lab Protective Equip: GOGGLES; LAB COAT; VENT HOOD; PROPER GLOVES

Storage Color Code: Orange (General Storage)

### Potential Health Effects -----

#### Inhalation:

Acute pneumoconiosis from overwhelming exposure to silica dust has occurred. Coughing and irritation of throat are early symptoms.

#### Ingestion:

No adverse health effects expected.

**Skin Contact:**

No adverse effects expected.

**Eye Contact:**

May cause irritation, redness and pain.

**Chronic Exposure:**

Inhalation of quartz is classified as a human carcinogen. Chronic exposure can cause silicosis, a form of lung scarring that can cause shortness of breath, reduced lung function, and in severe cases, death.

**Aggravation of Pre-existing Conditions:**

Inhalation may increase the progression of tuberculosis; susceptibility is apparently not increased. Persons with impaired respiratory function may be more susceptible to the effects of this substance. Smoking can increase the risk of lung injury.

---

## 4. First Aid Measures

**Inhalation:**

Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

**Ingestion:**

If large amounts were swallowed, give water to drink and get medical advice.

**Skin Contact:**

Wash exposed area with soap and water. Get medical advice if irritation develops.

**Eye Contact:**

Wash thoroughly with running water. Get medical advice if irritation develops.

---

## 5. Fire Fighting Measures

**Fire:**

Not considered to be a fire hazard.

**Explosion:**

Not considered to be an explosion hazard.

**Fire Extinguishing Media:**

Use any means suitable for extinguishing surrounding fire.

**Special Information:**

In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode.

---

## 6. Accidental Release Measures

Ventilate area of leak or spill. Wear appropriate personal protective equipment as specified in Section 8. Spills: Sweep up and containerize for reclamation or disposal. Vacuuming or wet sweeping may be used to avoid dust dispersal.

## 7. Handling and Storage

Keep in a tightly closed container, stored in a cool, dry, ventilated area. Protect against physical damage. Use dustless systems for handling, storage, and clean up so that dust does not exceed the PEL. Use adequate ventilation and dust collection. Practice good housekeeping. Do not allow dust to collect on walls, floors, sills, ledges, machinery, or equipment. Maintain, clean and test respirators in accordance with OSHA regulations. Maintain and test ventilation and dust collection equipment. Wash clothing that has become dusty; do not breathe the dust from clothing. Containers of this material may be hazardous when empty since they retain product residues (dust, solids); observe all warnings and precautions listed for the product.

---

## 8. Exposure Controls/Personal Protection

### **Airborne Exposure Limits:**

-OSHA Permissible Exposure Limit (PEL):

Total dust:  $30\text{mg}/\text{m}^3/(\% \text{SiO}_2 + 2)$

Respirable Fraction:  $10\text{ mg}/\text{m}^3/(\% \text{SiO}_2 + 2)$

-ACGIH Threshold Limit Value (TLV):

$0.05\text{ mg}/\text{m}^3$  (TWA) respirable dust, A2 -Suspected Human Carcinogen.

### **Ventilation System:**

A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.

### **Personal Respirators (NIOSH Approved):**

If the exposure limit is exceeded and engineering controls are not feasible, a half-face high efficiency particulate respirator (NIOSH type N100 filter) may be worn for up to ten times the exposure limit or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. A full-face piece high efficiency particulate respirator (NIOSH type N100 filter) may be worn up to 50 times the exposure limit, or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. If oil particles (e.g. lubricants, cutting fluids, glycerine, etc.) are present, use a NIOSH type R or P filter. For emergencies or instances where the exposure levels are not known, use a full-facepiece positive-pressure, air-supplied respirator. **WARNING:** Air-purifying respirators do not protect workers in oxygen-deficient atmospheres. Where respirators are required, you must have a written program covering the basic requirements in the OSHA respirator standard. These include training, fit testing, medical approval, cleaning, maintenance, cartridge change schedules, etc. See 29CFR1910.134 for details.

### **Skin Protection:**

Wear protective gloves and clean body-covering clothing.

### **Eye Protection:**

Use chemical safety goggles. Maintain eye wash fountain and quick-drench facilities in work area.

---

## 9. Physical and Chemical Properties

**Appearance:**

Fine, off-white granules.

**Odor:**

Odorless.

**Solubility:**

Insoluble in water.

**Specific Gravity:**

2.65

**pH:**

No information found.

**% Volatiles by volume @ 21C (70F):**

0

**Boiling Point:**

2230C (4046F)

**Melting Point:**

1710C (3110F)

**Vapor Density (Air=1):**

No information found.

**Vapor Pressure (mm Hg):**

10 @ 1732C (3150F)

**Evaporation Rate (BuAc=1):**

Not applicable.

---

## 10. Stability and Reactivity

**Stability:**

Stable under ordinary conditions of use and storage.

**Hazardous Decomposition Products:**

At higher temperatures, can change crystal structure to form tridymite or cristobalite, which have greater health hazards.

**Hazardous Polymerization:**

Will not occur.

**Incompatibilities:**

Strong alkalis, hydrofluoric acid, powerful oxidizers and fluorine containing compounds.

**Conditions to Avoid:**

Dusting and incompatibles.

---

## 11. Toxicological Information

**Toxicological Data:**

No LD50/LC50 information found relating to normal routes of occupational exposure.

Investigated as a tumorigen and mutagen.

**Carcinogenicity:**

Quartz: NIOSH considers this substance to be a potential occupational carcinogen.

-----\Cancer Lists\-----			
Ingredient	---NTP Carcinogen---		IARC Category
	Known	Anticipated	
Quartz (14808-60-7)	Yes	No	1

## 12. Ecological Information

### Environmental Fate:

No information found.

### Environmental Toxicity:

No information found.

## 13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be managed in an appropriate and approved waste disposal facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

## 14. Transport Information

Not regulated.

## 15. Regulatory Information

-----\Chemical Inventory Status - Part 1\-----				
Ingredient	TSCA	EC	Japan	Australia
Quartz (14808-60-7)	Yes	Yes	Yes	Yes

-----\Chemical Inventory Status - Part 2\-----				
Ingredient	Korea	--Canada--		
		DSL	NDSL	Phil.
Quartz (14808-60-7)	Yes	Yes	No	Yes

-----\Federal, State & International Regulations - Part 1\-----				
Ingredient	-SARA 302-		-----SARA 313-----	
	RQ	TPQ	List	Chemical Catg.
Quartz (14808-60-7)	No	No	No	No

-----\Federal, State & International Regulations - Part 2\-----			
Ingredient	CERCLA	-RCRA-	-TSCA-
		261.33	8(d)
Quartz (14808-60-7)	No	No	No

Chemical Weapons Convention: No TSCA 12(b): No CDTA: No  
SARA 311/312: Acute: Yes Chronic: Yes Fire: No Pressure: No  
Reactivity: No (Pure / Solid)

**WARNING:**

THIS PRODUCT CONTAINS A CHEMICAL(S) KNOWN TO THE STATE OF CALIFORNIA TO CAUSE CANCER.

**Australian Hazchem Code:** No information found.

**Poison Schedule:** No information found.

**WHMIS:**

This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

---

## 16. Other Information

**NFPA Ratings:** Health: **2** Flammability: **0** Reactivity: **0**

**Label Hazard Warning:**

WARNING! HARMFUL IF INHALED. OVEREXPOSURE MAY CAUSE LUNG DAMAGE. MAY CAUSE EYE IRRITATION. INHALATION CANCER HAZARD. CONTAINS QUARTZ WHICH CAN CAUSE CANCER. Risk of cancer depends upon duration and level of exposure.

**Label Precautions:**

Do not get in eyes, on skin, or on clothing.  
Do not breathe dust.  
Keep container closed.  
Use only with adequate ventilation.  
Minimize dust generation and accumulation.  
Wash thoroughly after handling.

**Label First Aid:**

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention. In case of eye contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention if irritation develops or persists.

**Product Use:**

Laboratory Reagent.

**Revision Information:**

MSDS Section(s) changed since last revision of document include: 8, 11.

**Disclaimer:**

\*\*\*\*\*  
\*\*\*\*\*

**Mallinckrodt Baker, Inc. provides the information contained herein in good faith but makes no representation as to its comprehensiveness or accuracy. This document is intended only as a guide to the appropriate precautionary handling of the material by a properly trained person using this product. Individuals receiving the information must exercise their independent judgment in determining its appropriateness for a particular purpose. MALLINCKRODT BAKER, INC. MAKES NO**

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**Prepared by:** Strategic Services Division  
Phone Number: (314) 539-1600 (U.S.A.)

# **APPENDIX F**

## **ACTIVITY HAZARD ANALYSES**

## ACTIVITY HAZARD ANALYSIS

Project: <u>Phase II Remediation Activities</u> Activity: <u>General Site Hazards</u>		Location: <u>Gould Island, Naval Station Newport, Newport, RI</u>	
MAJOR STEPS	POTENTIAL HAZARDS	PROTECTIVE MEASURES/CONTROLS	
1. General Site Hazards	a. Back Injuries	a. Back Injuries <ul style="list-style-type: none"> <li>◆ Site personnel will be instructed on proper lifting techniques;</li> <li>◆ Mechanical devices should be used to reduce manual handling of materials;</li> <li>◆ Team lifting should be utilized if mechanical devices are not available.</li> </ul>	
	b. Slips/Trips/Falls	b. Slips/Trips/Falls <ul style="list-style-type: none"> <li>◆ Maintain work areas safe and orderly; unloading areas should be on even terrain; mark and repair if possible tripping hazards.</li> </ul>	
	c. Vehicular Traffic	c. Vehicular Traffic <ul style="list-style-type: none"> <li>◆ Spotters will be used when backing up trucks and heavy equipment and when moving equipment.</li> </ul>	
	d. Overhead Hazards	d. Overhead Hazards <ul style="list-style-type: none"> <li>◆ Personnel will be required to wear hard hats that meet ANSI Standard Z89.1.</li> <li>◆ All ground personnel will stay clear of suspended loads.</li> <li>◆ All equipment will be provided with guards, canopies or grills to protect the operator from falling or flying objects.</li> <li>◆ All overhead hazards will be identified prior to commencing work operations.</li> </ul>	
	e. Dropped Objects	e. Dropped Objects <ul style="list-style-type: none"> <li>◆ Steel toe boots meeting ANSI Standard Z41 will be worn.</li> </ul>	
	f. Noise	f. Noise <ul style="list-style-type: none"> <li>◆ Hearing protection will be worn with a noise reduction rating capable of maintaining personal exposure below 85 dBA (ear muffs or plugs); SHSO will determine the need for hearing protection; all equipment will be equipped with manufacturer's required mufflers</li> </ul>	
	g. Eye Injuries	g. Eye Injuries <ul style="list-style-type: none"> <li>◆ Safety glasses meeting ANSI Standard Z87 will be worn.</li> </ul>	
	h. Heavy Equipment (overhead hazards, spills, struck by or against)	h. Heavy Equipment <ul style="list-style-type: none"> <li>◆ Equipment will have seat belts;</li> <li>◆ Operators shall wear seat belts when operating equipment;</li> <li>◆ Do not operate equipment on grades that exceed manufacturer's recommendations;</li> <li>◆ Equipment will have guards, canopies or grills to protect from flying objects;</li> <li>◆ Ground personnel will stay clear of all suspended loads;</li> <li>◆ Spill and absorbent materials will be readily available;</li> <li>◆ Drip pans, polyethylene sheeting or other means will be used for secondary containment;</li> </ul>	

Project: Phase II Remediation Activities  
 Activity: General Site Hazards

Location: Gould Island, Naval Station Newport, Newport, RI

MAJOR STEPS	POTENTIAL HAZARDS	PROTECTIVE MEASURES/CONTROLS
		<ul style="list-style-type: none"> <li>◆ Ground personnel will stay out of the swing radius;</li> <li>◆ Eye contact with operators will be made before approaching equipment;</li> <li>◆ Operator will acknowledge eye contact by removing his hands from the controls;</li> <li>◆ Equipment will not be approached on blind sides;</li> <li>◆ All equipment will be equipped with backup alarms.</li> </ul>
	i. Struck by	i. Struck by <ul style="list-style-type: none"> <li>◆ Be aware of heavy equipment operations.</li> <li>◆ Keep out of the swing radius of heavy equipment.</li> <li>◆ Ground personnel in the vicinity of heavy equipment operations shall be within the view of the operator at all times.</li> <li>◆ Ground personnel shall be aware of the counterweight swing and maintain an adequate buffer zone.</li> <li>◆ Ground personnel shall not stand directly behind heavy equipment when it is in operation.</li> </ul>
	j. Pinch/Cut/Smash	j. Pinch/Cut/Smash <ul style="list-style-type: none"> <li>◆ Cut resistant kevlar work gloves will be worn when dealing with sharp objects; all hand and power tools will be maintained in safe condition; guards will be kept in place while using hand and power tools.</li> </ul>
	k. Contact with Electricity	k. Contact with Electricity <ul style="list-style-type: none"> <li>◆ Equipment will be equipped with GFCI.</li> <li>◆ Electrical extension cords shall be of the “Hard” or “Extra Hard” service type.</li> <li>◆ All electrical work will be conducted by a licensed electrician.</li> <li>◆ All utilities will be marked prior to excavation activities proceeding.</li> <li>◆ All equipment will stay a minimum of 15 feet from overhead energized electrical lines (50 kV). This distance will increase .4 inches for each 1 kV above 50 kV.</li> </ul>
EQUIPMENT USED	INSPECTION REQUIREMENTS	TRAINING REQUIREMENTS
<ol style="list-style-type: none"> <li>1. Heavy Equipment</li> <li>2. Appropriate PPE</li> <li>3. First Aid Kits</li> <li>4. Portable Eyewash</li> </ol>	<ol style="list-style-type: none"> <li>1. Inspections will be performed on equipment prior to each use.</li> <li>2. Inspections will be performed on PPE prior to each use.</li> <li>3. Weekly inspections will be performed on first aid kits.</li> <li>4. Portable eye wash will be inspected weekly</li> </ol>	<ol style="list-style-type: none"> <li>1. Personnel have read and comply with SHSP</li> <li>2. Site specific training.</li> <li>3. Qualified operators will be used for equipment operation</li> <li>4. At least two individuals on-site will have current CPR, First aid and bloodborne pathogen training</li> </ol>

## ACTIVITY HAZARD ANALYSIS

Project: <u>Phase II Remediation Activities</u> Activity: <u>Mobilization/Demobilization</u>		Location: <u>Gould Island, Naval Station Newport, Newport, RI</u>	
MAJOR STEPS	POTENTIAL HAZARDS	PROTECTIVE MEASURES/CONTROLS	
1. Mobilization/Demobilization of Equipment and Supplies	a. Struck by Heavy Equipment/Vehicles  b. Struck by Equipment/Supplies  c. Overexertion Unloading/Loading Supplies  d. Caught in/on/between  e. Slip/Trip/Fall	a. Struck by <ul style="list-style-type: none"> <li>◆ Be aware of heavy equipment operations.</li> <li>◆ Keep out of the swing radius of heavy equipment.</li> <li>◆ Ground personnel in the vicinity of heavy equipment operations shall be within the view of the operator at all times.</li> <li>◆ Ground personnel shall be aware of the counterweight swing and maintain an adequate buffer zone.</li> <li>◆ Ground personnel shall not stand directly behind heavy equipment when it is in operation.</li> </ul> b. Struck by Equipment/Supplies <ul style="list-style-type: none"> <li>◆ Workers will maintain proper space around their work area, if someone enters it, stop work.</li> <li>◆ When entering another worker's work space give a verbal warning so they know you are there.</li> </ul> c. Overexertion Unloading/Loading Supplies <ul style="list-style-type: none"> <li>◆ Train workers on proper body mechanics, do not bend or twist at the waist.</li> </ul> d. Caught in/on/between <ul style="list-style-type: none"> <li>◆ Do not place yourself between two vehicles or between a vehicle and a fixed object.</li> </ul> e. Slip/Trip/Fall <ul style="list-style-type: none"> <li>◆ Mark all holes and low spots in area with banner tape. Instruct personnel to avoid these areas</li> <li>◆ Drivers will maintain 3 point contact when mounting/dismounting vehicles/equipment.</li> <li>◆ Drivers will check surface before stepping, not jumping down.</li> </ul>	
EQUIPMENT USED	INSPECTION REQUIREMENTS	TRAINING REQUIREMENTS	
1. Heavy Equipment 2. Appropriate PPE 3. First Aid Kits 4. Portable Eyewash 5. Fire Extinguishers 6. Air Monitoring Equipment	1. Inspections will be performed on equipment prior to each use. 2. Inspections will be performed on PPE prior to each use. 3. Weekly inspections will be performed on first aid kits. 4. Portable eye wash will be inspected weekly 5. Weekly inspections will be performed on fire extinguishers. 6. Air monitoring equipment will be pre- and post calibrated according to manufacturer's specifications.	1. Personnel have read and comply with SHSP 2. Site specific training 3. Qualified operators will be used for equipment operation 4. At least two individuals on-site will have current CPR, First aid and bloodborne pathogen training 5. Instruct personnel on proper use of fire extinguishers 6. Qualified individuals will use air monitoring equipment.	

### ACTIVITY HAZARD ANALYSIS

Project: Phase II Remediation Activities  
 Activity: Site Preparation and Phase II Activities

Location: Gould Island, Naval Station Newport, Newport, RI

MAJOR STEPS	POTENTIAL HAZARDS	PROTECTIVE MEASURES/CONTROLS
1. Site Preparation	a. Overexertion Repairing Soil Erosion Controls  b. Struck against wood stakes	a. Overexertion Repairing Soil Erosion Controls ◆ See 1 (b) above in Mobilization  b. Struck against wood stakes ◆ Wear Leather Work Gloves as per Table 6-1 to prevent splinters.
2. Soil Excavation	a. Struck by Heavy Equipment/Vehicles     b. Fall into Excavation  c. Caught on/in/between  d. Exposure to Contaminated Dust	a. Struck by Heavy Equipment/Vehicles ◆ Speed limit for traffic is 15 mph for all areas of the site. ◆ Operators/Drivers shall submit a copy of their valid driver's license on initial arrival for each vehicle brought on site. ◆ Drivers will maintain workers on foot in sight, if you lose sight of someone, Stop! ◆ Design the site to minimize backing operations. ◆ Personnel are not allowed to use a cellular phone while driving a vehicle on-site. ◆ Use flaggers or spotters for traffic control whenever there is heavy or congested traffic, "blind spots", backing, or where there are road hazards or unsafe road conditions. Flaggers must use flags/sign paddles that are 18" x 18" square minimum. ◆ All personnel involved with this phase of work will wear high visibility vests at all times. ◆ Do not approach heavy equipment unless eye contact with appropriate hand signals has been made with the operator to cease activity. Equipment operators shall confirm that eye contact had been made by stopping operation and clearly showing their hands are off of the controls.  b. Fall into Excavation ◆ Do not leave excavations open overnight whenever possible. ◆ Install open trench warning devices/barricades.  c. Caught on/in/between ◆ Do not place yourself between two vehicles or between a vehicle and a fixed object.  d. Exposure to Contaminated Dust ◆ All workers will work upwind from dust generation. ◆ Dust control procedures will be initiated whenever visible dust is generated. ◆ Wear proper PPE as per Table 6-1.
3. Breaking and Excavation of Concrete	a. Exposure to Concrete Dust  b. Contact with Contaminated Soil	a. Exposure to Concrete Dust ◆ See 2 (f) above  b. Contact with contaminated soil/dust ◆ All workers will operate upwind of soil moving location. ◆ Workers will wear proper PPE when required as per Table 6-1. Real time dust monitoring will be performed using a miniram or equivalent instrument.

Project: Phase II Remediation Activities  
 Activity: Site Preparation and Phase II Activities

Location: Gould Island, Naval Station Newport, Newport, RI

4. Soil Sampling	a. Exposure to Contaminated Dust  b. Contact with Contaminated Soil	a. Exposure to Contaminated Dust ◆ See 2 (f) above  b. Contact with Contaminated Soil ◆ See 3 (h) above
------------------	---	---

EQUIPMENT USED	INSPECTION REQUIREMENTS	TRAINING REQUIREMENTS
1. Heavy Equipment 2. Appropriate PPE 3. First Aid Kits 4. Portable Eyewash 5. Fire Extinguishers 6. Air Monitoring Equipment	1. Inspections will be performed on equipment prior to each use. 2. Inspections will be performed on PPE prior to each use. 3. Weekly inspections will be performed on first aid kits. 4. Portable eye wash will be inspected weekly 5. Weekly inspections will be performed on fire extinguishers. 6. Air monitoring equipment will be pre- and post calibrated according to manufacturer's specifications.	1. Personnel have read and comply with SHSP 2. Site specific training 3. Qualified operators will be used for equipment operation 4. At least two individuals on-site will have current CPR, First aid and bloodborne pathogen training 5. Instruct personnel on proper use of fire extinguishers 6. SHSO will use air monitoring equipment.

### ACTIVITY HAZARD ANALYSIS

Project: Phase II Remediation Activities  
 Activity: Site Restoration and Equipment Decontamination

Location: Gould Island, Naval Station Newport, Newport, RI

MAJOR STEPS	POTENTIAL HAZARDS	PROTECTIVE MEASURES/CONTROLS
1. Backfill excavated areas	a. Struck by Equipment/Vehicles	a. Struck by Equipment/Vehicles ♦ See 2 (a) in Site Preparation
2. Restore Site to Previous Condition	a. Slip/Trip/Fall	a. Slip/Trip/Fall ♦ See 1 (d) in Mobilization above
EQUIPMENT USED	INSPECTION REQUIREMENTS	TRAINING REQUIREMENTS
1. Heavy Equipment 2. Appropriate PPE 3. First Aid Kits 4. Portable Eyewash 5. Fire Extinguishers 6. Air Monitoring Equipment 7. Air Sampling Equipment 8. Concrete Crusher	1. Inspections will be performed on equipment prior to each use. 2. Inspections will be performed on PPE prior to each use. 3. Weekly inspections will be performed on first aid kits. 4. Portable eye wash will be inspected weekly 5. Weekly inspections will be performed on fire extinguishers. 6. Air monitoring equipment will be pre- and post calibrated according to manufacturer's specifications. 7. Air Sampling pumps to be inspected and calibrated to proper flow rate pre and post sampling. 8. Inspections will be performed on equipment prior to use.	1. Personnel have read and comply with SHSP 2. Site specific training 3. Qualified operators will be used for equipment operation 4. At least two individuals on-site will have current CPR, First aid and bloodborne pathogen training 5. Instruct personnel on proper use of fire extinguishers 6. Qualified individuals will use air monitoring equipment. 7. Qualified individuals will use air sampling equipment. 8. Qualified operators will be used for equipment operation

# **APPENDIX G**

## **PPE SELECTION FORM**

**TABLE 6.1 PERSONAL PROTECTIVE EQUIPMENT SELECTION**

**ACTIVITY:** \_\_\_\_\_

<b>TASK</b>	<b>HEAD</b>	<b>EYE/FACE</b>	<b>FEET</b>	<b>HANDS</b>	<b>BODY</b>	<b>HEARING</b>	<b>RESPIRATOR</b>

**SHSO** \_\_\_\_\_

**APPENDIX H**

**MEDICAL DATA SHEET**

**Foster Wheeler Environmental Corporation**

**MEDICAL DATA SHEET**

The brief medical data sheet shall be completed by all on-site personnel and will be kept in the Support Zone by the SHSO as a project record during the conduct of site operations. It accompanies any personnel when medical assistance is needed or if transport to a hospital is required.

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

Name: \_\_\_\_\_ Home Telephone: \_\_\_\_\_

Address: \_\_\_\_\_

Age: \_\_\_\_\_ Height: \_\_\_\_\_ Weight: \_\_\_\_\_ Blood Type: \_\_\_\_\_

Name and Telephone Number of Emergency Contact: \_\_\_\_\_

\_\_\_\_\_

Drug or Other Allergies: \_\_\_\_\_

Particular Sensitivities: \_\_\_\_\_

Do You Wear Contacts? \_\_\_\_\_

Provide A Check List Of Previous Illnesses: \_\_\_\_\_

What Medications Are You Presently Using? \_\_\_\_\_

Do You Have Any Medical Restrictions? \_\_\_\_\_

Name, Address, And Phone Number Of Personal Physician: \_\_\_\_\_

**APPENDIX I**

**WORK RULES**

# **FOSTER WHEELER ENVIRONMENTAL CORPORATION**

## **GENERAL HEALTH AND SAFETY RULES**

1. All site personnel must attend each day's Daily Briefing.
2. Any individual taking prescribed drugs shall inform the Environmental and Safety Supervisor (ESS) of the type of medication. The ESS will review the matter with the Project Environmental and Safety Manager (PESM) and the Corporate Medical Consultant (CMC), who will decide if the employee can safely work on-site while taking the medication.
3. The personal protective equipment specified by the ESS and in the EHS plan(s) shall be worn by all site personnel. This includes hard hats and safety glasses which must be worn at all times in active work areas.
4. Facial hair (beards, long sideburns or mustaches) which may interfere with a satisfactory fit of a respirator mask is not allowed on any person who may be required to wear a respirator.
5. All personnel must sign the site log and the exclusion zone log when used at the site.
6. Personnel must follow proper decontamination procedures and shower at the end of the work shift.
7. Eating, drinking, chewing tobacco or gum, smoking and any other practice that may increase the possibility of hand-to-mouth contact is prohibited in the exclusion zone or the contamination reduction zone. (Exceptions may be permitted by the PESM to allow fluid intake during heat stress conditions.)
8. All lighters, matches, cigarettes and other forms of tobacco are prohibited in the Exclusion Zone.
9. All signs and demarcations shall be followed. Such signs and demarcation shall not be removed except as authorized by the ESS.
10. No one shall enter a permit-required confined space without a permit. Confined space entry permits shall be implemented as issued.
11. All personnel must follow Hot Work Permits as issued.
12. All personnel must use the Buddy System in the Exclusion Zone.
13. All personnel must follow the work-rest regimens and other practices required by the heat stress program.
14. All personnel must follow lockout/tagout procedures when working on equipment involving moving parts or hazardous energy sources.
15. No person shall operate equipment unless trained and authorized.

16. No one may enter an excavation greater than four feet deep unless authorized by the Competent Person. Excavations must be sloped or shored properly. Safe means of access and egress from excavations must be maintained.
17. Ladders and scaffolds shall be solidly constructed, in good working condition and inspected prior to use. No one may use defective ladders or scaffolds.
18. Fall protection or fall arrest systems must be in place when working at elevations greater than six feet for temporary working surfaces and four feet for fixed platforms.
19. Safety belts, harnesses and lanyards must be selected by the Supervisor. The user must inspect the equipment prior to use. No defective personal fall protection equipment shall be used. Personal fall protection that has been shock loaded must be discarded.
20. Hand and portable power tools must be inspected prior to use. Defective tools and equipment shall not be used.
21. Ground fault interrupters shall be used for cord and plug equipment used outdoors or in damp locations. Electrical cords shall be kept out of walkways and puddles unless protected and rated for the service.
22. Improper use, mishandling or tampering with health and safety equipment and samples is prohibited.
23. Horseplay of any kind is prohibited.
24. Possession or use of alcoholic beverages, controlled substances or firearms on any site is forbidden.
25. All incidents, no matter how minor must be reported immediately to the Supervisor.
26. All personnel shall be familiar with the Site Emergency Response Plan.

**The above Health and Safety Rules are not all inclusive and it is your responsibility to comply with all regulations set forth by OSHA, the FWENC Environmental, Health and Safety Programs, the EHS plan(s), the client, FWENC Supervisors and the ESS.**

**APPENDIX J**  
**HOSPITAL ROUTE MAP**

Figure 12-1  
Route to Newport Hospital, 11 Friendship St,  
Newport, RI 02840-2209  
Phone: (401) 846-6400

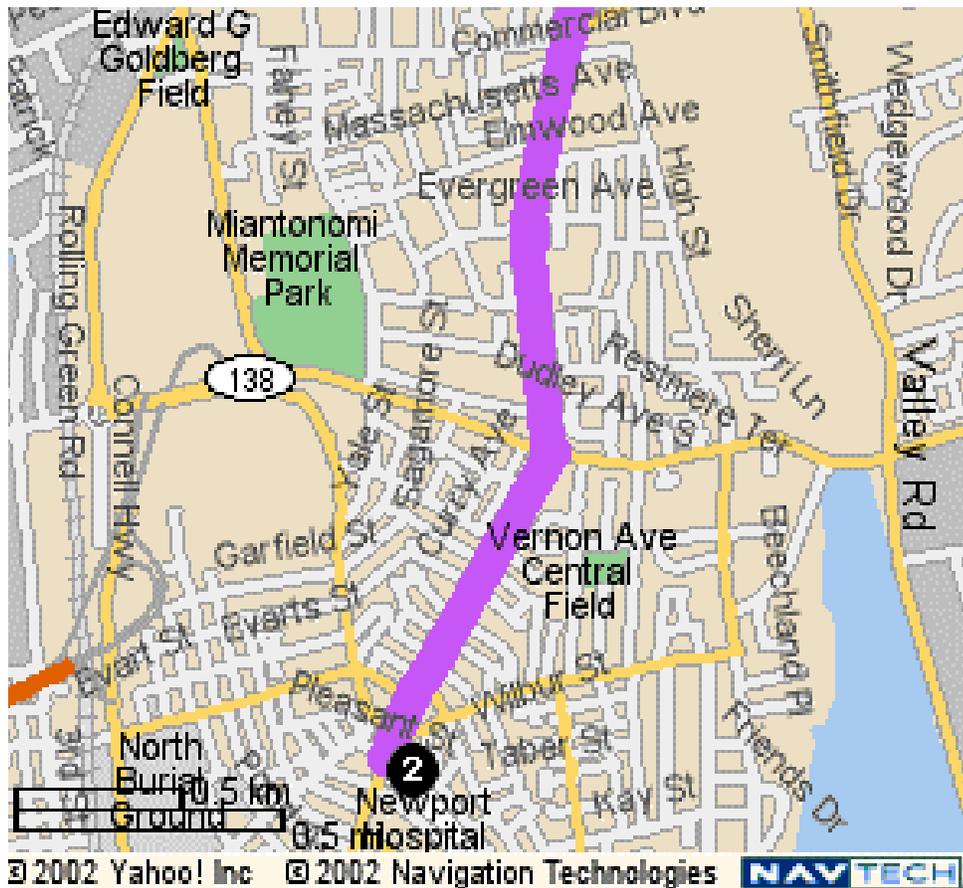


Leave Site trailer, drive east on Perry St. to Gate 4.

Travel through gate and turn left onto Coddington Hwy. Continue on Coddington Hwy. to Rt. 114 (Main Rd.), turn right onto Rt. 114 (Main Rd.).

See next map following page.

**Figure 12-1 Continued south on Rt. 114 (Main Rd.)  
Route to Newport Hospital, 11 Friendship St,  
Newport, RI 02840-2209  
Phone: (401) 846-6400**



Follow Rt. 114 south through Portsmouth and Middletown into Newport.  
Bear left onto Broadway.  
Proceed south on Broadway to a traffic light at Friendship Street, turn left onto Friendship Street.  
Arrive at Hospital.

**APPENDIX K**

**WEEKLY REPORTS**





## **APPENDIX L**

### **FWENC PROJECT RULES HANDBOOK**

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**: Volume I Health, Safety and Project Rules**

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**Purpose**

The FWENC Project Rules Handbook (FPRH) is your guide and reference to job rules and safe work practices which are required to be complied with on all Foster Wheeler Environmental Corporation projects.

Volume I of the FPRH presents health, safety, and job rules. The FPRH has been extremely condensed from OSHA Construction Safety Standards and other related references.

<b>Version Date:</b> 03/08/2001 - Revised
<b>Department/Category:</b> Project Rules Handbook
<b>Document Type:</b> Handbook
<b>Keyword Index:</b>

**FOSTER WHEELER ENVIRONMENTAL CORPORATION**

**PROJECT RULES HANDBOOK**

**VOLUME I**

**ENVIRONMENTAL, HEALTH, SAFETY AND PROJECT RULES**

**2000**

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## ***WELCOME TO FOSTER WHEELER ENVIRONMENTAL CORPORATION***

One of our primary goals for the successful completion of each and every Foster Wheeler Environmental Corporation (FWENC) project is for the work to be completed as safely as possible and without incident. An incident is defined as a near miss or an accident with any personal injury, illness, or loss of property. We believe that the elimination of incidents, including environmental incidents (spills, releases, or permit exceedences), regardless of whether or not injuries are involved, is vital to the efficient execution of all of our projects. Productivity and safety are so intertwined in the workplace, that to spend time and energy on safety not only improves safety performance, it also improves schedule and reduces costs.

Our expectation and our goal for this and any other project is for zero incidents from project initiation through project completion. Each employee is expected to strive to accomplish all tasks safely, correctly, by procedure, and without incident.

Foster Wheeler Environmental Corporation is committed to providing a safe, healthful, and environmentally compliant workplace. Everything practicable will be done to help each employee work in a safe, productive manner. As a condition of employment, employees are expected to work safely, and to immediately report all incidents and hazardous conditions to their Supervisor or safety representative.

The safety and job work rules in this Handbook are for your use as part of the project Environmental, Health and Safety (EHS) Plan. You are expected to abide by the rules and regulations outlined in this Handbook.

You must also realize that it is not possible to include in this Handbook specific instructions for each and every project condition, State or Federal regulation, or other recognized safety and work rules. Therefore, as you are working, please remember to keep safety foremost in your mind. It takes only a minute to build a safety thought which contributes to a lifetime with a safe work record, but all those efforts can be destroyed in a single thoughtless second which allows one incident to occur. As you perform your work, remember that the common sense safe way is usually the best way to do every job. Together, we can achieve the goal of a safe, successful project.

Sincerely,

L. F. Jones, Jr.  
Vice President Remedial Construction

D. I. Rogers  
Chief Operating Officer

S. W. Box  
President and CEO

## **INTRODUCTION**

### **PURPOSE**

The FWENC Project Rules Handbook (FPRH) is your guide and reference to job rules and safe work practices which are required to be complied with on all Foster Wheeler Environmental Corporation projects.

Volume I of the FPRH presents environmental, health, safety, and job rules. Volume II of the FPRH is a guideline of safe work practices and reference information which will help you perform your tasks safely. The FPRH has been extremely condensed from OSHA Construction Safety Standards and other related references.

### **APPLICABILITY**

This FPRH reflects the minimum awareness required for performance of work by Foster Wheeler Environmental Corporation employees. It will also be necessary for employees to comply with additional requirements which may be identified by the Project Work Plan, Project Environmental, Health and Safety (EHS) Plan, the Project SHERP (Safety, Health and Emergency Response Plan), or any other project specific requirements (i.e., Oil Refinery Safety Plans, OSHA 29CFR 1910 and 1926, Corps of Engineers Safety and Health Requirements Manual EM385-1-1, Cold Weather training, etc.). Foster Wheeler Environmental Corporation subcontractors shall be expected to require standards of performance consistent with those of Foster Wheeler Environmental Corporation prior to commencing any site work activity.

**1.0 FOSTER WHEELER ENVIRONMENTAL CORPORATION ENVIRONMENTAL, HEALTH AND SAFETY (EHS) POLICY**

**ATTACHMENT 1**

**FOSTER  WHEELER**  
**FOSTER WHEELER ENVIRONMENTAL CORPORATION**  
**ENVIRONMENTAL SAFETY AND QUALITY POLICY**

The management of Foster Wheeler Environmental Corporation is committed to ensuring the health, safety, and well-being of our employees and the communities in which we work, to enhancing and protecting the environment, and to providing quality services to our clients. This commitment is fundamental to our operating philosophies of Client Service Quality<sup>®</sup>, Do It Right<sup>®</sup>, and Shared Vision<sup>SM</sup>.

We are committed to:

- Providing and maintaining a safe and healthful work-place;
- Complying with all applicable environmental, health, and safety laws and regulations;
- Conforming with company policies and procedures and the requirements of ISO 14001;
- Incorporating pollution prevention and loss prevention principles into our work process;
- Planning, tasking, and executing plans to achieve the desired level of ESQ performance;
- Delivering products and services that meet the quality expectations of our clients;
- Utilizing well trained personnel who understand and have the knowledge to fulfill their ESQ responsibilities;
- Establishing ESQ improvement objectives and targets each year;
- Monitoring and continually improving our environmental management system; and
- Recognizing outstanding employee and project ESQ performance.

To fulfill these commitments, each employee of Foster Wheeler Environmental Corporation and its subsidiaries has the responsibility to help create and work in a safe and environmentally protective manner, to strive for Zero Incident Performance, and to promote the continual improvement of our organization.



Sam Box  
President and CEO



Don Rogers  
Chief Operating Officer

Revision Date April, 2000

**2.0 CORPORATE BY LINES - FOSTER WHEELER ENVIRONMENTAL CORPORATION**

## 2.1 Client Service Quality™

Our opportunity for growth in work, professional development, and reward is driven by the size, character, and satisfaction of our Client base. As a Service organization, it is the uniqueness, cost effectiveness and responsiveness of our delivery of services that differentiates us from our competitors.

Quality execution of our Service, including work products and management, and the development and nurturing of our Client relationships, is the basis of our expectation of repeat work opportunity and new Client base expansion.

Our success depends upon our ability to provide a level of Quality that meets our Client(s) expectations, and then to focus all of our efforts on providing that level of Client Service. We do this by establishing common agreement on scope; by being innovative in problem solving; by utilizing the total asset base, knowledge and capacity of our resources; by being cost effective and schedule responsive; and, by communicating constantly.

The word "Client" encompasses internal as well as external customers. In performing Client Services, we must remember that our success is driven by how well we work together. Working well together means providing Quality Service to our Clients through work product accuracy and completeness, integrity, personal ownership, and interpersonal cooperation.

In addition, as a full service provider to the environmental industry, all aspects of our Service capabilities are critical to our Clients. All functions and operations are equally valued, and their commitment to mutual success and cooperation makes them more capable of delivering Client Service Quality™ than they could as stand alone operations.

Thus, Clients provide the base of our operations; Service is the work we perform; and Quality becomes the measure of our success. We are committed to the concept of Client Service Quality™ and believe that it differentiates us from our competitors. Accordingly, we are committed to making the extra effort to know our Clients (internal and external), understand their needs, support and meet those needs, and constantly review to ensure that expectations are being met.

## 2.2 Do It Right™

Do It Right™ is intended to capture a group of concepts that define the heart of the way we do business.

First, it means that we will do our work with a great deal of attention to health and safety.

Second, it means that we will fully comply with all laws and regulations pertaining to our business.

Third, it means that we will comply with the terms, scope, schedule and budget of our contract with our client.

Fourth, it means that we will provide our clients the level of quality they expect, and pay for.

Fifth, it means that we will perform our work in a well planned way. We will plan the work and work the plan.

Sixth, it means that we will carefully communicate (inside to our own team, and outside to our clients) and document the plan and the execution of our work.

Seventh, it means that we will gather data and make decisions in an inclusive way, seeking the advice and guidance of those who can contribute to or will be impacted by the decision.

Eighth, it means that we dedicate ourselves to continuous improvement in quality, cost effectiveness, and client service.

It means that together we will be the best that we can be; the first time, every time.

### **3.0 DRUG FREE WORKPLACE POLICY**

Quality of workmanship and maintaining a safe working environment are primary responsibilities of every employee. Foster Wheeler Environmental Corporation is dedicated to assuring that employees essential to the Project are fit for duty at all times.

Possession, use, distribution, sale, influencing others toward use, or being under the influence of illegal drugs at any time may be reason for denial of access and reason for termination of employment. "Illegal Drugs" are defined as drugs, or the synthetic or generic equivalents of drugs, which are illegal under Federal, State, or local laws including, but not limited to, marijuana, heroin, hashish, cocaine, hallucinogens, depressants and stimulants not prescribed for current personal medical treatment by a licensed physician and any other drug or drug-like substance, for which the sale, use or possession of is unlawful.

Use, possession, sale, distribution, or being under the influence of alcohol during working hours may be reason for denial of access and reason for termination of employment.

Any employee taking over-the-counter or prescribed medication should consult his or her physician to determine whether the drug may have an adverse effect on performance. If the medication has such an effect, the employee must notify their immediate Supervisor. An employee taking prescription medication must be prepared to provide satisfactory, verifiable proof that the prescription is necessary for the employee's current medical condition and that the prescription predated the taking of the medication (possession of the prescription bottle will be adequate).

Persons, property, equipment, and storage areas are subject to search. This includes employees, work areas, equipment, personal work space, storage facilities, desks, lunch and tool boxes, lockers, storage bins, briefcases, purses, etc. Vehicles will be subject to search at any time. Any instance of a person refusing to permit a requested search may be reason for denial of access and reason for termination of employment. Employees are subject at any time to being screened, including breathalyzer, functional testing, urine testing or other physical tests as requested. Additionally, employees are subject to post-accident drug and alcohol screening. Appropriate steps will be taken to determine the condition of any employee exhibiting behavior suggesting lack of fitness for duty.

#### **4.0 EMPLOYEE NOTIFICATION**

In accordance with Public Law 100-379, dated August 4, 1988, "Worker Adjustment and Retraining Notification Act" (WARN), you are advised of the following:

Due to the nature of the construction industry, it is understood that your employment is not permanent. Furthermore, Foster Wheeler Environmental Corporation hereby informs you that your employment will be terminated at the completion of your assignment on this particular Project, and that they do not promise to transfer, assign, or relocate you to another project the Company may have now or in the future. It is expressly understood that this is not a "Contract" for employment, and your employment may be terminated prior to the completion of this Project.

#### **5.0 SEXUAL HARASSMENT POLICY**

It is Corporate policy to prohibit sexual harassment of our employees. This prohibition applies to management, employees and even outsiders and clients. It is not the purpose of this policy to intrude upon the personal lives of our employees or to interfere with social relationships. However, sexual harassment has no place at FWENC and will not be permitted. "Sexual harassment" includes any unwelcome or offensive sexual advances, requests for sexual favors or other verbal or physical conduct of a sexual nature, such as uninvited touching or sexually related comments, or creation of a "hostile work place" through the display of any sexually explicit materials. Any individual who believes that he or she is being subjected to sexual harassment of any kind by anyone connected with his or her work should report the matter promptly to the Office Manager or to an Operations Manager, whomever the employee is more comfortable with.

#### **6.0 EMPLOYEE RESPONSIBILITIES AND ENVIRONMENTAL, HEALTH AND SAFETY RULES**

Every employee has a responsibility to assure that the project proceeds efficiently, safely, and in a manner that minimizes impacts to the environment. To that end:

1. Employees shall attend each day's Work Briefing as scheduled.
2. Employees shall implement, adhere to, and follow established Foster Wheeler Environmental Corporation rules, guidelines, procedures, plans, etc., as specified.
3. Any employee taking prescribed medication shall inform their Supervisor of the type of medication. The Supervisor will review the matter with the project safety and management personnel and the Corporate Medical Consultant, to determine if the employee can safely work on-site while taking the medication.
4. The personal protective equipment (PPE) specified in the site Environmental, Health and Safety Plan (EHS Plan), the Safety Health and Emergency Response Plan (SHERP), or the Activity Hazard Analysis (AHA), shall be worn by all employees. This includes hard hats, steel toed boots, and safety glasses which must be worn at all times in active work areas.

5. Facial hair (beards, long sideburns or mustaches) which may interfere with satisfactory fit of a respirator mask is not allowed on any employee who may be required to wear a respirator.
6. Employees shall know the hazards on site, work zones, PPE and respirator use, and decontamination methods.
7. Employees shall immediately report to their Supervisor or the Environmental and Safety Supervisor (ESS) any incident, accident, injury, symptoms of possible exposure, or unsafe condition, no matter how minor.
8. Employees shall follow proper decontamination procedures.
9. Employees shall enter and exit the Exclusion Zone (EZ) and the Contamination Reduction Zone (CRZ) through designated areas.
10. Employees shall sign the in/out log and the CRZ/EZ log when used at the project.
11. Eating, drinking, chewing tobacco or gum, smoking and any other practice that may increase the possibility of hand-to-mouth contact is prohibited in the EZ or the CRZ. (Exceptions may be permitted only by the Project Environmental and Safety Manager (PESM) for proper reasons such as to allow fluid intake during heat stress conditions.)
12. All lighters, matches, cigarettes and other forms of tobacco are prohibited in the EZ and CRZ.
13. All authorized safety signs and demarcations shall be followed and shall not be placed or removed except as authorized by the ESS.
14. No person shall enter a permit-required Confined Space without a permit. Confined space entry permits shall be followed as issued.
15. Excavations shall be checked daily for slope stability and air quality. No employee may enter an excavation greater than four feet (4') deep unless authorized by a Competent Person and then only after they have been sloped or shored properly. Safe means of access and egress from excavations shall be maintained.
16. Employees shall follow Lockout/Tagout Procedures when working on equipment involving moving parts or hazardous energy sources. Locks and tags shall be installed and removed only in accordance with procedure and when authorized.
17. Employees who perform Hot Work (welding or cutting operations) shall check with their Supervisor prior to starting any Hot Work operation. When working in an area which requires a Hot Work Permit, the Hot Work Permit shall be followed as issued.
18. Employees shall use the Buddy System when performing operations in hazardous areas. For example: working with hazardous contaminants, exceeding physical capability (heat stress), exposure to bee sting, poisonous reptile or poisonous weed, and working in proximity of operating machinery or equipment.
19. Employees shall follow the work-rest regimens and other practices required by the heat stress program.

20. No employee shall operate equipment unless properly trained and authorized. Operation shall be in a manner consistent with the owner/operator's manual.
21. Ladders and scaffolds shall be solidly constructed, in good working condition, properly secured, and inspected prior to use. Defective ladders or scaffolds shall be removed from service and repaired or disposed.
22. Fall protection or fall arrest systems shall be in place when working at elevations greater than six feet (6') above the surrounding work area.
23. Body harnesses and lanyards shall be inspected prior to use. No defective personal fall protection equipment shall be used. Personal fall protection that is defective or has been shock loaded shall be discarded.
24. Equipment and hand tools (manual and power) shall be inspected prior to use. Defective tools and equipment shall be removed from service, and either properly repaired or disposed.
25. Ground fault interrupters shall be used for cord and plug equipment used outdoors or in damp locations. Electrical cords shall be kept out of walkways and accumulations of water unless protected and rated for the service.
26. Improper use, mishandling or tampering with health and safety equipment and samples is prohibited.
27. Horseplay of any kind is prohibited.
28. Possession or use of alcoholic beverages, controlled substances or weapons is forbidden.
29. Employees shall be familiar with the emergency response plan so that proper response can be taken in an emergency.
30. Employees shall know the location and types of emergency equipment, such as fire extinguishers, emergency showers and air horns, as well as rally points.
31. Employees shall ask questions when uncertain about a procedure or equipment use.
32. Employees shall practice contamination avoidance techniques.
33. Employees shall obtain help to lift or move bulky or heavy objects.
34. Employees shall keep work, storage, and access areas clean of tools, equipment and debris.
35. Employees shall perform all tasks in a safe and approved manner.
36. Employees shall participate in the evaluation or investigation of any accident or incident when requested to do so.
37. Employees shall perform all tasks in a manner which minimizes impacts to the environment and which furthers personal commitment to the [ESQ](#) Policy.

There will be instances when additional or different rules or requirements must be complied with. Also, a situation may arise where a project rule or requirement may become inappropriate. Should this occur, the ESS and Superintendent, after careful evaluation, may authorize a variance to the rule or requirement. All variances shall be evaluated on a case by case basis and require approval by the Project Manager; any additional requirements identified for the variance shall be included. When a variance is granted, it shall be allowed to continue only for as long as the conditions for which it was evaluated continue to be present.

## 7.0 GENERAL PROJECT RULES

The following project rules are designed to help you understand what we expect from our employees and what you can expect from Foster Wheeler Environmental Corporation. An employee who fails to maintain at all times the proper standards of conduct or who violates any of the following rules and regulations may subject himself or herself to disciplinary action, including termination of employment. Our objective, however, is to make your employment with us rewarding and problem free. Your understanding of the facts contained in this FWENC Project Rules Handbook is essential for this to be achieved.

### 7.1 Definitions

#### 1. Aerial Lifts

**Aerial lifts** include the following types of vehicle-mounted aerial devices used to elevate personnel to job-sites above ground:

- a. Extensible boom platforms;
- b. Aerial ladders;
- c. Articulating boom platforms;
- d. Vertical towers; and
- e. A combination of any such devices. Aerial equipment may be made of metal, wood, fiberglass reinforced plastic (FRP), or other material; may be powered or manually operated; and are deemed to be aerial lifts whether or not they are capable of rotating about a substantially vertical axis.

2. **Competent Person** means one who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them.

3. **Qualified Person** means one who, by possession of a a recognized degree, certificate, or professional standing or who by extensive knowledge, training, and experience, has successfully demonstrated his/her ability to solve or resolve problems related to the subject matter, the work, or the project.

## **7.2 Workplace**

Employees shall be at their place of work at the designated starting time and shall remain at their place of work until the designated quitting time. All employees shall comply with project starting, lunch and quitting times.

## **7.3 Badging Procedures (if utilized)**

Employees shall pick up and drop off their identification badges at the designated location at the beginning and the end of each shift upon entrance and exit from the project.

On some projects, sign-in/out logs are kept or timekeepers log employees in and out.

## **7.4 Parking Lot**

The employee parking lot, if any, will be so designated. **NO** company vehicles shall be driven into the employee parking lot without proper authorization. Employees who illegally park in fire lanes, areas posted with no parking signs, handicapped parking spaces, or visitor parking spaces are subject to disciplinary action and removal of the vehicle at the employee's expense.

## **7.5 Gate Reports And Notification**

Any employee entering or leaving the project at any time other than the normal daily starting and quitting time (including overtime hours) must report their entrance or departure to the timekeeper and sign the in/out log. When an employee departs the project at other than normal quitting time, the employee must obtain approval from his or her immediate Supervisor. Employees entering late or leaving early will be docked in fifteen (15) minute increments.

## **7.6 Absenteeism**

Absent employees must notify their immediate Supervisor in a timely fashion (within 2 hours of the start of daily activities). Failure to do so and/or excessive absenteeism may be reason for disciplinary action up to and including termination of employment.

## **7.7 Inspection**

All employees are subject to search upon entering or leaving the job site.

## **7.8 Rest Breaks/Coffee Breaks**

There will be no site-wide organized rest or coffee breaks on the project unless so designated in accordance with a heat stress, cold stress regimen established by the Project Manager and ESS.

Thermos bottles may be permitted (unless posted otherwise) at the place of work provided there is no interference with the progress of the work. Employees working in an EZ or CRZ will be allowed to break as determined by Health and Safety criteria. Violators may be disciplined up to and including termination of employment.

#### **7.9 Cameras/VCRs**

There shall be no unauthorized cameras, VCRs or other photographic recording or playing devices allowed on a project.

#### **7.10 Safety Equipment**

All employees shall wear approved hard hats and proper eye protection on the project site as required. Acceptable ANSI Z-41 steel toed footwear is required on all project sites. Steel toed fabric sneaker type shoes are not allowed regardless of OSHA/ANSI approval. Additional safety protective equipment must be worn when and where required.

Employees who require corrective eyewear (glasses or contact lenses) shall be responsible for providing such approved corrective eyewear when wearing a respirator in addition to any approved safety eyewear which may be required for routine construction activity. All corrective eyewear shall conform to ANSI requirements as appropriate.

#### **7.11 Tasks Associated With High Loss Potential**

All employees shall be aware that special precautions or procedures may be appropriate when performing tasks associated with a high potential for loss of life or property. Examples include Confined Space entry, Excavation, Lockout/Tagout, and Hot Work.

### **8.0 EMPLOYEE DISCIPLINE**

#### **8.1 Verbal Warnings And Written Reprimands**

Verbal warnings and written reprimands are forms of discipline used to document and intended to correct undesirable actions.

#### **8.2 Unacceptable Conduct**

Unacceptable employee conduct and/or violation of a project rule or requirement may be reason for disciplinary action up to and including suspension without pay or termination of employment. Examples of unacceptable employee conduct and/or rule violation are as follows:

1. Inciting, encouraging, or participating in any strike, walkout, slowdown, picket, sympathy strike or any other work stoppage in violation of a Project Labor Agreement.
2. Unauthorized possession or theft of project or other person's property.

3. Altering, damaging or mutilating project or other person's property.
4. Violation of Security Rules.
5. Reporting or badging for other employees or other identification misrepresentation.
6. Making or stating false claims or falsifying reports or records.
7. Refusal to submit to search.
8. Refusal to submit to drug and alcohol screening or testing or other similar inspections.
9. Unauthorized possession or use of alcoholic beverages, controlled substances, or weapons on any project.
10. Un-excused absence for three (3) consecutive days without proper notification to the immediate Supervisor.
11. Unauthorized use or possession of keys or other devices used for lock opening without specific permission.
12. Absenteeism, tardiness (badging in late) or early quits (badging out early) when considered excessive in management's view.
13. Sleeping on the project.
14. Improper use of, or failure to use, toilet facilities.
15. Failure or refusal to perform assigned work as directed.
16. Fighting.
17. Negligence resulting in an infraction of health and safety or project rules or requirements.
18. Unauthorized work breaks.
19. Horseplay of any kind.
20. Gambling or the sponsoring of raffles.
21. Failing to inform a Supervisor when leaving either a work area or the project.
22. Not using trash receptacles or otherwise creating unsanitary conditions.
23. Smoking, using tobacco or eating in prohibited areas.
24. Unauthorized cooking on the project.
25. Sale of food, beverages or other items on the project.
26. Failure to display identification badge in the proper manner and in a conspicuous place (when required).
27. Violation of environmental, health, and safety or project rules or requirements.

28. Stopping work early at lunch, break, or quitting times.
29. Starting work late after starting, break, or lunch times.
30. Sexual harassment.
31. Failure to report use of prescription drugs.
32. Failure to report equipment or material damage.
33. Failure to report an accident or incident.
34. Displaying pornographic, sexually explicit or otherwise offensive photographs, calendars, or other materials which may be objectionable to other individuals or groups.

This list is not all inclusive. If you are unsure, ask your Supervisor.

### **8.3 Disciplinary Measures**

Management reserves the right to take disciplinary action at its discretion up to and including suspension or termination of employment, depending on the severity of the violation.

At the discretion of Management, suspension without pay may be given in lieu of discharge.

### **9.0 REHIRE POLICY**

1. Termination for non-performance or unacceptable conduct - Employee is not eligible for rehire without management approval. (Individual cases may be reviewed on their own merits after a suitable amount of time has elapsed). Under no circumstances, however, will an individual be re-employed without the review and approval of the Project Manager or his designee.
2. Termination for lack of work - Employee is eligible for rehire.
3. Voluntary Quit - Subject to review depending on circumstances; however, normally not eligible for rehire for thirty days.
4. Voluntary Quit more than once within a twelve month period - Normally not eligible for rehire for twelve months.
5. Termination for absenteeism and tardiness - Normally not eligible for rehire for a minimum of ninety days subject to a case by case review.
6. Other termination- - May be eligible for rehire at management's discretion.

## NOTES

**10.0 FOSTER WHEELER ENVIRONMENTAL CORPORATION PROJECT RULES HANDBOOK ACKNOWLEDGMENT**

I hereby acknowledge:

1. That I have received, read, understand, and will comply with the environmental, health, and safety and project work rules and requirements.
2. That I have read and understand the notification of Public Law 100-379, dated August 4, 1988, "Worker Adjustment and Retraining Notification Act" (WARN).
3. That in case I am injured on the Project, I will immediately report the injury to my immediate Supervisor and the project first aid station and obtain medical treatment, no matter how slight the injury.
4. That I will report all incidents to my immediate Supervisor no matter how minor the incident.
5. That I give Foster Wheeler Environmental Corporation permission to perform searches and drug and alcohol screening tests at any time including: pre-employment, random, periodic, for cause, post-accident, and at termination.
6. That I consider myself qualified and capable of performing the functions required of the indicated Job Classification.
7. That I understand that this Handbook is not intended to and does not create any contractual rights regarding my employment between me and Foster Wheeler Environmental Corporation.

---

*Name of Project*

---

Job Classification

---

Date

---

Company Representative  
Printed Name

---

Employee  
Printed Name

---

Company Representative  
Signature

---

Employee  
Signature

**: Volume II Health And Safety Guidelines**

**Purpose**

The FWENC Project Rules Handbook (FPRH) is your guide and reference to job rules and safe work practices which are required to be complied with on all Foster Wheeler Environmental Corporation projects.

Volume II of the FPRH is a guideline of safe work practices and reference information which will help you perform your tasks safely. The FPRH has been extremely condensed from OSHA Construction Safety Standards and other related references.

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**FOSTER WHEELER ENVIRONMENTAL CORPORATION**

**PROJECT RULES HANDBOOK  
VOLUME II  
ENVIRONMENTAL, HEALTH AND SAFETY GUIDELINES**

1998

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## **1.0 SAFE PRACTICES**

### **1.1 Office Areas**

1. Cords shall be kept out of walkways.
2. Desk and file cabinet drawers shall be kept closed. High profile cabinets and bookshelves should be anchored.
3. Electric equipment shall be turned off at the end of the day.
4. Nothing shall be placed on top of file cabinets that could fall off and cause injury.
5. Help shall be obtained to lift heavy objects.
6. Stair handrails shall be used.
7. Look in the direction you are walking.
8. Chairs have four or five legs - use them.
9. All spills shall be cleaned up promptly.
10. Pointed and sharp objects shall be stored so that they cannot injure you.
11. The appropriate safety precautions contained elsewhere in this Handbook shall be followed whether inside an office or outside the office on a construction site.

### **1.2 Housekeeping**

1. All work and storage areas shall be kept clean and orderly. Aisles and walkways shall be kept free of obstructions and tripping hazards.
2. All trash and scrap shall be disposed of or recycled in proper containers, including lunch papers, soft drink cans, banding straps, wood, rags, paper cups, etc.
3. Tools, materials and equipment shall be stored in an orderly manner, and in their proper places.
4. Stored material, scrap and other tripping hazards shall be kept out of roads and walkways, off stairs and away from emergency equipment.
5. Cords, cables, and hoses crossing roads or walkways shall be covered to prevent tripping or damage or supported overhead at least seven feet (7') above walkways and fourteen feet (14') above roads.
6. Exposed nails in reusable lumber shall be removed. Exposed nails in scrap lumber shall be bent down. Exposed nails shall be removed from the tops of wooden crates and from around the tops of wooden kegs. Exposed nails present a serious hazard and must be dealt with

immediately upon discovery.

### 1.3 Fire Prevention & Protection

1. Fire prevention and protection go hand in hand. Fire protection is most effective if you first prevent the fire. To do this:
  - a. "Open flame" tools and equipment shall be controlled.
  - b. Nearby combustible materials shall be protected from heat, flame, sparks and slag by moving or covering them.
  - c. Flammable liquids shall be kept in closed containers by using approved safety cans.
  - d. Grounding and bonding wires and straps shall be used when transferring flammable liquids.
  - e. Hot Work Permits shall be obtained and followed.
  - f. A fire watch shall be maintained for 30 minutes after completion of Hot Work.
  - g. End of shift inspections shall be performed for work areas. Steam, air, water, welding fuel gas, electric welding leads, and temporary electric utilities shall be cut off at the source unless instructed otherwise.
  - h. Packing material is very combustible. Closed metal containers shall be used for storage.
  - i. Dirty or oily rags shall be stored in closed containers.
  - j. Compressed gases and flammable and combustible liquids shall be properly stored.
2. Fire protection is knowing how to stop or control a fire once it starts. To do this:
  - a. The locations of fire extinguishers, alarm devices and emergency exit routes shall be known.
  - b. The different types of fire extinguishers which are used for different types of fires shall be known.
  - c. Extra fire extinguishers shall be kept nearby when using open flame tools.
  - d. Fire extinguishers shall be inspected monthly, serviced yearly and recharged immediately after use.
  - e. Fire extinguishers, hydrants, hose stations and fire doors shall be kept clear of stored material and remain accessible.

### 1.4 Spill Response

1. Spill response activities shall be performed as required by the project plans.
2. Tools, equipment, and materials designated and stored for spill response shall not be used for any other purpose.

## **2.0 EQUIPMENT INSPECTION AND SAFE WORK PRACTICES**

All tools and equipment must be in good condition if they are to serve you properly. Before using any tool or piece of equipment, it shall be inspected for defects. Damaged or broken tools or equipment shall not be used and shall be reported, properly tagged out, and taken out of service.

### **2.1 Manual Hand Tools**

1. Every tool is designed for a specific use. The proper tool shall be used for each job.
2. Tools shall be inspected daily for defects and proper working condition (e.g., clean, sharp, oiled, dressed, adjusted, etc.).
3. Chisels, stardrills, etc., shall be kept dressed to prevent mushroomed heads from resulting in dangerous flying objects.
4. Hardened steel shall never be hit with hardened steel.
5. "Cheaters" shall not be used to increase capacity. Only the proper sized tool shall be used.
6. Tools shall be carried in proper sheath, belt bag or box with the points down.

### **2.2 Power Hand Tools**

1. Every tool is designed for a specific use. The proper tool shall be used for each particular job.
2. Tools shall be inspected daily for defects and to keep tools in proper working condition (e.g., clean, sharp, oiled, dressed, adjusted, safety guards present, power cord/plug serviceable, etc.).
3. Power tools are designed to do work an employee cannot do alone. They are stronger than an employee and, therefore, must be controlled to be used effectively. Power tools have limits of operation and should not be overloaded.
4. Know how to shut a power tool off before turning it on. Locked "on" switches shall not be allowed on hand held power tools. Employees shall not remove or disable any guards or safety devices from tools so equipped.
5. Eye protection is required for protection from flying particles.
6. Tools and equipment shall be inspected for weak or loose parts before connection to a power supply.

7. Explosive powder actuated tools shall be inspected daily before use for proper operation of their safety devices. You must be authorized by your Supervisor and certified to operate powder actuated tools.
8. All portable grinders shall be equipped with grinding guards. Grinding guards shall be in place and properly secured at all times.
9. The power supply shall be properly attached to the tool and to the source. Electric tools shall be grounded or "double insulated".
10. A work area shall be checked for other personnel before starting a tool. Nearby personnel shall be warned about power tool operation.
11. Tools shall be operated with good footing and good balance. Watch out for nearby obstructions, be prepared for jamming of rotating tools, and avoid the use of loose clothing. The power source shall be disconnected prior to attempting to free a jammed tool.
12. Air hoses shall be shut off and bled down before disconnection. Electric cords shall be unplugged.
13. Chain saws shall have an automatic chain brake or kickback device. A chain saw shall never be used to cut above the operator's shoulder height.
14. Power tools shall be stored in a safe place when not in use and protected from weather, dirt, and water.
15. Lanyards shall be used to lift or lower power tools; never use the power cord for this purpose.

### **2.3 Stationary Power Tools (Bench Grinders, Radial Saws, Drill Presses, etc.)**

1. Areas in and around tools shall be free of slip, trip and fall hazards, fire hazards and hand hazards.
2. Tools shall be securely anchored to prevent vibration and shall be inspected daily for defects and proper working condition (e.g., cleaned, oiled and adjusted).
3. Only authorized operators shall operate power tools. Check with your Supervisor for training, safety requirements and authorization to operate.
4. Exposed moving parts shall be guarded before operation and chuck keys, wrenches or other servicing tools shall be removed before operation.
5. Rings or other jewelry, loose clothing or gloves shall not be worn near any rotating machines, tools, or equipment.
6. Material shall be securely anchored when appropriate. Hands shall be kept away from points of tool operation. Work rests shall be properly adjusted. Push sticks or tongs shall be used when feeding or removing material to prevent arms, hands, legs, or feet from being near the points of operation.

7. Adjustments shall be made only when power is off and when equipment cannot be restarted "accidentally". All warnings shall be read and heeded.

## **2.4 Mechanical Material Handling**

1. The weight of the load shall be known before it is to be moved.
2. The capacity of the equipment shall be known before it is to be used to move the load.
3. Tag lines shall be used to control the load. The tag line shall be kept free of your feet and body, and free of obstruction during movement of the load.
4. Wind adds extra hazards to material handling. Your Supervisor shall be consulted before lifts are made in strong winds.
5. Loads shall be lifted only to the lowest height necessary to transport and place the load.
6. Crane work shall be coordinated with all parties who may be impacted, i.e., client, subcontractors, prime contractor, and other contractors.
7. Critical lifts (over 75% capacity or multiple cranes) shall not be performed without proper authorization.

## **2.5 Rigging**

1. The safe working loads of the rigging equipment you plan to use shall be known. Larger sized rigging components shall be used where there is doubt. All rigging shall be inspected for defects by a Qualified Person before use on each shift. Defective rigging shall be removed from service.
2. All hooks (except shake out hooks) not equipped with safety latches or mousing shall not be used.
3. Only put one eye on a hook. Use a shackle if two or more eyes are involved.
4. A Qualified Person shall approve any configuration which requires rigging from overhead steel.
5. Softeners shall be used for sharp edges to provide a better bite and to prevent damage to cables.

## **2.6 Hoist Inspection**

1. Personnel hoists used for raising and lowering people require special equipment, special safeguards and special precautions. Check with your Supervisor.
2. Material hoists shall not be used for hoisting people.
3. Material shall be secured to prevent it from shifting.

## **2.7 Equipment (General)**

1. The operator of large equipment having an obstructed view behind the operator shall be responsible to ensure that the back up alarm is functional at all times. All equipment shall be inspected daily. Inspection forms shall be completed and turned in to your Supervisor prior to use of any equipment.
2. All safety devices installed on equipment, such as lights, horns, brakes, seat and shoulder belts, mirrors, roll over and falling object protection systems, etc., shall be maintained in operating condition and shall be utilized by the equipment operator. These devices shall not be removed or modified unless approved by a designated authority.
3. Articulating equipment should not be turned on slopes; proceed to top or bottom of slope before turning.
4. All buckets, blades, bowls, forks, etc., shall be placed in the designated "safe" position when leaving the equipment unattended.

## **2.8 Cranes (General)**

1. Riding the hook, the ball or the load shall not be permitted at any time. A basket suspended from a crane used to transport personnel or used as a work platform shall be permitted only by exception, and then only when reviewed and approved by a Qualified Person.
2. Cranes shall be operated only on solid footing. Outriggers shall be used with rubber tired cranes. Areas of counterweight swing shall be barricaded.
3. Boom, lines and loads shall be kept a minimum distance of ten feet (10') away from energized overhead electric power lines. The minimum distance increases for power lines greater than 50,000 volts (see Appendix B). Power lines must be de-energized and grounded or other special precautions must be taken to work closer than the minimum distance.
4. The operator shall avoid swinging loads over the heads of personnel.
5. Only one crane signal person shall be used at any one time unless special circumstances require and are approved.
6. Cranes shall be inspected and documented daily. Deficiencies shall be corrected before further use.
7. Cab interiors shall be kept clean of mud/debris/etc.
8. Ensure handholds and steps are adequate to allow safe access and egress.

## **2.9 Forklifts**

1. You must be authorized by your Supervisor before operating a forklift.
2. Forks shall be spread as far apart as possible and the stability of all loads shall be checked before moving.

3. Forks shall be lowered to the lowest point possible before transporting a load.

4. Look in the direction of travel before moving and during moving. Watch out for overhead hazards!
5. Back down grades when carrying a load.
6. No riders shall be allowed unless a passenger seat is provided.
7. Forks shall not be used as an elevator or as a work platform.
8. Forks shall be lowered all the way down before leaving the equipment.
9. Loads shall be secured with straps when appropriate, i.e., drums, items with a high center of gravity, and loads with a small base compared to the overall size.

### **2.10 Front End Loaders**

1. No riders shall be allowed.
2. Always look in the direction of travel.
3. Use softeners at the edges of the bucket if the bucket is used for lifting material with a cable.
4. Do not use bucket teeth for attachment of rigging; use the hook.
5. Lower the bucket all the way down before leaving the equipment.
6. The bucket shall not be used as a personnel lift or work platform.

### **2.11 Motor Vehicles**

1. The driver is responsible for checking all parts, equipment and accessories affecting the safe operation of a vehicle. The vehicle shall be free from defects and in safe operating condition.
2. All controls and safety accessories shall be checked before a motor vehicle is placed in motion.
3. Loads shall be secured before movement of the vehicle.
4. Seat-shoulder belts shall be worn. Speed limits and all traffic control signs and devices shall be complied with.
5. Look before backing up and honk the horn three (3) times to warn others nearby. A flagman should be used for guidance in congested areas or when visibility is blocked to the rear.
6. All passengers must be seated while the vehicle is in motion. Arms and legs shall be kept inside. Riding in the back of a truck shall not be permitted unless personnel are seated in the bed or unless guardrails and seating are provided. Driving or riding with an open tailgate shall not be permitted. Riding in the bed of a truck with material shall not be permitted unless the material is anchored down. Riding in the bed of a

dump truck shall not be permitted.

7. The wheels of trucks or trailers shall be chocked before the loading or unloading of material. The wheels should remain chocked until the work is completed. The truck or trailer bed shall be checked for broken or missing flooring. Trailer jacks shall be used if the cab (tractor) has been removed from trailer.
8. The driver should not leave any motor vehicle unattended while the engine is running.

## **2.12 Tracked Equipment (General)**

1. Do not use track cleats as steps to access equipment.
2. Do not stand on tracks, or steps, when other work is being conducted on the equipment, i.e., air bottle change out.
3. Ensure use of the 3-points of contact rule when accessing/exiting equipment, i.e., two hands, one foot at all times.
4. Ensure that the handrails and steps extend beyond the track width for entering or exiting tracked equipment.

## **2.13 Chainfalls**

1. Hard pulling on the hand chain usually means overloading or defective parts. All such equipment shall be inspected prior to use and defective equipment shall be removed from service.
2. Be sure the overhead support will take the load. Proper sized beam clamps are safer than wrapping wire rope around the support steel.
3. Do not wrap the load chain around the load. Use a choker or sling.
4. Center the load in the bottom of the hook, not on the point.

## **2.14 Manual Material Handling**

1. Leg muscles are stronger than back muscles. Lifts should be made with your legs, not your back, by bending your knees and keeping your back straight.
2. Plan before you lift - consider weight, size, shape, path of travel and set down location. Get help if necessary.
3. Protect your hands and fingers from rough edges, sharp corners, and metal straps. Keep your hands and fingers out of pinch points which occur between the load and other objects.

## **2.15 Equipment Erection (in the air)**

1. Cranes, hoists, chainfalls, etc., and proper rigging replace bull work. Trying to push or pull loads by hand, or by foot, causes accidents.
2. Body, fingers, and feet shall be kept out from under suspended loads.

3. Watch out for wet or slippery surfaces.
4. Proper scaffolding, ladders, platforms, and body harnesses shall be used as necessary.
5. Safety nets shall be used when the workplace is more than twenty-five feet (25') above a surface where the use of ladders, scaffolds, catch platforms, temporary floors, safety lines, and body harnesses is not practical.
6. Where safety nets are required, operations are not to begin until the net is in place and has been approved for use by a Competent Person.

## **2.16 Material Storage**

1. Dunnage shall be placed under material for easier rehandling and for more stable stacking. If dunnage has a rectangular cross section, the long dimension shall be placed down. Dunnage shall be removed and stored for reuse when the material is removed.
2. Material shall be stored in an orderly fashion with adequate access for rehandling.
3. Round items shall be chocked so that they cannot roll. Loose items shall be stacked no higher than seven feet (7'). Loose items such as bags or blocks shall be cross tied.
4. Banding straps shall be kept in place during storage. Bands shall be removed from pallets and from the work area when they are cut loose. If banding straps are fastened to the underside of a pallet, the band shall be cut flush with the pallet or the ends shall be folded into the pallet.
5. A heavy item should never be placed on a weaker material.

## **2.17 Overhead Work**

1. Personnel shall be protected from overhead work.
2. Barricades, signs or other warning devices shall be erected to warn people of overhead work. Barricades or signs put up by others shall be respected.
3. Covered walkways shall be provided where people must pass under overhead work.

## **2.18 Ladders**

1. General - All Portable Ladders
  - a. Ladders shall be inspected for defects. (When defects are found, the ladder is to be withdrawn from use immediately.) Ladder feet shall always be set on a solid foundation.
  - b. Only one person shall be allowed on a ladder at one time.

- c. Ladders shall be used for climbing - not for material skids, walkways or work benches.
- d. A helper shall be used to secure the base of the ladder while the top of the ladder is being tied off.
- e. Personnel shall face the ladder while climbing up or down and while working from it, and shall use a body harness when falls are possible.
- f. Both hands shall be used for climbing. A hand line shall be used to raise material.
- g. Generally no metal ladders may be used. Exceptions must be approved prior to use.
- h. Ladders shall be stored safely to prevent damage from vehicles, material, etc.

2. Straight and Extension Ladders

- a. The correct slope of a ladder is 1:4, one foot horizontal for every four feet (4') vertical.
- b. The ladder shall be secured from slipping by using non-slip feet on the bottom and tying off the ladder at the top.
- c. The ladder shall be extended at least three feet (3') above the top landing when the ladder is to be used for access to the landing.
- d. Extension ladders should not be taken apart to make two (2) ladders.
- e. Hands shall be kept off rungs while extending or lowering extension or section. Latches shall be in place before climbing.

3. Stepladders

- a. Ladders shall be fully opened with spreader locked. Do not use a stepladder as a straight ladder.
- b. Do not stand or step on the top three steps.
- c. Do not overload or exceed the ladder rating.
- d. Loose tools shall be kept off the steps and the top platform.
- e. The stepladder shall be tied off if it is taller than eight feet (8').

## 2.19 Scaffolds

1. General - All Scaffolds
  - a. Scaffolds shall be designed by a Qualified Person and shall be constructed and loaded in accordance with that design.
  - b. Scaffolds and scaffold components shall be inspected for visible defects by a Competent Person before each shift, and after any occurrence which could affect a scaffold's structural integrity.
  - c. Only correct scaffolding shall be used. Makeshift scaffolding shall not be used. Only manufacturer's approved components, including connecting hardware, shall be used with fabricated frame scaffold.
  - d. Scaffold poles, legs, posts, frames, and uprights shall bear on base plates and mud sills or other adequate firm foundations.
  - e. Install top rails (approximately 42" high) and midrails. Guardrails shall be at least 2 x 4 lumber, ½ inch wire rope (tight), 1½ inch O.D. pipe, 2 x 2 angle iron or patented rail members. Fiber or synthetic rope shall not be used for rails.
  - f. Toe boards - four inch (4") minimum height - shall be installed for scaffold platforms.
  - g. Screening - ½" hardware cloth from top rail to planking shall be installed where personnel are required to pass under the scaffolding and no other protection is provided.
  - h. All working platform levels shall be fully decked. Scaffold grade planks are purchased for that particular purpose. No other planking is to be used for scaffolding and all scaffold planks shall be inspected to ensure integrity prior to use. The full width of the scaffold platform shall be decked (at least two planks wide). Planks shall be cleated or anchored down to prevent them from slipping. Planking shall extend a minimum of six inches (6") and a maximum of **twelve** inches (**12"**) past the end supports for planks ten feet (10') or less in length. For planks greater than ten feet (10') in length, the planking shall extend a minimum of six inches (6") and a maximum of eighteen inches (18") past the end supports.
  - i. Trash and excess material shall be kept off of scaffolds so that the maximum amount of walking and working space is available.
  - j. Climbing on or working from the cross bracing, top rail or midrail shall not be permitted.
  - k. A body harness shall be used if guardrails are not used. Some scaffolds with guardrails also require the use of a body harness. Check with your Supervisor.

- I. A stairway, ladder or ramp shall be used for scaffold access on all structures.
- m. Body harnesses shall be tied off to a separate lifeline for two (2) point suspended scaffolds and boatswain chairs.

## 2.20 Guardrails, Barricades, Hole Covers, Stairs

1. Guardrails shall be strong enough to restrain someone who may fall against them.
2. Barricades shall be used to warn people of hazards. Fiber or synthetic rope, road-block horses or similar devices may be used and may be enhanced by colored flagging. Barricades around fall hazards (holes in floors, excavations, etc.), should be at least six feet (6') back from the edge of the hazard.
3. Hole covers shall be strong enough to support any loads that may be placed on the covers and are to be secured in place to prevent slipping.
4. Railings shall be provided for every flight of stairs, including trailer steps, having four (4) or more risers.

## 2.21 Excavation

**Do not enter an excavation over four feet (4') deep unless directed by your Supervisor. Prior to employee entry into an excavation, a Competent Person who has demonstrated knowledge and understanding of the appropriate requirements shall evaluate slope stability and the Environmental and Safety Supervisor (ESS) shall verify presence of suitable breathing air.**

1. Prior to the start of any excavation work, the Project or Site Manager shall designate one or more Competent Persons. The Competent Person will ensure that OSHA requirements for excavations are satisfied.
2. All utilities shall be located and identified prior to initiating digging.
3. Stairways, ladders, or ramps shall be provided as a means of egress for all excavations four feet (4') or more in depth. Travel distance shall be no more than twenty-five feet (25') to an exit.
4. Warning systems, such as berms or barricades, shall be utilized to prevent employees from entering the excavation when vehicles and machinery are operating adjacent to excavations.
5. Surfaces surrounding open excavations shall be free of surface hazards which could fall into the open trenches or excavations.
6. Scaling or barricades shall be used to prevent rock, soil, or other debris from falling into open excavations.
7. Excavated and loose materials shall be kept at least three feet (3') from

the edge of excavations.

8. Walkways or bridges with standard guardrails and toe boards shall be provided at points where employees are to cross over excavations.
9. Barriers shall be provided to prevent personnel from inadvertently falling into an excavation.
10. Side slopes and shoring shall be under the oversight of a Competent Person. Shoring may be required for vertical sides more than five feet (5') deep. Benching is an acceptable alternative to an inclined surface; however, it must be approved by the Competent Person.
11. Employees shall not work in excavations in which water has accumulated or is accumulating without the use of additional protection such as special support systems or water removal.

## 2.22 Confined Spaces

1. A confined space is a space which exhibits the following characteristics:
  - a. Is large enough and configured such that an employee can enter a portion or all of his or her body;
  - b. Has limited or restricted means for entry or exit; and
  - c. Is not designed for continuous occupancy.

**Do not enter a confined space unless you are trained to do so, are directed by your Supervisor, are certain that there is a valid, current "confined space entry permit," and are certain that all requirements are being followed.**

2. Personnel entering a confined space are responsible for:
  - a. Inspection of all respiratory apparatus, safety equipment and PPE to be used/worn.
  - b. Knowing the hazards, mode of exposure, signs and symptoms and consequences of exposure to hazards.
  - c. Communicating with the attendant as necessary to enable the attendant to monitor entry status and to enable the attendant to alert entrants of the need to evacuate the confined space.
  - d. Notifying the attendant of previously undetected/unknown hazards which could cause harm or injury to team personnel.
  - e. Wearing the designated respiratory apparatus, safety equipment and PPE.
  - f. Knowing all emergency response procedures.
  - g. Exiting from the confined space whenever an evacuation is ordered, warning signs or undesired symptoms of exposure are noted, a prohibited condition is noted or an alarm is activated.



### **2.23 Line Breaking**

1. Follow Lockout/Tagout procedure to safely isolate the system from energy sources.
2. Ensure the correct line is identified. Walk down from a positively identified location where possible.
3. Know what fluid or gas to expect and be prepared to contain it when the line is opened up. Always assume the line is under full pressure.
4. Be certain the correct PPE is being worn.
5. Break open the line only by the method approved by your Supervisor. Do not change from breaking a flange to saw cutting or grinding or torch cutting without approval from your Supervisor and the ESS.

### **2.24 Lockout/Tagout Procedure**

1. Any time work is to be performed in an area where there is a possibility for the presence of energy to be released in an uncontrolled manner, the site specific Lockout/Tagout procedure shall be followed.
2. Common energy sources, which shall be considered, include electrical, mechanical, hydraulic, pneumatic, chemical and thermal energy.
3. Work tasks which routinely require consideration of the Lockout/Tagout procedure include: confined space entry, excavation, hot work, line breaking, equipment or machinery repair and revision of operating systems.

### **2.25 Signs and Danger Tags**

1. Signs are posted to warn of possible hazards and shall be read and obeyed.
2. Danger tags such as "HANDS OFF - DO NOT OPERATE" shall be installed on electrical switches, piping, valves and equipment to notify personnel not to operate them, because to do so could cause serious injury.
3. Danger tags and electrical locks shall be installed and removed only by authorized personnel.

### **2.26 Temporary Heaters**

1. Heaters shall be set on a solid, non-combustible base.
2. Heaters shall be kept outside of tanks, pits or other confined spaces. Hot air blowers shall be used when possible.
3. Heaters shall be located a safe distance away from combustible material.
4. Solid fuel heaters (coal, coke) shall not be used inside buildings or on

scaffolds.

5. Good ventilation shall be provided for all temporary heaters.
6. Heaters shall be equipped with an approved automatic shutoff device to stop the flow of fuel if the flame goes out and a device to shut off if the unit is knocked over.
7. Open fires or burn barrels are not permitted.

## **2.27 Weather Protection**

1. Only fire retardant tarps, fire resistant plastic or non-combustible material shall be used for enclosing work areas.
2. Flexible coverings shall be tied or secured down to prevent wind flap.

## **2.28 Hazard Communication (Labeling)**

1. Employees using or handling any chemical shall complete the following steps when handling chemicals:
  - a. Read the label on the container. If special instructions are provided, they will usually be part of the label.
  - b. Consult the Material Safety Data Sheet (MSDS) for further warnings or requirements. The MSDSs are maintained by the ESS.
  - c. Look for information concerning special precautions for personal protection.
  - d. Note appropriate first aid in case of an exposure.
  - e. Become familiar with the various types of labels and their warnings.

## **2.29 Precautions for Handling Hazardous Materials**

1. Flammable Liquids
  - a. Approved safety cans with flame arrestors shall be used for storage and dispensing of flammable liquids.
  - b. Containers shall be labeled with the name of the contents. Consult with the ESS for other labeling requirements. Do not mix contents and labels.
  - c. Cans and liquids shall be kept away from open flames or hot surfaces and smoking shall not be allowed in the area.
  - d. Flammable liquids shall not be used for cleaning parts or people.
  - e. Tanks and drums shall be electrically grounded and bonded to the dispensing container.

- f. Only approved storage cabinets shall be used.
2. Corrosive, Toxic Liquids
- a. Containers shall be marked with the name of the contents and a suitable hazard warning (consult with the ESS).
  - b. Keep off skin and away from nose and mouth.
  - c. Personal protective equipment shall be utilized.
  - d. Wastes shall be disposed of in approved containers.
  - e. Promptly report all spills or environmental violations to your Supervisor or use the Compliance Hot Line number posted at the jobsite.
3. Compressed Air
- a. Compressed air shall not be used for cleaning skin or clothing.
  - b. Special nozzles with 30 psi max discharge are required for cleaning machinery, work benches and tools. Eye protection shall be worn and other people should be kept at a distance.
  - c. Water hose shall not be used in lieu of air hose. Couplings shall be locked and safety wired together or provided with a safety lanyard (whip check).
  - d. Pressure shall be bled off before uncoupling hose.
4. Compressed Gas Cylinders
- a. Cylinders should be kept upright and tied off vertically with strong wire or chain to a secure location or kept chained in a cylinder buggy.
  - b. Cylinders shall not be dropped or rolled.
  - c. A rack shall be used for lifting cylinders to and from upper elevations.
  - d. Caps shall be replaced when gauges are removed.
  - e. Oxygen cylinders shall be stored twenty feet (20') feet away from other cylinders or separated by a solid divider.
  - f. Oil and grease shall be kept away from oxygen valves.
  - g. Cylinders shall be kept at a safe distance or shielded from welding and cutting operations. They are not to be placed where they can contact an electric circuit. When installing valves or other couplings to cylinders, the proper tools (spark resistant) shall be used.

- h. Full and empty cylinders shall be kept separated and marked as to their status.
- i. Stored cylinders shall be grouped by their contents.

### **2.30 Waste Management and Storage**

1. When managing, excavating, or otherwise handling materials or wastes on a job site, be knowledgeable of the contaminants and classification of the material/waste.
2. Keep storage areas in an orderly fashion.
3. Comply with posted warning and caution signs in waste storage areas.
4. Ensure drums, containers and tanks are in good condition.
5. Label drums, containers, and tanks as required by the EHS plans. If unlabeled, inform your Supervisor.
6. Segregate incompatible waste/materials.
7. Keep flammable materials away from ignition sources.
8. Store containers away from accumulated liquids (e.g., on pallets).
9. Remove accumulated liquids from secondary containment and properly dispose of residue.
10. Provide adequate aisle space between containers.
11. Do not mix or otherwise combine materials unless specifically directed.
12. Ensure covers/tarps are secured on containers unless adding/removing materials/waste.
13. Cleanup all spills/releases of materials and properly dispose of these residues.
14. Ensure accumulation times are met as specified in EHS plans. If you are unsure, ask your Supervisor.

### **2.31 Welding and Burning**

1. Electric Welding/Arc Gouging
  - a. Hot Work Permit shall be requested and followed.
  - b. Leads shall be kept out of walkways.
  - c. Arcs shall be shielded to protect others from receiving flash burns.
  - d. The rod shall be removed from an electrode holder before laying it down. Rod butts shall be put in a container, not on the floor.
  - e. Proper grounding shall be used between work and the welding machine.
  - f. Welding machines shall be turned off at end of shift.
2. Gas Burning/Welding
  - a. Hot Work Permit shall be requested and followed.
  - b. Hoses shall be kept out of walkways.

- c. Flash-back flame arrestors shall be installed.
- d. Areas shall be checked for possible fire hazards.
- e. Gauges shall be removed at the end of the shift and caps shall be replaced on cylinders. Toolboxes shall be used to store hose and gauges shall be ventilated.
- f. Soapy water shall be used when checking for leaks.
- g. Before using fuel gas cylinders, the cylinder valve shall be cracked before connecting gauges, to clean out any dirt or debris.
- h. Cylinder valve shall be opened slowly and the wrench shall be left in position while the cylinder is in use.
- i. A regulator shall always be used on fuel gas cylinders.
- j. The cylinder valve shall always be closed before removing regulator.
- k. When fuel gas cylinders connected to gauges have a leak, either the leak will be repaired or the cylinder shall be removed from service.
- l. Always close cylinder valves and bleed hoses when leaving torch sets unattended for any length of time.

### **2.32 Spray Painting**

- 1. A fire extinguisher shall be kept in immediate area.
- 2. Proper respirators shall be worn in areas where spraying is being done.
- 3. Ventilation and overspray containment shall be provided.
- 4. Breathing air for hoods shall satisfy OSHA requirements for source, pressure control and cleanliness.

### **2.33 Sandblasting/Guniting**

- 1. All equipment shall be inspected frequently.
- 2. All equipment shall be grounded.
- 3. Automatic shutoff nozzle shall be used when sandblasting operations are active.
- 4. Protective equipment is required. Breathing air for hoods shall satisfy OSHA requirements for source, pressure control and cleanliness.
- 5. Work shall be isolated from other people.

### **2.34 Electrical**

1. No electrical "Hot Work" is allowed without authorization from your Supervisor.
2. Temporary lighting equipment requires guards over the bulbs. Metal guards shall be grounded. Low voltage lighting is recommended for use in confined spaces or Class 1, Division 1 explosion proof lighting equipment in any confined space with a potentially flammable atmosphere.
3. A circuit ground wire is for protection. Do not bypass or damage it.
4. Extension cords shall be kept out of water, mud, and at least seven feet (7') above walkways.
5. Disconnect switches shall be labeled to show the equipment or service they feed and checked before operation. When operating a disconnect switch, keep one hand in your pocket and turn your face away from the disconnect.
6. Electrical equipment shall be shut down before servicing, repairing or investigating questionable function. Follow the Lockout/Tagout procedure.
7. [Ground Fault Circuit Interrupters \(GFCIs\) should be used on all projects where use of electrical tools or devices is required.](#)

### **2.35 Radioactive Material**

Unless otherwise instructed by your Supervisor, stay away from radioactive material and from areas where it is being used. Obey the warning signs.

## **3.0 PERSONAL PROTECTIVE EQUIPMENT**

The personal protective equipment (PPE) specified in the site Environmental, Health and Safety Plan (EHS Plan) or the Safety Health & Emergency Response Plan (SHERP) shall be worn by all employees in the designated work areas.

### **3.1 Head**

Hard hats shall be worn at all times in active work areas, except by equipment operators inside fully enclosed cabs. Hard hats shall not be modified or defaced. No coloring, marking, letters, decals, etc., shall be applied to hard hats except as approved by the designated authority.

### **3.2 Eyes and Face**

1. ANSI approved safety glasses with attached sideshields shall be worn at all times in active work areas, unless full face respirators are worn.
2. Face shields are not eye protection and shall be worn with appropriate safety glasses or goggles. Face shields are required when handling hot molten materials, corrosive chemicals, and spark and chip producing equipment.
3. Chemical splash goggles shall be worn when handling liquid chemicals.

4. Burning goggles with a minimum density - #5 shall be worn for gas welding and burning.
5. Welding hoods with lenses having a proper density shade shall be worn for electric welding.

### **3.3 Ears**

1. Hearing protection shall be worn in noisy areas. In general, hearing protection shall be worn if you need to raise your voice for conversation.
2. Hearing protection shall be worn for noise levels at or above 85 dBA.

### 3.4 Hands & Fingers

1. Suitable work gloves shall be used for the work being done.
2. Special gloves (acid proof, lineman's, etc.) shall be worn when special hazards exist.

### 3.5 Feet & Toes

1. ANSI approved leather lace-up steel toed shoes six inches (6") high minimum shall be worn.
2. Sandals, sneakers or other soft footwear shall not be permitted, regardless of ANSI approval.

### 3.6 Skin

1. Skin shall be protected from the sun, welding arcs, and hot surfaces.
2. Protective gloves and creams shall be used for protection from irritants.

### 3.7 Fall Arrest Systems

1. Body harnesses are required when working from any surface six feet (6') above work surfaces where possibility of falls exist or where guardrails are not installed.
2. When the possibility of a fall exists, a body harness shall be worn and tied off as short as possible. Potential fall areas should be clear of obstructions.
3. Corporate policy requires that body belts, commonly called safety belts, no longer be used as personal fall arrest equipment. Effective January 1, 1998, the only OSHA approved use for body belts is as a positioning device.
4. Only lanyards that limit a fall to six feet (6') or less shall be used.
5. A suitable anchoring point capable of supporting a load of 5000 lbs. is required for personal fall arrest systems.
6. Manufactured scaffold components have not been designed to act as an anchorage point for fall arrest systems. Do not tie off to a scaffold unless approved by a Qualified Person.
7. A body harness shall be worn and a lanyard attached to the boom or basket when working from an aerial lift.

### 3.8 Special Protective Equipment

Shin guards, toe guards, chaps, high visibility vests, kickback aprons, and other special protective equipment shall be worn when necessary for protection from hazards, or when required by the Supervisor.

### **3.9 Body Clothing**

1. Employees are required to report to work dressed for routine construction exposure classification. This shall include shirts with sleeves, full length trousers, and proper work boots with steel toes. NOTE: "tank top" or sleeveless shirts, shorts, canvas or perforated shoes, and shoes or boots with abnormally high heels, no treads, or without heels are not permitted. Clothing made from synthetic fabrics such as polyester, rayon, etc., shall not be worn as these fabrics are highly flammable.
2. When required by the EHS Plan or ESS, chemical protective clothing shall be worn, maintained properly, and replaced if defective.

### **3.10 Storage and Disposal**

PPE shall be stored and disposed of as directed in the EHS Plan.

## **4.0 RESPIRATORY PROTECTION**

Respirators are one of the most important items that is worn. They protect the lungs which are the most critical path for chemicals to enter the body. If the air is contaminated with chemicals, the chemicals could be introduced into the body along with the air. Chemicals, just like oxygen, are taken by the bloodstream from the lungs to every part of the body. If the chemicals are toxic, they will damage the body.

### **4.1 Personnel Requirements**

1. A respirator, when required, shall be used in the proper manner.
2. The respirator shall be inspected prior to each use and replacement equipment or parts shall be obtained when a respirator is found to be defective.
3. Proper care of the respirator and all equipment shall be taken.
4. Personnel shall be clean shaven where the seal of the respirator contacts the face.
5. Respirator cartridges shall be changed daily unless a more frequent schedule is provided in the EHS Plan. Cartridges may expire sooner depending on the environment. The life of the cartridge can be decreased when exposed to moisture.
6. The respirator cartridge shelf life date shall be checked prior to replacement.

### **4.2 Respirator Cleaning**

1. Each employee has the responsibility to clean, disinfect and care for their respirator unless other arrangements have been made.
2. Personal respirators shall be cleaned, disinfected, and inspected after each day's use or more frequently, if necessary.

3. Clean, dry respirators shall be stored in zippered plastic bags. These bags shall be placed in a clean, dry place away from sunlight and from extreme heat and cold.

## **5.0 ENVIRONMENTAL, HEALTH AND SAFETY MONITORING**

**5.1** Monitoring is performed by the ESS to measure the concentrations of dust, vapors and gases in the air throughout and surrounding the site.

**5.2** Monitoring instruments include direct reading monitors (instantaneous result) and collection devices for samples which are analyzed at a laboratory. Monitoring may be conducted in each active work area and at fixed locations on and off site and personnel may be requested to wear a collection device to enhance monitoring efforts.

## **6.0 MEDICAL MONITORING**

**6.1** Prior to wearing respirators and working on hazardous waste sites, both OSHA and FWENC require that all employees pass a comprehensive medical examination prior to beginning work on any site. Physicals are then required periodically and/or after each employee's work assignment is finished. On certain projects, periodic medical monitoring throughout the project may also be conducted.

**6.2** The purposes of a comprehensive medical examination are:

1. To detect medical conditions that could increase your risk of injury or illness from work on the site.
2. To promptly detect any indications of illness related to work on site.
3. To help assure that your health at the completion of your work on site hasn't been affected.

Forms will be provided for completion before the exam and directions will be given for taking the exam. Confidential results of your exam will be provided.

## **7.0 EMERGENCIES AND EVACUATION**

**7.1** Employees shall know the following information which will be given in the site familiarization briefing:

1. Names and responsibilities of the emergency coordinator and other authority emergency response personnel on all shifts.
2. Warning signals to alert site personnel of an emergency.
3. Whom to contact in an emergency.
4. Types of emergencies and responses for each emergency.
5. Actions that should and should not be taken for various types of emergencies.
6. Where emergency equipment is kept and how it should be used (when

authorized).

7. How to evacuate the site and where to assemble.
8. Who is responsible for fighting large fires and for cleaning up spills.
9. Locations of emergency phone numbers.

**7.2** Employees shall be permitted to perform only emergency response actions for which they have been trained.

## **8.0 ZONE CLASSIFICATION**

**8.1** Environmental remediation work sites typically have various areas classified into one of three zones as follows:

1. The "Support Zone" (SZ) is a clean area which typically includes office space, parking, a lunch break area, equipment storage and supplies.
2. The "Exclusion Zone" (EZ) is an isolated area containing known hazardous contaminants. Remediation activities are conducted in the Exclusion Zone and all personnel who have not completed training and medical evaluation are excluded from this area.
3. The "Contamination Reduction Zone" (CRZ) is a buffer zone between the EZ and the SZ which is used for entry to and exit from the EZ and for decontamination of all items taken from the EZ.

Personnel in this area will be required to wear PPE as specified in the EHS Plan. Discarded PPE is placed in containers in the CRZ. CRZ requirements include:

- a. Only authorized personnel are permitted in Exclusion Zones.
  - b. Decontamination procedures included in an Environmental, Health and Safety Plan shall be followed when exiting the Exclusion Zone.
  - c. Objects found in the Exclusion Zone may not be removed for personal use without the permission of the Supervisor.
  - d. The Buddy System shall always be used in the Exclusion Zone.
4. Zone demarcation shall be established and maintained as required in the Project Plans, and as directed by the Superintendent, working in conjunction with the Environmental and Safety Supervisor (ESS). All fences, gates, boundaries, etc., being relocated or revised, and which define an EZ, CRZ, or SZ, shall be preapproved by the ESS.

## **9.0 WHERE TO GO FOR INFORMATION**

**9.1** A written plan called the Safety, Health and Emergency Response Plan (SHERP) or the Environmental, Health and Safety (EHS) Plan has information about such things as hidden hazards and needed protection, and actions to protect the environment. The SHERP and EHS Plan are kept in the offices of the Superintendent and the Environmental and Safety Supervisor (ESS). Each

employee is expected to know whom to contact, and the basic content and location of the SHERP or EHS Plan.

- 9.2** If you have any questions about environmental, health and safety, always ask your Supervisor or the ESS.

**WIND CHILL TABLE**

Source: National Weather Service NOAA, U.S. Commerce Department

Both temperature and wind cause heat loss from body surfaces. A combination of cold and wind makes a body feel colder than the actual temperature. The table shows, for example, that a temperature of 20 degrees Fahrenheit, plus a wind of 20 miles per hour, causes a body heat loss equal to that in minus 10 degrees with no wind. In other words, the wind makes 20 degrees feel like minus 10.

Top line of figures shows actual temperatures in degrees Fahrenheit.  
Column at left shows wind speeds.

		TEMPERATURE															
MPH	35	30	25	20	15	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45
W 5	33	27	21	19	12	7	0	-5	-10	-15	-21	-20	-31	-36	-42	-47	-52
I 10	22	16	10	3	-3	-9	-15	-22	-27	-34	-40	-46	-52	-58	-64	-71	-77
N 15	16	9	2	-5	-11	-18	-25	-31	-38	-45	-51	-58	-65	-72	-78	-85	-92
D 20	12	4	-3	-10	-17	-24	-31	-39	-46	-53	-60	-67	-74	-81	-88	-95	-103
	25	8	1	-7	-15	-22	-29	-36	-44	-51	-59	-66	-74	-81	-88	-96	-103
30	6	-2	-10	-16	-25	-33	-41	-49	-56	-64	-71	-79	-86	-93	-101	-109	-116
35	4	-4	-12	-20	-27	-35	-43	-52	-58	-67	-74	-82	-89	-97	-105	-113	-120
40	3	-5	-13	-21	-29	-37	-45	-53	-60	-69	-76	-84	-92	-100	-107	-115	-123
45	2	-6	-14	-22	-30	-38	-46	-54	-62	-70	-78	-85	-93	-102	-109	-117	-125

APPENDIX A

<p><u>LITTLE DANGER</u> (For properly clothed person)</p>	<p><u>INCREASING DANGER</u> (Flesh may freeze within one minute)</p>	<p><u>GREAT DANGER</u> (Flesh may freeze within 30 seconds)</p>
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APPENDIX B

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**MINIMUM CLEARANCE FROM ENERGIZED OVERHEAD ELECTRICAL LINES**

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Nominal System Voltage	Minimum Required Clearance
0-50 kv	10 feet
51-100 kv	12 feet
101-200 kv	15 feet
201-300 kv	20 feet
301-500 kv	25 feet
501-750 kv	35 feet
751-1000 kv	45 feet

SOURCE: US ARMY CORPS OF ENGINEERS, SAFETY AND HEALTH MANUAL, EM385-1-1, OCTOBER 1992 - PAGE 163

APPENDIX C

**With Prolonged Exposure and/or Physical Activity**

<b>Extreme Danger</b>
Heat Stroke or Sunstroke Highly Likely
<b>Danger</b>
Sunstroke, Muscle Cramps, and/or Heat Exhaustion Likely
<b>Extreme Caution</b>
Sunstroke, Muscle Cramps, and/or Heat Exhaustion Possible
<b>Caution</b>
Fatigue Possible

		Relative Humidity (%)													
		40	45	50	55	60	65	70	75	80	85	90	95	100	
Air Temperature	°F	40	45	50	55	60	65	70	75	80	85	90	95	100	
	110	136													
	108	130	137												
	106	124	130	137											
	104	119	124	131	137										
	102	114	119	124	130	137									
	100	109	114	118	124	129	136								
	98	105	109	113	117	123	128	134							
	96	101	104	108	112	116	121	126	132						
	94	97	100	103	106	110	114	119	124	129	135				
	92	94	96	99	101	105	108	112	116	121	126	131			
	90	91	93	95	97	100	103	106	109	113	117	122	127	132	
88	88	89	91	93	95	98	100	103	106	110	113	117	121		
86	85	87	88	89	91	93	95	97	100	102	105	108	112		
84	83	84	85	86	88	89	90	92	94	96	98	100	103		
82	81	82	83	84	84	85	86	88	89	90	91	93	95		
80	80	80	81	81	82	82	83	84	84	85	86	86	87		

Heat Index  
(Apparent Temperature)

APPENDIX D

## IMPACT COMPARISON CHART

<u>ITEM</u>	<u>WEIGHT</u>	<u>FORCE WHEN DROPPED</u>	
		<u>32'</u>	<u>48'</u>
Square Washer	3½ oz.	7 lbs.	11.7 lbs.
6.9 kv. Insulator	2 lbs. 9 oz.	88 lbs.	132 lbs.
Lag Screw	3½ oz.	7 lbs.	11.7 lbs.
5/8 x 16 Mach. Bolt	1 lbs. 10 oz.	52 lbs.	78 lbs.
5/8 x 18 Mach. Bolt	1 lbs. 14 oz.	56 lbs.	84 lbs.
10-in. Crescent Wrench	12 oz.	24 lbs.	36 lbs.
12-in Crescent Wrench	1½ lbs.	48 lbs.	72 lbs.
9-inch Pliers	15 oz.	30 lbs.	45 lbs.

## NOTES

**APPENDIX M**

**TEMPERATURE EXTREMES**

## EHS 4-6: Temperature Extremes (Previously HS4-6)

**Purpose**

The purpose of this program is to prevent heat and cold stress related injuries and illnesses at field operations.

**Version Date:** 03/17/1998 - Revised

**Original Issue Date:** 02/01/95

**Department/Category:** Environmental, Health & Safety - Programs

**Document Type:** Procedure

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**Approved by:**



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## **1.0 PURPOSE**

The purpose of this program is to prevent heat and cold stress related injuries and illnesses at field operations.

## **2.0 SCOPE**

This program applies to all Foster Wheeler Environmental Corporation (FWENC) and subcontractor field personnel that may be exposed to heat or cold stress during the performance of their field work assignments.

## **3.0 MAINTENANCE**

The Director, Environmental, Safety and Quality (ESQ) Programs is responsible for updating this procedure. Approval authority rests with FWENC's President and Chief Executive Officer. Suggestions for revision shall be submitted to both the department responsible for updating the procedure and the Executive Director, Administration and Compliance.

## **4.0 DEFINITIONS**

### **4.1 Adjusted Temperature**

The dry bulb temperature adjusted to account for solar radiation, to be used as a heat stress indicator for personnel in impermeable protective clothing.

### **4.2 Deep Frostbite**

The tissue beneath the skin is solid to the touch; it may involve a full thickness freeze to the bone. This is an extreme emergency and can result in permanent tissue loss.

### **4.3 Frostbite**

Freezing of body tissue.

### **4.4 Frostnip or Incipient Frostbite**

A cold related injury that progresses slowly and is painless while developing. The victim is usually unaware that he/she has frost nip. The skin first becomes reddened, then changes to white; no freezing of tissue occurs.

#### **4.5 Heat Cramp**

Painful muscle spasms usually occurring on the arms, legs, and abdomen; caused by excessive loss of body electrolytes from profuse sweating.

#### **4.6 Heat Exhaustion**

A form of shock that occurs when the body loses large amounts of water and electrolytes from excessive perspiration after exposure to heat and physical activity; also called heat prostration.

#### **4.7 Heat Rash**

Profuse tiny raised red vesicles (blister-like) on affected areas of the skin which cause a prickling sensation during heat exposure.

#### **4.8 Heat Stroke**

A life-threatening condition caused by rapidly rising body core temperature that occurs when the body's temperature regulating mechanisms are overwhelmed. Sweating stops and the skin is dry and hot.

#### **4.9 Hyperthermia**

A rise in body core temperature above 99.6 C.

#### **4.10 Hypothermia**

Decreased body core temperature from prolonged exposure to freezing or near-freezing temperatures. This is the most life-threatening cold injury and affects the entire body with possible localized severe cooling.

#### **4.11 Superficial Frostbite**

Frostbite which affects the skin and tissue just beneath the skin. The skin is firm and waxy, tissue beneath is soft and numb. The skin turns purple and may tingle and burn during warming.

#### **4.12 Wet-Bulb Globe Temperature (WBGT)**

Method used to measure the environmental factors (e.g., temperature, relative humidity) which impacts the body's physiological responses to heat.

#### **4.13 Wind-Chill Factor or Equivalent Chill Temperature (ECT)**

An index describing the effect of the cooling power of moving air on exposed flesh. The effect of wind velocity at a certain temperature is expressed as the equivalent cooling effect of a lower temperature with still air.

#### **4.14 Work/Rest Regimen**

The ratio of time spent working to time spent resting in an area designed to relieve heat related conditions. This ratio is expressed in one hour periods. Example: A work/rest regimen of 75% work, 25% rest corresponds to 45 minutes work, 15 minutes rest each hour.

### **5.0 DISCUSSION**

#### **5.1 Responsibilities**

##### **5.1.1 Field Personnel**

All field personnel will be trained in heat and cold stress prevention and treatment. Field personnel will monitor themselves and their workmates for symptoms of heat and cold stress and will inform the Environmental and Safety Supervisor (ESS) or their supervisor immediately should symptoms become apparent.

##### **5.1.2 Line Management**

Site Supervisors have the responsibility to:

- Provide resources and facilities necessary to prevent health effects from temperature extremes
- Enforce work rules related to such prevention
- Ensure implementation of the requirements of this program as specified in the Site Environmental, Safety and Health (EHS) plans.

##### **5.1.3 Environmental, Health and Safety Personnel**

The Project Environmental and Safety Manager (PESM) will make the initial determination of heat and cold stress prevention requirements as part of the site EHS Plan (see EHS 3-2, EHS Plans) and oversee the implementation of this program on a project basis for all FWENC field programs.

The ESS will assist with implementation of heat and cold stress prevention programs. The ESS will, in most cases, be the person responsible for monitoring heat and cold

stress on the job, determining work/rest and work/warm-up schedules where used, and will implement emergency response or corrective action, if needed. The ESS will train site personnel on the effects of temperature extremes and the site prevention program, and will maintain records related to this program.

## **5.2 General Program Requirements**

Adverse weather conditions must be considered when planning site operations. Excessively hot or cold working environments can produce a number of different injuries. Critical to the ability to care for those injuries is a basic understanding of the way in which the body maintains its temperature and how it physiologically adjusts to extremes of heat and cold. Attachment A provides information on the body's physiological responses to heat and cold stress.

Proper care of victims who are suffering from the effects of heat or cold exposure will help to minimize injuries and speed recovery. On the other hand, improper treatment of these emergencies can result in serious injury, disability, or death.

The most effective first aid for any injury is prevention. When acceptable monitoring and prevention programs are followed, there should be no victims.

## **5.3 Heat Stress**

A heat stress prevention program will be implemented when ambient temperatures exceed 70°F for personnel wearing impermeable clothing and for other personnel when the WBGT index exceeds the ACGIH Threshold Limit Values.

### **5.3.1 Selection of Chemical Protective Clothing**

The PESM will review site data and working conditions and select the personal protective equipment ensemble that best protects the employees from site hazards. The risk of heat related illness will be fully considered in balancing the risks and benefits of the PPE. Where contact with a waste material is unlikely; contact is not expected to result in a serious dermal hazard; and significant absorption of the contaminants is not likely to occur, then impermeable clothing should not be required. In this case, the risk of heat related illness may grossly outweigh the benefits provided by such equipment. Even when chemical protective clothing is needed, the PESM should consider the probable exposure scenarios and select protective equipment accordingly. For example, if dermal exposure is likely to be localized, strong consideration should be given to using gloves, boots, gauntlets, leggings, aprons, bibs, face shields, etc., in lieu of full body coveralls and respirators.

### **5.3.2 Hydration**

FWENC will supply cool (50°–59°F) potable water or other suitable drinks (e.g., sport electrolyte replacements) for fluid replacement. Employees involved in the heat stress prevention program will be trained and encouraged to drink at a rate of approximately 8 oz. every 20 minutes. Individual cups will be used and kept in closed containers or dispensers.

### 5.3.3 Cool Rest Areas

Shaded rest areas will be provided. On large remediation projects, air conditioned rest areas should be provided for workers exposed to heat stress conditions.

### 5.3.4 Other Prevention Program Elements

The PESM, ESS and the Project Manager will incorporate other elements into the heat stress prevention program as necessary. The selected elements will be described in the EHS plans. Engineering controls are preferred. Where their use is not feasible, the program must incorporate administrative/work practice controls, personal protective equipment, or a combination. Examples of other prevention program elements include:

- **Engineering Controls**

Engineering controls may include:

- Air conditioned cabs for heavy equipment and vehicles (Such controls may eliminate the need for other program elements);
- Fans or blowers; and
- Cold water for drenching personnel in impermeable clothing. This can be provided through a garden hose, a garden sprayer filled with ice water, a clean drum full of water for "hard hat dipping" or containers of ice water and clean towels in the rest area to hasten cool down.

- **Administrative and Work Practice Controls**

Administrative controls include:

- Adjusting work schedules to do the bulk of the work during the cooler parts of the day;
- Acclimatizing workers; and
- Implementing work/rest regimens (See Attachment B for Work/Rest Regimen Procedures).

- **Personal Protective Equipment**

Personal cooling devices which may be useful include:

- Ice vests;
- Circulating water vests; and
- Vortex tubes.

Where ice vests and circulating water vests are used, rest periods of approximately 15 minutes should be taken when ice packs or batteries need to be changed.

Continuous work over long periods of time with these devices may present an increased musculoskeletal injury risk due to the extra weight. Since the duration of the cooling effectiveness of these devices will vary with heat and work loads, users must be instructed to leave the area to replenish ice or batteries at the first sign of loss of cooling.

- **Monitoring**

A program of environmental and physiological monitoring must be established in order to use work/rest regimens. The monitoring procedures are described in Attachment B.

### **5.3.5 Training**

All site personnel must receive training on the following topics:

- Health effects of hot environments and symptoms of heat related illness;
- Personal risk factors;
- Effect of personal protective equipment on heat stress conditions;
- Preventive measures;
- Fluid replacement;
- Elements of the site Heat Stress Prevention Program; and
- First aid and emergency response.

Records shall be maintained in accordance with EHS 1-9, Recordkeeping.

## **5.4 Cold Stress**

At certain times of the year, workers may be exposed to the hazards of working in cold environments. Potential hazards in cold environments include frostbite, trenchfoot or immersion foot, and hypothermia as well as slippery surfaces, brittle equipment, poor judgement and taking short cuts. The current ACGIH threshold limit values (TLVs) for cold stress will be used as a guideline. FWENC will implement the following cold stress prevention program elements when there is a potential for cold related injuries.

### **5.4.1 Personal Protective Equipment**

The following personal protective equipment will be provided as necessary to FWENC employees when conditions indicate a potential for cold-related injury. Subcontractors will be expected to supply appropriate equipment to their employees.

- Hard hat liners,
- Gloves or glove liners,

- Rain gear or water impermeable coveralls and gloves for potentially wet operations,
- Fleeced boot liners where rubber steel-toe boots are used, and
- Winter coveralls.

#### 5.4.2 Engineering Controls

A variety of engineering controls shall be evaluated to minimize cold stress. These include:

- General or spot heating should be used to increase temperature at the workplace.
- If fine work is to be performed with bare hands in a cold environment, special provisions should be made to keep the worker's hands warm. Warm air jets, radiant heaters, or contact warm plates can be used.
- The work area should be shielded from winds and drafts that may affect the wind chill factor.
- The air velocity in refrigerated rooms should be minimized as much as possible, and should not exceed 1m/sec in the work zone.
- At temperatures below freezing, metal handles of tools and control bars should be covered with thermal insulating material.
- Unprotected metal chair sets should not be used as they conduct heat away from the body.
- When necessary, equipment and processes should be substituted, isolated, relocated, or redesigned to reduce cold stress at the worksite.
- Power tools, hoists, cranes, or lifting aids should be used to reduce metabolic workload.
- Heated warming shelters such as tents and cabins should be made available if work is performed continuously in an equivalent chill temperature of 20°F or below.
- The ESS may implement a work-rest schedule to reduce exposure to cold stress.
- Scheduled rest breaks should be enforced.
- Personnel exposed to the cold should be provided the opportunity for frequent intake of warm, sweet, caffeine-free, nonalcoholic liquids or soup.
- Work should be moved to warmer areas whenever possible.
- Extra workers should be assigned to highly demanding tasks.
- Workers should be allowed to pace themselves, taking breaks when needed.

- Workers shall be trained in the prevention, symptoms, and emergency response to cold stress.
- Utilize the "buddy system" to monitor cold stress symptoms among the workers.
- Allow new employees time to adjust or "acclimate" to cold conditions.
- Minimize the need to sit or stand in one place for long periods of time.
- Minimize the amount of work time spent in a cold environment.
- Allow for the weight and bulkiness of protective clothing when estimating work performance goals and tasks.

#### **5.4.3 Warm Rest Areas**

FWENC will make warm rest areas, e.g., heated trailers, available for rest breaks in cold weather. Employees will be permitted and encouraged to use the heated trailers whenever they experience symptoms of cold stress.

#### **5.4.4 Work/Warm-up Schedule**

The work/warm-up schedule found in the ACGIH TLVs for cold stress will be followed. In addition, FWENC will make warm-up periods available to employees who need to change into dry clothing to prevent immersion foot or hypothermia.

#### **5.4.5 Training**

All FWENC employees and subcontractors will be trained in:

- The effects of cold stress, including frostbite, immersion foot and hypothermia;
- Personal risk factors;
- Recognition of the symptoms;
- Methods employees can use to protect themselves; and
- First aid procedures and recognition of medical emergencies.

Records shall be maintained in accordance with EHS 1-9, Recordkeeping.

## **6.0 REFERENCES**

ACGIH (American Conference of Government Industrial Hygienists)  
Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices, 1994-95.  
NIOSH (National Institute for Occupational Safety and Health)  
Occupational Exposure to Hot Environments, Revised Criteria 1986.

NIOSH/OSHA/EPA/USCG/EPA

Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities. October 1985.

National Safety Council

Fundamentals of Industrial Hygiene. Third Edition, 1988.

Environmental, Health & Safety - Programs Procedure EHS 1-9, Recordkeeping 

Environmental, Health & Safety - Programs Procedure EHS 3-2, Environmental, Health & Safety Plan(s) 

## 7.0 ATTACHMENTS

Attachment A - Heat and Cold Stress Information

Attachment B - Work/Rest Regimens and Monitoring

**ATTACHMENT A (Page 1 of 6)  
HEAT AND COLD STRESS INFORMATION**



**FOSTER WHEELER ENVIRONMENTAL CORPORATION  
HEAT AND COLD STRESS INFORMATION**

**HEAT STRESS**

Hot weather can cause physical discomfort, loss of efficiency, and personal injury. The human body strives to maintain a constant core temperature of 98.6o. If this temperature is to be maintained, heat loss must equal heat production. This balance is maintained by variations in the blood flow to the outer part of the body. When the core temperature rises, blood vessels beneath the skin dilate, and the blood brings increased heat to the skin, where it is dissipated by radiation and convection. This works only as long as the skin temperature is lower than the temperature of the outside environment. Heat loss by radiation convection is impossible when the temperature of the outside air approaches or exceeds the temperature of the skin. The body will now rely on dissipation through evaporation of sweat. But the sweat mechanism also has limits. The normal adult can sweat only about one liter per hour and can sweat at that rate for only a few hours at a time. In addition, sweating only works if the relative air humidity is low. Sweat evaporation ceases entirely when the relative humidity reaches 75 percent.

Of particular concern in heat stress monitoring is the use of personal protective clothing which decreases natural body ventilation and greatly increases the temperature and humidity to the skin. If precautions are not taken, heat stress will progress into a heat-related injury. Heat-related injuries fall into three major categories: heat cramps, heat exhaustion, and heat stroke.

**Heat Cramps**

Symptoms

Heat cramps are the least common and least severe of heat injuries. Heat cramps occur when the electrolytic balance in the blood between water, calcium, and sodium (salt) is altered. Low blood salt level, from profuse sweating and inadequate salt consumption, is the usual cause.

Symptoms of heat cramps include:

- Severe muscle cramps and pain, especially of the upper legs, calves, and abdomen, and occasionally in the arms
- Faintness and dizziness
- Possible nausea and vomiting

Treatment

Emergency care will include:

- Remove victim from the hot environment

**ATTACHMENT A (Page 2 of 6)**  
**HEAT AND COLD STRESS INFORMATION**

- Dilute one teaspoon of salt in one quart of water or use a commercial product with a low glucose content; allow victim to sip this solution at the rate of one-half glassful every 15 minutes
- To relieve pain, gently stretch the involved muscle group; gently massage cramps as long as it does not increase the pain or discomfort

The victim should avoid exertion of any kind for 12 hours. A victim of heat cramps is prone to recurrence.

### **Heat Exhaustion**

#### Symptoms

Heat exhaustion is the most common heat injury and usually occurs in an individual who is involved with heavy physical exertion in a hot, humid environment, and is wearing protective clothing. Heat exhaustion is a mild state of physical shock caused by the pooling of blood in the vessels just below the skin, causing blood to flow away from the major organs of the body. Due to prolonged and profuse sweating, the body also loses large amounts of salt and water.

The symptoms of heat exhaustion include:

- Profuse sweating
- Pale, cool, sweaty skin
- Headache and extreme weakness, fatigue
- Nausea and possible vomiting
- Dizziness and faintness
- Collapse and possible brief unconsciousness
- Body core temperature normal, may even be slightly below normal

#### Treatment

Emergency care will include:

- Remove victim from the hot environment and out of the exclusion zone
- Lie victim down with feet slightly raised
- Remove as much clothing as reasonable (especially personal protective clothing); loosen what cannot be removed
- Apply cold, wet compresses to the skin; fanning will also aid in cooling
- If the victim is fully alert, allow him/her to drink water or the same solution, at the same rate, that was used for the emergency care of heat cramps
- If the victim vomits, do not give fluids by mouth, transport him/her to a hospital immediately (dehydration is the most critical problem in heat exhaustion victim; intravenous fluids will have to be given)
- Take oral temperature every 10 minutes, if the victim's temperature is above 101° or shows a steady increase, transport to a hospital immediately and start sponging him/her off with cool water

## ATTACHMENT A (Page 3 of 6) HEAT AND COLD STRESS INFORMATION

### Heat Stroke

Heat stroke is a true life-threatening emergency having a mortality rate of 20 to 70 percent. This condition results when the heat regulating mechanisms of the body break down and fail to cool the body sufficiently. The body temperature rises to between 105 and 110 F; no sweating occurs in about 50 percent of the victims. Because no cooling takes place, the body stores increasingly more heat, and eventually brain cells are damaged, causing permanent disability or death. About 4,000 Americans die of heat stroke annually.

There are two basic kinds of heat stroke: classic heat stroke and exertional heat stroke. Classic heat stroke, in which people lose the ability to sweat, generally affects the elderly or chronically ill. Exertional heat stroke, in which victims retain the ability to sweat, is accompanied by physical exertion and muscle stress. Exertional heat stroke is the type that will be most commonly encountered on a field operation requiring strenuous physical activity.

The symptoms of heat stroke include:

- Oral temperature of 105 F or higher
- Hot, reddish skin, skin is usually dry
- Headache
- Dry mouth
- Shortness of breath
- Nausea or vomiting
- Increasing dizziness and weakness
- Mental confusion and anxiety; victims may show unusual irritability, aggression, combative agitation, or hysterical behavior
- Convulsions, sudden collapse and possible unconsciousness; all heat stroke victims having varying levels of consciousness, ranging from disorientation to coma

### Treatment

Emergency care will include:

- Remove the victim from the hot environment and from the exclusion zone
- Call for trained emergency medical personnel immediately
- Remove as much clothing as reasonable (especially personal protective clothing); cut clothing with bandage scissors, if necessary, being careful not to injure victim
- Pour cool water over the victim, avoiding his nose and mouth
- Fan the victim
- Place cold packs under the arms and against neck and ankles
- Wrap victim in a wet blanket
- Continue a combination of these methods until the oral temperature falls below 103 F (take measures to prevent chilling, if necessary, i.e., use slower cooling if the victim starts shivering)
- Elevate the head and shoulders slightly during cooling
- Never give the victim anything to drink unless fully conscious and vomiting is unlikely
- Because heat stroke involves the entire body, a number of complications may result:
- Brain swelling, convulsions, coma, kidney failure, liver failure, high blood pressure and heart failure.

Therefore, always transport the victim to a hospital even if the body core temperature has lowered to near normal.

## ATTACHMENT A (Page 4 of 6) HEAT AND COLD STRESS INFORMATION

The two most reliable and distinct differences between heat stroke and heat exhaustion are:

### Heat Stroke

- Skin flushed (red); may be dry; hot to touch
- Oral temperature above 105°F.

### Heat Exhaustion

- Skin pale; wet or clammy; cool to touch
- Oral temperature usually normal.

## Cold Stress

Hypothermia is a drop in the core body temperature below 98.6 F. The first symptoms of hypothermia are uncontrollable shivering and the sensation of cold; this is followed by a slowed and sometimes irregular heart beat, a weakened pulse and a drop in blood pressure. Vague or slow slurred speech, memory lapses, apathy, incoherence and drowsiness can occur. Other symptoms may include cool skin, slow, irregular breathing, apparent exhaustion, and fatigue after rest.

### Prevention

Hypothermia is caused by prolonged exposure to a cold environment, whether air, water, or snow and ice. Adequate dry clothing with appropriate insulating capacity must be provided to workers to prevent hypothermia, especially if work is performed in air temperatures below 40 F. Wind chill is a critical factor. Work at a slow but steady pace. The job should be a "no sweat" operation.

Unless there are unusual or extenuating circumstances, cold injury to other than the extremities (hands, feet, and head) is not likely to occur without the development of the initial signs of hypothermia. Older workers or workers with circulatory problems require special precautionary protection against hypothermia. The use of extra insulating clothing and/or a reduction in the duration of the exposure period are among the special precautions which should be considered for these workers. The precautionary actions to be taken will depend upon the physical condition of the worker and should be determined with the advice of a physician with knowledge of the cold stress factors and the medical condition of the worker.

### Treatment

First aid for mild hypothermia will be performed as follows:

1. End the exposure - get the victim out of the cold and wet.
2. Replace wet clothing with dry or add insulation to clothing.
3. Offer warm, non-alcoholic fluids.
4. Increase exercise.
5. Seek shelter from wind, wet and cold.

## **ATTACHMENT A (Page 5 of 6) HEAT AND COLD STRESS INFORMATION**

**CAUTION:** If the victim remains cold for a number of hours, chemical changes may have taken place which, on rewarming, may cause major medical problems for the victim and which could result in death. Severely hypothermic victims are best warmed in the hospital under controlled conditions. If a severely hypothermic victim cannot be transported to a hospital within a few hours, rewarming should begin in the field.

### Symptoms

Frostbite can occur either before or after the onset of hypothermia when body tissue (usually an extremity) is exposed to freezing temperatures. Frostbite occurs when the fluids surrounding tissue cells freezes. The danger of frostbite increases with increased wind chill and/or reduced temperatures below 32 F. Frostbite can also occur if tissues are in prolonged contact with a frozen material or object. Skin contact with frozen metal, for example, can result in frostbite in a short period of time, even in a warm environment.

There are three degrees of frostbite:

- First degree - freezing without blistering or peeling, "frostnip"
- Second degree - freezing with blistering and/or peeling, and
- Third degree - freezing resulting in the death of skin tissue and possibly the death of underlying tissues as well

Symptoms of frostbite include the following:

- The skin changes color to white or grayish-yellow, progresses to reddish-violet, and finally turns black as the tissue dies
- Pain may be felt at first, but subsides
- Blisters may appear, and
- The affected area is cold and numb

### Prevention

Frostbite can be prevented by wearing sufficient protection to prevent skin from coming into prolonged contact with a freezing environment. The following steps can be taken:

1. Wear sufficient clothing. Mittens are better than gloves. Face masks and wool stocking caps are better than hats. Wind and waterproof hoods protect the face and neck.
2. Clothing should be loose enough to prevent constriction of blood vessels. Boots must be roomy enough to permit movement of the toes with no feeling of tightness.
3. Do not contact conductive metals or contact gasoline or other solvents with bare skin as rapid evaporation of solvents may quickly lead to frozen tissues in a cold environment.
4. Exercise the toes and fingers to maintain circulation.
5. Observe the condition of your partners' face, hands and ears frequently for signs of frostbite.
6. Avoid smoking and drinking alcoholic beverages.

## ATTACHMENT A (Page 6 of 6) HEAT AND COLD STRESS INFORMATION

### Treatment

First aid for superficial (first degree) frostbite is as follows:

1. Place a warm body part next to the frozen area, applying firm, steady pressure.
2. DO NOT RUB THE AREA. Rubbing may cause further damage to already injured skin.
3. Protect the area from further freezing.

First aid for deep frostbite (second and third degree) is as follows:

1. KEEP THE FROZEN PART FROZEN!
2. Prevent further injury: avoid rubbing and further freezing of unaffected tissue.
3. If the part has thawed, the part should NOT be allowed to refreeze or bear weight. A victim with thawed feet should be carried out.
4. Give the victim plenty of fluids and evacuate to medical assistance as soon as possible.

### Symptoms

This condition may be caused by long, continuous exposure to cold without freezing, combined with persistent dampness or actual immersion in water. Edema (swelling), tingling, itching, and severe pain occur, and may be followed by blistering, death of skin tissue, and ulceration. When other areas of the body are affected besides the feet, the condition is known as chilblains.

### Prevention

Trenchfoot and chilblains can be prevented by keeping the body as dry as possible at all times. Waterproof boots should be worn when required, but provisions must be made for preventing excessive perspiration to accumulate inside the boots. Socks should be changed at least twice daily and the boots wiped dry inside with each change of socks. The feet should also be wiped dry and foot powder applied.

### Treatment

Affected body parts should not be rubbed or massaged, but bathed in water using plain white soap. Dry thoroughly and elevate the body part, allowing the body part to be exposed at room temperatures. If the feet are affected, do not walk during treatment.

**ATTACHMENT B (Page 1 of 5)**

**WORK/REST REGIMENS AND MONITORING**



**FOSTER WHEELER ENVIRONMENTAL CORPORATION**

**HEAT STRESS  
WORK/REST REGIMES AND MONITORING**

**Introduction**

Establishing a work/rest regimen that allows work to be completed in a timely manner while providing adequate rest time to prevent heat stress requires involvement of the ESS, FOL, and individuals involved. In many cases, particularly when wearing normal field type clothing (i.e., level D), awareness and communication are the key elements to a successful program. Allowing rest periods on an "as needed" basis while ensuring vigilance for initial symptoms of heat stress, encourages this success.

There are times when this approach is not appropriate. When heat stress contributing protective clothing (e.g., respirators, impermeable coveralls) are worn for extended periods, or when "as needed" work/rest regimens adversely impact either the individuals exposed to the heat source or work completion, a more formal work/rest regimen will be established.

Formal work/rest regimens are based either on 1) monitoring ambient conditions (e.g., with a WBGT), estimating work loads and establishing work/rest times, 2) monitoring physiological conditions and adjusting work/rest periods, or 3) using personnel heat stress monitors.

The WBGT, physiological monitors, and personnel heat stress monitors will be used in accordance with manufacturer's instructions. Personnel heat stress monitors will be approved for use by the PESM.

**II. WBGT Based Work/Rest Regimens**

**A. Work/Rest Regimens**

When required, the WBGT will be used in conjunction with the work load to determine the appropriate work/rest regimen for personnel wearing regular work clothing or semipermeable disposal coveralls (uncoated Tyvek). Light work examples include sitting or standing or performing light hand or arm work. Moderate work includes walking about with moderate lifting and pushing. Heavy work corresponds to pick and shovel-type work.

The work/rest regimen using the WBGT procedure will be used as a guideline. Table B-1 outlines the work/rest regimen guidelines based upon WBGT temperature and work load. Table B-2 identifies the correction factors. The WBGT temperature will be determined in accordance with Section B of this attachment.

**ATTACHMENT B (Page 2 of 5)**

**WORK/REST REGIMENS AND MONITORING**

**Table B-1.** Examples of Permissible Heat Exposure Threshold Limit Values.  
(Values are given in °F WGBT)\*

<b>Work - Rest Regimen</b>	<b>Work Load</b>		
	<b>Light</b>	<b>Moderate</b>	<b>Heavy</b>
Continuous work	86	80	77
75% Work - 25% Rest, each hour	87	82	78
50% Work - 50% Rest, each hour	89	85	82
25% Work - 75% Rest, each hour	90	88	86

\* Notes on Table B-1

- 1) These values are for fully acclimatized workers wearing light weight pants and shirts. For conditions other than this use this table with the correction factors from Table B-2.
- 2) These values assume that workers drink frequently and have properly increased salting of food prior to exposure.
- 3) These values are guidelines. Actual levels may be modified based on individual physiological response and actual work and rest conditions.
- 4) These values assume that the rest location is cool enough to alleviate heat load conditions.

**ATTACHMENT B (Page 3 of 5)**

**WORK/REST REGIMENS AND MONITORING**

**Table B-2.** Correction Factors for Table B-1 in °F\*

<b>Clothing Type</b>	<b>WBGT Correction</b>
Summer work uniform	0
Cotton overalls	-3.5
Winter work uniform	-7
Water barrier, permeable	-11
<b>Condition</b>	<b>WBGT Correction</b>
Unacclimatized worker, moderate work load	-4.5

\*To use this table, identify the most restrictive applicable clothing type and whether unacclimatized workers are involved. Add the two. Modify Table B-1 temperatures by this amount. For example, the Table B-1 TLV for continuous work, light workload is 86oF. If cotton overalls (-3.5) are work and acclimatized workers are acclimatized (no additional change) the modified limit is 82.5oF.

**B. WBGT Determination**

If the Wet Bulb Globe Temperature (WBGT) is used to determine if field conditions are conducive to heat stress illnesses, the WBGT is determined through the following equations:

- Outdoors with solar load: (1)

$$WBGT=0.7 NWB+0.2GT+0.1DB$$

- Indoors or outdoors with no solar load: (2)

$$WBGT=0.7 NWB+0.3GT$$

Where:

- WBGT = Wet Bulb Globe Temperature Index
- NWB = Natural Wet-Bulb Temperature
- DB = Dry-Bulb Temperature
- GT = Globe Thermometer Temperature

## ATTACHMENT B (Page 4 of 5)

### WORK/REST REGIMENS AND MONITORING

The factors involved in the above equations can be measured in the following manner:

- Through the use of a direct-reading heat stress monitor capable of measuring all of the individual factors associated with the WBGT equation. For example, the Reuter-Strokes Wibet No. RSS-214 heat stress monitor.
- By measuring the individual factors manually using the following type of equipment

Natural Wet-Bulb Temperature Thermometer  
Dry-Bulb Temperature Thermometer  
Globe Temperature Thermometer  
Stand

### III. Adjusted Temperature Based Work/Rest Regimens

When wearing impermeable protective clothing, the use of work/rest regimens based on WBGT is not recommended. The WBGT index is designed to account for the effects of evaporative cooling. Vapor barrier clothing impedes the evaporation of sweat and renders the WBGT an inappropriate physiological model. The most important environmental conditions related to heat stress for workers wearing impermeable protective clothing have been suggested to be the ambient dry bulb temperature and the radiant solar heat. These factors are combined into an index called the adjusted temperature using the following formula:

$$T^{\circ} \text{ adjusted} = \text{ambient dry bulb temperature} + (13 \times \% \text{ sunshine})$$

where % sunshine is an estimate of the amount of time the sun is covered by clouds thick enough to produce a shadow. The thermometer bulb should be shielded from radiant heat when taking measurements.

The adjusted temperature values are then used to determine the initial work/rest regimen and physiological monitoring frequency. Table B-3 gives the work period and monitoring frequency. Initially, rest periods will be at least 15 minutes. Physiological monitoring that is normally recommended is pulse rate and body temperature. Procedures for each are described below. Initially, both should be done. Pulse rate monitoring may be discontinued with the approval of the PESM if temperature monitoring proves to be effective.

**ATTACHMENT B (Page 5 of 5)**

**WORK/REST REGIMENS AND MONITORING**

**A. Pulse Rate Monitoring**

Take the pulse immediately at the start of the rest period (P1). Take the pulse again 2 1/2 to 3 minutes into the rest period (P2). If any of the following conditions exist, shorten the next work period by a third:

P1 > 110 beats per minute(bpm)

P2 > 90 bpm

P1 - P2 < 10 bpm.

Pulse rates can be taken with an electronic pulse meter, or manually with a stopwatch for 30 seconds.

**B. Oral Temperature**

Take the oral temperature immediately at the start of the rest period. If the oral temperature exceeds 99.5o shorten the next work period by a third. Do not return the worker to hot work in semipermeable or impermeable clothing until the oral temperature is less than 99.5oF.

Oral temperatures may be taken with disposable oral thermometers or infrared ear drum scanners, such as the Thermoscan. Note: If a Thermoscan unit is purchased, the Pro Model should be selected. The home model available through drugstores cannot be recalibrated.

**C. Removal from Exposure**

If an individual requires a shortening of the work period on more than two consecutive monitoring periods, or repeatedly over a few days, they should be removed from exposure to hot environments wearing semipermeable impermeable protective clothing until examined and cleared for such work by the consulting physician.

**Table B-3.** Initial Work Period and Physiological Monitoring Frequency <sup>1</sup>

ADJUSTED TEMPERATURES	SCHEDULE
90° F or above	15 minutes
87.5° - 90° F	30 minutes
82.5° - 87.5° F	60 minutes
77.5° - 82.5° F	90 minutes
70° - 77.5° F	120 minutes

<sup>1</sup> Schedule is for fit and acclimatized workers in impermeable protective clothing.

## **FOSTER WHEELER ENVIRONMENTAL CORPORATION**

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