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NAS KEY WEST
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HEALTH AND SAFETY PLAN FOR THE SUPPLEMENTAL RESOURCE CONSERVATION AND RECOVERY ACT FACILITY INVESTIGATION AND REMEDIAL INVESTIGATION NAS KEY WEST FL

7/11/1996

BROWN AND ROOT ENVIRONMENTAL

HEALTH AND SAFETY PLAN

SUPPLEMENTAL RFI AND RI
FOR
NAVAL AIR STATION KEY WEST
KEY WEST, FLORIDA

Submitted to:
Southern Division
Naval Facilities Engineering Command
North Charleston, South Carolina

Submitted by:
Brown & Root Environmental
900 Trail Ridge Road
Aiken, South Carolina 29803

Contract No. N62467-89-D-0317/114

January 1996
Mod. 02 7/10/96

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Field Operations Leader

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1.0 PURPOSE

The purpose of this plan is to assign responsibilities, establish personnel protection standards and mandatory safety practices and procedures, and provide for contingencies that may arise while operations are being conducted at the Naval Air Station (NAS), Key West, Florida.

2.0 APPLICABILITY

The provisions of the plan are mandatory for all onsite employees and site visitors (including state and Federal government, and military personnel) engaged in hazardous material management activities including, but not limited to, initial site reconnaissance, preliminary field investigations, mobilization, project operations, and demobilization. This plan has been developed under U.S. Environmental Protection Agency (USEPA) guidelines and complies with all regulations including OSHA 29 CFR 1910.120 Hazardous Waste Operation and Emergency Response (HAZWOPER), 1926 Construction Industry standards, and U.S. Army Corps of Engineers EM385-1-1.

PERSONNEL ASSIGNMENTS

Site Name: Naval Air Station
Key West

Address: Key West, Florida

Effective Date: January 8, 1996

Client Contact: Dudley Patrick,
Remedial Project Manager
Southern Division
Naval Facilities Engineering
Command

Phone Number: (803) 820-5541

Activity Coordinator: Ron Demes
Director of Public Works
NAS Key West

Phone Number: (305) 293-2194

Purpose: Supplemental RFI/RI Fieldwork as described in Section 3.1 of this Health and Safety Plan.

Proposed Dates of Work: January 8 - 31, 1996

PROJECT TEAM

Brown & Root Environmental (B&RE) Personnel:	**Discipline/Tasks Assigned:**
Kevin Walter	Project Manager
Scott Flickinger/Rachel Layman (alternate)	Field Operations Leader (FOL)
Kent Cubbage/Julea Bradley (alternate) Alford Barnett (second alternate sampler)	Biologist/Sampler
Mike Whitten	Biologist/Site Safety Officer (SSO)
Gary Braganza	Geologist
Tom Nicotera	Sampler
Tom Buntin	Surveyor

Non-B&RE Personnel:

Drilling subcontractor names TBA

Plan Preparation:

Prepared by: Rachel M. Layman

Plan Reviewed and Approved by:

B&RE Navy CLEAN Health and Safety Manager: Matthew M. Soltis, CSP, CIH

Reviewed:

B&RE Project Manager: Kevin Walter

Follow Up Report:

Responsible Person: Kevin Walter

3.0 SITE BACKGROUND INFORMATION

3.1 SITE HISTORY

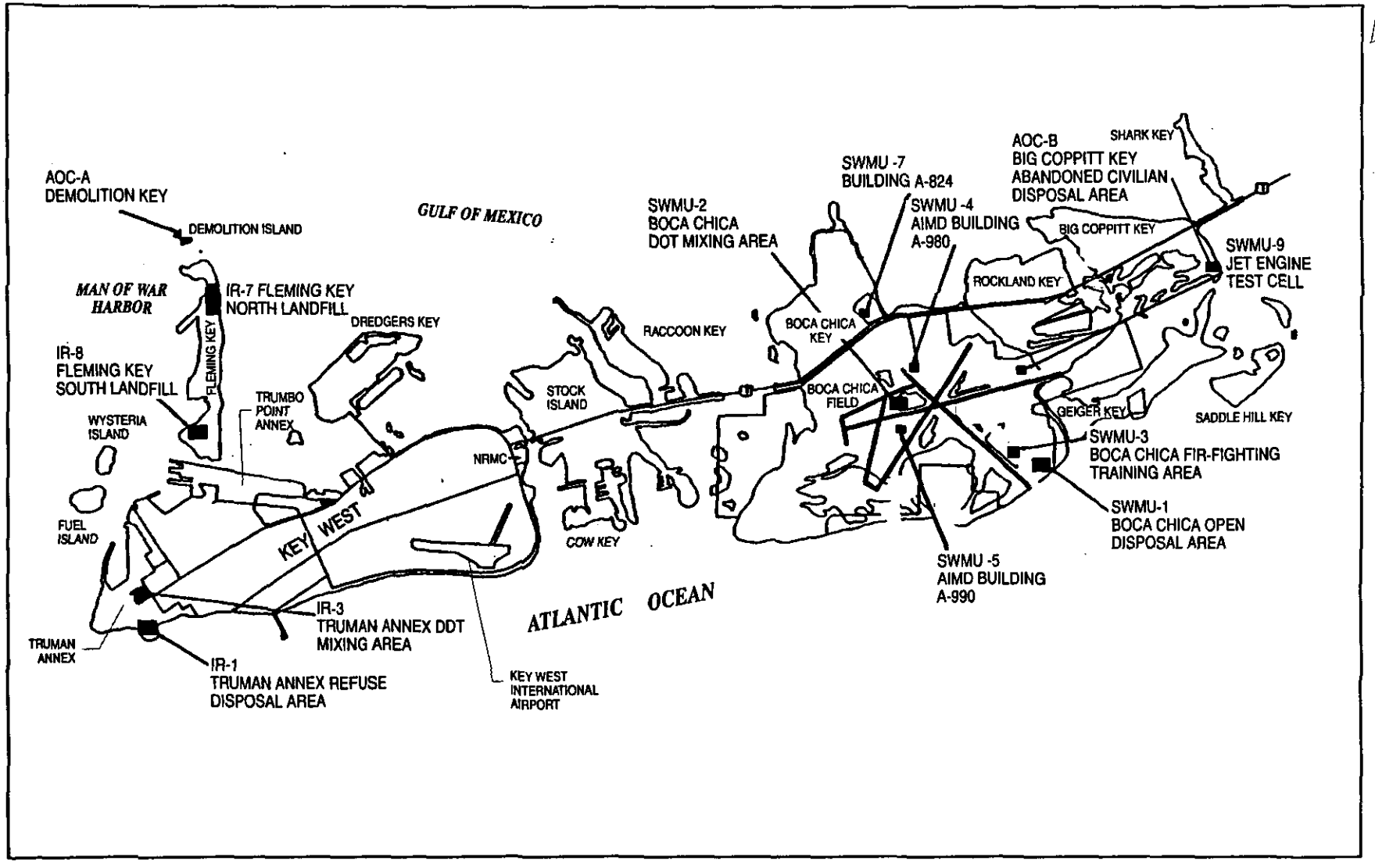
NAS Key West is located in southern Monroe County, approximately 150 miles southwest of Miami on the two westernmost islands of the Florida Keys (Boca Chica and Key West). It is connected to the mainland by the Overseas Highway (U.S. Highway No. 1).

Several naval installations located in various parts of the lower Florida Keys comprise what is known as the Naval Complex at Key West. Most of these are located in the vicinity of Key West and Boca Chica Key. The entire complex encompasses approximately 5,000 acres. NAS Key West is the host activity of the Naval Complex. The air station is located on Boca Chica Key and encompasses 3,250 acres.

A U.S. naval base was first established on Key West in 1823 for removing pirates from the Florida Keys. The base was expanded during the Mexican War, the Spanish-American War, and again during World War I, with periods of inactivity in between. In 1939, a seaplane base was opened; and in 1942, the Boca Chica airfield was built. During World War II, Key West Naval Station was established as the Sixth Naval District Headquarters. Since that period, the role of the military at NAS has decreased. The Naval Station was disestablished in 1973, resulting in the relocation of Navy submarine units, the Underseas Diving School, and the Fleet Sonar School. A Marine unit was transferred from Key West in 1977. During the late 1970's, several other operations were transferred or downgraded.

Currently, NAS Key West maintains aviation operations, a research laboratory, communications intelligence, counter-narcotics air surveillance operations, a weather service, and several other activities. In addition to the naval activities and units, other Department of Defense (DOD) and Federal agencies are located at Key West. Defense activities include U.S. Air Force squadrons, U.S. Army Special Forces Division, U.S. Coast Guard, and a Defense Property Disposal Office.

This portion of the supplemental RFI/RI will consist of activities at three Solid Waste Management Units (SWMUs), four Installation Restoration (IR) sites, and one Area of Concern (AOC) on the Naval facility in the westernmost Florida Keys (Figure 3-1). They include Boca Chica Aircraft Intermediate Maintenance Department (AIMD) Building A-980 (SWMU-4), Boca Chica AIMD Building A-990 (SWMU-5), Boca Chica Hazardous Waste Storage Building A-824 (SWMU-7), Truman Annex Refuse Disposal Area (IR Site 1), Truman Annex DDT Mixing Area (IR Site 3), Fleming Key North Landfill (IR Site 7), Fleming Key South Landfill (IR Site 8), and Big Coppitt Key Abandoned Civilian Disposal Area (AOC B). In addition, sampling activities will be conducted at five site-wide background locations on the islands.



Brown & Root Environmental

0 1.5 3.0
SCALE IN MILES (APPROXIMATE)

FIGURE 3-1. LOCATION OF NAS KEY WEST HAZARDOUS WASTE SITES

NAS KEY WEST — KEY WEST, FLORIDA

DRAWN BY:	SCALE:	DATE:	REV:
MDB	-	06/04/96	0
CHECKED BY:	CONTRACT NO.:	FILE NAME:	
RML	-	7046-1\F2LOCNS8.CDR	

3.2 SCOPE AND OBJECTIVES

This Health and Safety Plan (HASP) has been developed to address the potential hazards recognized in performing Supplemental RFI/RI activities at SWMU 1, 2, 3, and 9, and several Boca Chica background locations, at the NAS Key West. These activities will include the following investigative efforts to further characterize the contaminants in soil, sediment, groundwater, and surface water and to characterize the ecology, including major biological communities, in order to determine whether NAS activities have resulted in adverse impacts to Boca Chica Key's biological systems:

- Install groundwater monitoring wells at SWMU 1, 2, and 3 using a hollow stem auger drill rig.

- Collect soil, sediment, groundwater and surface water samples and perform chemical analyses for Appendix IX volatile organics, semivolatile organics, pesticides, polychlorinated biphenyls (PCBs), target analyte list metals, and cyanide.

- Conduct sediment sampling for toxicity testing.

- Conduct tissue analyses of resident fish and oysters to determine if contaminants present in SWMUs 1, 2, 3, and 9, including background, in surface waters and sediments are capable of accumulating in biotic tissue.

The activities will be performed to identify the nature and extent of actual or potential site contamination. This information will also be used to determine potential pathways of dispersion and exposure.

3.3 HAZARD EVALUATION

This hazard evaluation has been developed based on the planned activities at NAS Key West (as described in Section 3.2). In addition to the chemical substances (presented in Tables 3-1, 3-2, and 3-3) which may be encountered in the conduct of planned site activities, physical hazard potentials must be addressed; these are included in Section 3.4 of this HASP.

Evaluation of the chemical hazard potentials identified will be predominantly accomplished through the use of real-time direct reading monitoring instrumentation and adherence to action level responses (specified in Section 4.0 of this HASP). To some extent, these evaluation means will be supplemented by the attention of personnel to substance warning properties such as appearance, characteristic odor (see Table 3-3), and recognition of symptoms as specified in Table 3-3. In addition, the FOL will be responsible for creating an inventory of hazardous chemicals used for these EA activities and for maintaining the Material Safety Data Sheets (MSDSs) for these chemicals.

Table 3-1
Maximum Contaminants of Concern Concentrations in Soils and Sediment

Contaminant (mg/kg)[a]	SWMU No. 1	SWMU No. 2	SWMU No. 3	SWMU No. 7	Jet Engine Test Cell	IR Site No. 1	IR Site No. 3	IR Site No. 7	IR Site No. 8	AOC Site A	AOC Site B
Volatiles											
Benzene	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND	ND
Vinyl Chloride	ND	ND	40	ND	NS	ND	ND	ND	ND	ND	ND
Semivolatile											
Naphthalene	ND	ND	40	ND	NS	ND	ND	ND	ND	ND	ND
Aroclor 1260	ND	ND	ND	19	NS	10	ND	ND	ND	ND	ND
Pesticides											
Chlordane	ND	24	ND	ND	NS	ND	ND	ND	ND	ND	ND
4,4 DDD	0.21	340	ND	ND	NS	0.036	26	ND	ND	ND	ND
4,4 DDE	0.11	29	ND	ND	NS	0.037	61	ND	ND	ND	ND
4,4 DDT	ND	180	ND	ND	NS	0.11	14	ND	ND	ND	ND
Lindane	ND	0.67	ND	ND	NS	ND	ND	ND	ND	ND	ND
Metals											
Antimony	31.9	ND	ND	ND	NS	6.8	ND	50.3	ND	43.5	8.9
Arsenic	4.5	8	ND	10.9	NS	38	213	84	8.1	19.3	9
Cadmium	94.1	2.3	ND	ND	NS	ND	ND	ND	ND	ND	15.6
Chromium	2700	ND	ND	ND	NS	ND	ND	ND	ND	ND	67.4
Lead	12,300	90.3	136	ND	NS	10,600	1050	32.5	27.4	2100	237
Mercury	8.0	0.11	0.14	ND	NS	0.12	ND	0.24	0.2	ND	2.4
Nickel	18.8	3.3[b]	ND	ND	NS	78.4	ND	9.2	5.9	34.3	ND

[a]All values are mg/kg
[b]Estimated value
NS - Not sampled
ND - Not detected in area included in IRA scope of work

Source: "RCRA Facility Investigations/Remedial Investigation for SWMU 1, 2, 3, 4, 5, 7, IR Site 1, 3, 7, 8, AOC Site A and B" June 7, 1994; IT Corporation.

Table 3-2
Maximum Chemicals of Concern Concentrations in Groundwater[a]

Chemical	SWMU[c] #1	SWMU[c] #2	SWMU[c] #3	SWMU[c] #7	Jet Eng[b] Test Cells	IR Site 1[c]	IR Site 3[c]	IR Site 7[c]	IR Site 8[c]	AOC A[c]	AOC B[c]
Volatiles											
Benzene	ND	54	ND	ND	56 ppb	ND	ND	ND	ND	ND	ND
Chlorobenzene	ND	120	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2 - dichloroethene	ND	770	ND	ND	2800 ppb	ND	ND	ND	ND	ND	ND
1,1,1 Trichloroethane	ND	ND	ND	ND	3.9 ppb	ND	ND	ND	ND	ND	ND
Trichloroethene	ND	ND	ND	ND	44 ppb	ND	ND	ND	ND	ND	ND
Vinyl Chloride	3.2	ND	17	ND	ND	ND	ND	ND	ND	ND	ND
Semivolatiles											
Naphthalene	ND	ND	40	ND	340 ppb	ND	ND	ND	ND	ND	ND
Inorganics											
Antimony	251	88	152	ND	ND	563	83.2	292	231	249	240
Arsenic	94.5	ND	ND	ND	ND	ND	ND	ND	104	ND	83.4
Cadmium	ND	ND	ND	ND	ND	42.3	ND	ND	ND	52.2	6.2
Chromium	ND	ND	ND	ND	ND	394	ND	269	ND	ND	428
Lead	39.2[d]	ND	ND	ND	ND	2170	26.9	2000	553	1610	309
Pesticides											
Aldrin	ND	2.7	ND	ND	ND	ND	ND	ND	ND	ND	ND
4,4 DDD	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4,4 DDE	ND	3.8	ND	ND	ND	ND	0.84	0.28	ND	ND	ND
4,4 DDT	ND	6.9	ND	ND	ND	ND	0.5	0.42	ND	ND	ND
Dieldrin	ND	ND	ND	ND	ND	ND	1.2	ND	ND	ND	ND
Cyanide	310	ND	ND	ND	ND	ND	ND	270	ND	ND	ND

[a] All values are µg/l unless noted otherwise.
[b] *Source:* Contamination Assessment Report Jet Engine Test Cell Building A968, June 1994, ABB Environmental Services, Inc.
[c] *Source:* "RCRA Facility Investigations/Remedial Investigation for SWMU 1,2,3,4,5,7, IR Site 1,3,7,8, AOC Site A and B," June 7, 1994, IT Corporation
[d] Estimated value

Table 3-3
Chemical Hazard Information

Chemical	Exposure limits[a]		Harmful effects	Symptoms	Method of analysis	Routes of Exposure
			Volatiles			
Benzene	AL[b]:	0.5 ppm	Blood, CNS, skin, bone marrow, eyes, respiratory system, carcinogen	Irritated eyes, nose, respiratory system; giddiness; headache; nausea; staggering gait; fatigue; anorexia; lassitude; dermatitis	Charcoal tube	Inhalation; skin absorption; ingestion; contact
	PEL[b]:	1 ppm				
	STEL[b]:	5 ppm				
	TLV[b]:	0.1 ppm				
	IDLH[c]:	3000 ppm				
Chlorobenzene	AL[b]:		Respiratory system, eyes, skin, CNS, liver	Irritated eyes, nose, skin; drowsiness; uncoordinated; liver, lung, kidney damage	Charcoal tube	Inhalation; ingestion; contact
	PEL[b]:	75 ppm				
	STEL[b]:					
	TLV[b]:	10 ppm				
	IDLH[c]:	2400 ppm				
1,1-Dichloroethane	AL[b]:		Respiratory system, eyes, skin, CNS, liver	Irritated eyes, nose, skin; drowsiness; uncoordinated; liver, lung, kidney damage; depression	Charcoal tube	Inhalation; ingestion; contact
	PEL[b]:	100 ppm				
	STEL[b]:					
	TLV[b]:	100 ppm				
	IDLH[c]:	4000 ppm				
1,2-Dichloroethene	AL[b]:		Eyes, upper respiratory system, skin, CNS	Irritated eyes, mucous membrane; headache; dermatitis; narcolepsy; coma	Charcoal tube	Inhalation; ingestion; contact
	PEL[b]:	100 ppm				
	STEL[b]:	125 ppm				
	TLV[b]:	200 ppm				
	IDLH[c]:	4000 ppm				
Trichloroethene (TCE)	AL[b]:		Respiratory system, liver, heart, kidneys, CNS, skin	Headache, vertigo; vision disturbances; tremors; somnolence; nausea, vomiting; eye irritation; dermatitis	Charcoal tube	Inhalation; ingestion; contact
	PEL[b]:	50 ppm				
	STEL[b]:	200 ppm				
	TLV[b]:	50 ppm				
	IDLH[c]:	1000 ppm				
1,1,1-Trichloroethane (Methyl Chloroform)	AL[b]:		Respiratory system, liver, heart, kidneys, CNS, skin	Headache, vertigo, vision disturbances; tremors; somnolence; nausea, vomiting; eye irritation; dermatitis; cardiac arrhythmias; paresthesia	Charcoal tube	Inhalation; ingestion; contact
	PEL[b]:	350 ppm				
	STEL[b]:	450 ppm				
	TLV[b]:	350 ppm				
	IDLH[c]:	1000 ppm				

Table 3-3 (cont.)
Chemical Hazard Information

Chemical	Exposure limits[a]		Harmful effects	Symptoms	Method of analysis	Routes of Exposure
Vinyl Chloride (Chloroethene)	AL[a]: PEL[a]: STEL[b]: TLV[b]: IDLH[c]:	 1 ppm 5 ppm 	Liver, CNS, blood, respiratory system, lymphatic system	Weakness; abdominal pain, GI bleeding; pallor or cyanosis of extremities; carcinogen	Two charcoal tubes in series	Inhalation
			Semi-Volatiles			
Naphthalene	AL[a]: PEL[a]: STEL[b]: TLV[b]: IDLH[c]:	5 ppm 10 ppm 15 ppm 10 ppm 500 ppm	Eyes, blood, liver, kidneys, skin, CNS	Dermal blemishes; respiratory irritation; kidney irritation; bronchitis	2 Microm 37 mm PTFE member filter and sorbent	Inhalation; skin absorption; ingestion; contact
			Metals			
Antimony	AL[a]: PEL[a]: STEL[b]: TLV[b]: IDLH[c]:	 0.5 mg/m^3 0.5 mg/m^3 80 mg/m^3	Respiratory system, cardiovascular system, skin, eyes	Throat, mouth, and nose irritation, cough, dizziness, headache; nausea, vomiting, stomach cramps; insomnia; anorexia; skin irritation; cardiac abnormalities; olfactory fatigue	0.8 microm MCEF filter	Inhalation; contact
Arsenic	AL[a]: PEL[a]: STEL[b]: TLV[b]: IDLH[c]:	0.005 mg/m^3 0.01 mg/m^3 0.002 mg/m^3 0.2 mg/m^3 100 mg/m^3	Liver, kidneys, skin, lungs, lymphatic system	Ulceration of nasal septum; dermatitis; GI disturbances; peripheral neuropathy; respiratory irritation; hyperpigmentation of skin	0.8 microm MCEF filter	Inhalation; skin absorption; ingestion; contact
Cadmium	AL[a]: PEL[a]: STEL[b]: TLV[b]: IDLH[c]:	 0.2 mg/m^3 NA 50 mg/m^3	Respiratory system, kidneys, prostate, blood	Pulmonary edema, dyspnea, coughing, tight chest; substernal pain; headache; chills, muscular aches; nausea, vomiting, diarrhea	0.8 microm MCEF filter	Inhalation; skin absorption; ingestion; contact
Chromium	AL[a]: PEL[a]: STEL[b]: TLV[b]: IDLH[c]:	0.5 mg/m^3 1 mg/m^3 NA 0.5 mg/m^3 500 mg/m^3	Respiratory system, skin	Histologic fibrosis of lung; sensitization dermatitis	0.8 microm MCEF filter	Inhalation; ingestion

Table 3-3 (cont.)
Chemical Hazard Information

Chemical	Exposure limits[a]		Harmful effects	Symptoms	Method of analysis	Routes of Exposure
Cyanide	AL[a]:		CVS, CNS, liver, kidneys, skin	Asphyxiation and death can occur; weakness, head confusion; nausea, vomiting; irritated eyes, skin; slow gasping respiration	0.8 microm MCEF filter and bubbler	Inhalation; skin absorption; ingestion; contact
	PEL[a]:	5 mg/m³				
	STEL[b]:	NA				
	TLV[c]:					
	IDLH[c]:					
Lead	AL[a]:	30 mg/m³	GI tract, CNS, kidneys, blood, gingival tissue	Weakness, lassitude; insomnia; facial pallor; pale eyes; anorexia; abdominal pain; anemia; tremors; irritated eyes	0.8 microm MCEF filter	Inhalation; ingestion; contact
	PEL[a]:	50 mg/m³				
	STEL[b]:	NA				
	TLV[c]:	150 mg/m³				
	IDLH[c]:	700 mg/m³				
Mercury	AL[a]:		CNS, kidney, eyes, skin, respiratory system	Ataxia; vision, hearing disturbances; spastic or jerky movement; dizziness; nausea, vomiting, diarrhea; skin burns	Hydar solid sorbent tube	Inhalation; skin absorption; ingestion; contact
	PEL[a]:	0.01 mg/m³				
	STEL[b]:	0.03 mg/m³				
	TLV[c]:					
	IDLH[c]:	10 mg/m³				
Nickel	AL[a]:		Lungs, paranasal, sinus, CNS	Headache; vertigo; nausea, vomiting, epigastric pain, substernal pain; cough, hyperpnea, cyanosis, weakness; leukocytosis pneumonitis; delirium, convulsions	0.8 Microm MCEF filter	Inhalation; ingestion; contact
	PEL[a]:	1 mg/m³				
	STEL[b]:					
	TLV[c]:	0.05 mg/m³				
	IDLH[c]:					
			Pesticides			
Aldrin	AL[a]:		Cancer, CNS, liver, kidneys, skin	Headache, dizziness; nausea, vomiting; malaise; myoclonic jerks of limbs, clonic, convulsions, coma; hematopoietic, azotemia	0.8 Microm MCEF filter	Inhalation; skin absorption; ingestion, contact
	PEL[a]:	0.25 mg/m³				
	STEL[b]:					
	TLV[c]:	0.25 mg/m³				
	IDLH[c]:	100 mg/m³				
Chlordane	AL[a]:	NA	CNS, eyes, liver, kidneys, skin, lungs	Blurred vision; confusion; anorexia; delirium; coughing; abdominal pain; nausea, vomiting, diarrhea	0.8 Microm MCEF filter and chromosorb 102	Inhalation; skin absorption; ingestion; contact
	PEL[a]:	0.5 mg/m³				
	STEL[b]:	2 mg/m³				
	TLV[c]:	0.5 mg/m³				
	IDLH[c]:					

Table 3-3 (cont.)
Chemical Hazard Information

Chemical	Exposure limits[a]		Harmful effects	*Symptoms*	Method of analysis	Routes of Exposure
4,4-DDD	AL[a]:		*Experimental carcinogen and* neoplastigen, poison by ingestion	Blurred vision; confusion; ataxia, delirium; coughing; abdominal pain; nausea, vomiting, diarrhea	0.8 Microm MCEF filter and chromosorb 102	Inhalation; skin absorption; ingestion; contact
	PEL[a]:	1 mg/m³				
	STEL[b]:					
	TLV[c]:	1 mg/m³				
	IDLH[c]:					
4,4-DDE	AL[a]:		Experimental carcinogen and neoplastigen, poison by ingestion	Blurred vision; confusion; ataxia; delirium; coughing; abdominal pain; nausea, vomiting, diarrhea	0.8 microm filter and chromosorb 102	Inhalation; skin *absorption;* ingestion; contact
	PEL[a]:	1 mg/m³				
	STEL[b]:					
	TLV[c]:	1 mg/m³				
	IDLH[c]:					
4,4-DDT	AL[a]:		CNS, kidneys, liver, skin, PNS	Paresthesia of the tongue, lip, *face; tremors; apprehension,* dizziness, confusion, malaise, headaches, fatigue; *confusion;* vomiting; irritated eyes, skin	0.8 microm MCEF filter	Inhalation; skin absorption; ingestión; contact
	PEL[a]:	1 mg/m³				
	STEL[b]:					
	TLV[c]:	1 mg/m³				
	IDLH[c]:					
Dieldrin	AL[a]:		CNS, liver, kidneys, skin	Headache, dizziness; nausea, vomiting; malaise; sweating; jerky limbs; convulsions	0.8 Microm MCEF filter and ISO octane	Inhalation; skin absorption; ingestion; contact
	PEL[a]:	0.25 mg/m³				
	STEL[b]:					
	TLV[c]:	0.25 mg/m³				
	IDLH[c]:	450 mg/m³				
Lindane	AL[a]:		Eyes, CNS, blood, liver, kidneys, skin	Nose, throat and eyes irritation; headache; nausea, convulsions; respiratory difficulties, cyanosis, aplastic anemia, skin irritation, muscle spasm; liver and kidney damage	0.8 Microm filter and chromosorb 102	*Inhalation; skin* absorption; ingestion; contact
	PEL[a]:	0.5 mg/m³				
	STEL[b]:					
	TLV[c]:	0.5 mg/m³				
	IDLH[c]:	1000 mg/m³				

Table 3-3 (cont.)
Chemical Hazard Information

Chemical	Exposure limits[a]		Harmful effects	Symptoms	Method of analysis	Routes of Exposure
			PCBs			
Aroclor-1260	AL[a]:		Skin, eyes, liver	Irritated eyes, skin, acne, formation dermatitis; liver damage	13 mm glass fiber filter and florisil	Inhalation; skin absorption; ingestion; contact
	PEL[a]:	0.5 mg/m³				
	STEL[b]:	NA				
	TLV[c]:					
	IDLH[c]:	NA				

Sources:
[a]Action limits (AL), permissible exposure limits (PEL), 29 CFR 1910, Subpart Z, Toxic and Hazardous Substances
[b]Short-term exposure limits (STEL), immediate dangerous to life and health (IDLH), harmful effects, symptoms, method of analysis, and routes of exposure, National Institute for Occupational Safety and Health (NIOSH) *Pocket Guide to Chemical Hazards*
[c]Threshold limit values (TLV), American Conference of Governmental Industrial Hygienists (ACGIH)

Evaluation of physical hazards will be predominantly accomplished through direct observations by the Site Safety Officer and other field team personnel. The exposure limits, recognition qualities, acute and chronic effects, and first aid treatments are presented in Tables 3-2 and 3-3.

Upon arrival at the base, the B&RE FOL/SSO will notify the Base Fire Protection Department, Base Security Personnel, and Emergency Services of the activities to be undertaken and where.

All personnel will be required to follow base emergency procedures and will rely on base services to handle emergency calls, when needed.

3.4 PHYSICAL HAZARDS

Physical hazards which could be involved in the execution of this scope of work include, but are not limited to, the following items:

- Uneven or unstable terrain (slip/trip hazards)
- Strain/muscle pulls from manual lifting
- Water hazards
- Natural hazards (snakes, mosquitoes, poisonous plants, etc.)
- Inclement weather
- Heat stress
- Heavy machinery operation
- Pinch/compression points
- Noise in excess of 85 dBA
- Contact with unexploded ordnance (UXO)

Control efforts for these potential hazards will encompass and possibly combine use of proper equipment maintenance, guarding, and operation. Additionally, adherence to proper standard work practices (Section 9.0) and standard operating procedures (located in the Supplemental RFI/RI Work Plan) will aid in the elimination of these hazards. Each of the above-mentioned items is further detailed below. A Task-Specific Hazard Assessment Summary is provided in Table 3-4.

3.4.1 Uneven/Unstable Terrain

Planned activities described in the scope of work will bring field personnel into areas where this potential hazard exists (e.g., ditches and water body banks).

It has been determined that this hazard may exist in various locations, so it will be the FOL's responsibility [in accordance with Standard Operating Procedures (SOPs) and Safe Work Practices] to inspect, document, and put in place control measures prior to placing equipment or personnel at risk.

TABLE 3-4
TASK-SPECIFIC HAZARD ASSESSMENT SUMMARY

Task	Hazards	Protective Equipment
Monitoring well installation Soil boring installation	Exposure to contaminants	Proper use of PPE (Section 5.0) Adherence to decontamination procedures (Section 6.0) Good personal hygiene practices Proper use of air monitoring instruments (Section 4.0)
	Contact with moving machinery	Proper machine guarding (Section 3.4) Use of qualified operators Adherence to standard operating procedures (Section 9.0) Implementation of site controls (Section 13.0)
	Contact with energized sources	Adherence to standard operating procedures (Section 9.0)
	Heat stress Inclement weather	See Section 3.4
	Other physical hazards	See Section 3.4
Multi-media sampling soil sediment surface water groundwater	Exposure to contaminants	Proper use of PPE (Section 5.0) Adherence to decontamination procedures (Section 6.0) Good personal hygiene practices Proper use of air monitoring instruments (Section 4.0)
	Heat stress Inclement weather	See Section 3.4
	Other physical hazards	See Section 3.4
Biota sampling	Water hazards	Use of USCG-approved personal flotation devices (Section 3.4) Proper use of PPE (Section 5.0) Adherence to standard operating procedures (Section 9.0)
	Natural hazards	Adherence to standard operating procedures (Section 9.0) Site-specific training on identification and avoidance of natural hazards (Section 3.4)
	Exposure to contaminants	Proper use of PPE (Section 5.0) Adherence to decontamination procedures (Section 6.0) Good personal hygiene practices Proper use of air monitoring instruments (Section 4.0)
	Heat stress Inclement weather	See Section 3.4
	Other physical hazards	See Section 3.4

3.4.2 Strain/Muscle Pulls

Strain/muscle pulls may result from improper lifting techniques during mobilization, sampling, or demobilization. Proper lifting techniques or help should be used in activities involving manual material handling, such as placement, positioning, packing, or unpacking of heavy equipment. This information will be covered as part of the Site-Specific Training.

3.4.3 Water Hazards

As proposed in the scope of work, activities will take place over water out of boating vessels and near the water's edge. To avoid potential hazards associated with working on or over water (drowning) the field team shall employ U.S. Coast Guard-approved personal flotation devices when working over water or within 4 feet of the water's edge. Depending on conditions (depth and current), and at the discretion of the FOL, lifelines and lifeline attendants, or safety harnesses may be used. Due to the obvious hazards associated with working on or near water's edge during inclement weather, all field activities may be temporarily suspended or terminated at the discretion and direction of the FOL or Site Safety Officer representative.

3.4.4 Natural Hazards (snakes and other indigenous creatures)

Natural hazards such as poisonous plants and bites from poisonous or disease-carrying animals or insects (e.g., poisonwood, manchineel, snakes, mosquitoes) cannot be avoided in this type of environment. However, in an effort to offset the impact of this hazard, field personnel will have access to commercially available snake bite kits and insect repellents. Nesting areas in and about sampling points shall be avoided and another point selected within the same vicinity.

3.4.5 Inclement Weather

Because all work will be conducted outdoors, inclement weather may be encountered. Conditions may vary, so it will be at the discretion and direction of the FOL and the SSO to temporarily suspend or terminate activities as conditions dictate. All activities will be terminated in the advent of electrical storms. All activities in areas with possible UXO will cease in the event of thunderstorms. Personnel within these areas are required to leave the area immediately.

3.4.6 Heat Stress

This scope of work will require personnel to employ personal protective equipment (PPE) as a means of protection from both chemical and physical hazards; therefore, the potential for heat-related disorders during the proposed field dates is significant. To combat this problem, the FOL and the SSO shall initiate heat stress monitoring and effect the appropriate control measures. American Conference of Governmental Industrial Hygienists (ACGIH)-recommended control measures for this hazard are included in Appendix A.

3.4.7 Heavy Machinery

The performance of soil borings will be accomplished through drilling operations which will require the use of a drill rig. The most predominant physical hazard associated with this type of work is entanglement of safety equipment or clothing into the rotating augers. A thorough inspection of all equipment will be performed to remove potential snag points and to ensure emergency stop devices operate properly and all members of the field team know the location and operation of these devices. Persons working in close proximity of the drill rig will be required to secure all loose clothing or protective equipment to avoid possible entanglement. The use of a long-handled shovel or the equivalent will be used to remove drill cuttings away from the hole and from rotating tools. In addition, pins that protrude from augers shall not be allowed.

All mechanized equipment brought onsite to complete this scope of work will be inspected initially prior to the commencement of all onsite activities and then periodically thereafter. These inspections will be performed by the SSO or designee and will ensure the following:

- All safety guards are in place.
- All safety-restraints (i.e., seatbelts) are in place and functioning properly as required by Federal regulations.
- All mobile equipment is equipped with a backup alarm and emergency stop device.
- All operators are qualified to do so. All drivers will be required to have their Commercial Drivers License.
- Traffic Control Measure Routes and regulations will be established and adherence required.
- All maintenance performed on the equipment will employ manufacturers recommended parts, and be inspected prior to returning to services by SSO or designee.

In addition to the requirements established by this HASP, all heavy equipment, and/or the movement of such equipment, may also be bound to meet local or site specific regulations.

3.4.8 Pinch/Compression Points

Pinch and compression points of drilling or sampling equipment may result in injury. All equipment must be maintained in proper working order, with machine guarding devices in place. Any equipment found to be lacking in these areas shall be removed from service.

3.4.9 Noise in Excess of 85 dBA

Noise exposures exceeding the OSHA Permissible Exposure Limit could be encountered during certain phases of the drilling operation or other activities in proximity to military planes. Personnel who are repeatedly overexposed could experience a permanent reduction in their ability to hear normal conversation. Appropriate hearing protectors will be worn when in proximity to drilling operations or the runway, as determined by the SSO. It shall also be the responsibility of the SSO to ensure the application, use, and maintenance of occupational hearing protection, and protective measures shall be determined and proceed in accordance with 29 CFR 1910.95.

3.5 UNEXPLODED ORDNANCE (UXO)

In the event ordnance and explosive waste are encountered, they will be dealt with in strict accordance with Navy RAC SOP 2.1.17E (Ordnance and Explosive Waste). B&RE personnel will stop work and evacuate the affected area until the Navy ordnance personnel deem the area safe for work to continue.

4.0 AIR MONITORING

4.1 MONITORING REQUIREMENTS

Air monitoring will be conducted for hazards presented in Table 4-1. The types of monitoring instruments specified by the hazard and the action levels to upgrade personnel protection are shown in Table 4-2. All monitoring equipment shall be maintained following procedures outlined in the B&RE Standard Operating Manual for Monitoring Equipment.

4.2 MONITORING SCHEDULE

4.2.1 Instrument Calibration

All applicable instruments shall be calibrated daily before and after use. Readings shall be recorded on the Equipment Calibration Log or the Daily Instrument Calibration Checksheet (provided as Figure 4-1) and the Health and Safety Logbook.

4.2.2 Air Monitoring Frequency

All site readings (including indications of no positive readings) must be noted in the Health and Safety Logbook along with the date, time, location and influencing factors (e.g. weather conditions, wind direction and speed, humidity).

TABLE 4-1
INSTRUMENT MONITORING TYPE AND FREQUENCY

Task(s)	Atmospheric Hazard(s)	Monitoring Type & Frequency
Installation of soil borings and monitoring well	Flammable/Explosive Toxic Particulates	**FID (Sensydine) or PID (HNu with 11.7 ev lamp)**- potential sources continuously Breathing zone based on positive results at potential source areas. **Visual Observation** - for dusty conditions since contaminants may be present in particulate form or bound to particulates.
Sampling Surface water Groundwater Subsurface soil Surface soil Sediment	This is a task driven specification. Each SWMU has varying potentials for exposure. However, all sites may contain the following atmospheric hazards: Flammable/Explosive Toxic Particulates	**FID (Sensydine) or PID (HNu with 11.7 ev lamp)** - during initial opening of the well casing or area of surface water, then periodically if conditions dictate. Specifically, the PID will be used at SWMU 9 for field screening of chlorinated solvents in the five subsurface soil borings.

TABLE 4-2
HAZARD MONITORING METHODS, ACTION LEVELS, AND PROTECTIVE MEASURES

Hazard	Monitoring Method	Action Level	Monitoring Schedule	Protective Measures
Organic vapors	PID or FID	Background readings in the breathing zone.	Initial/Periodically	Level D
		Readings greater than 5 ppm above background (in workers breathing zone) will require workers to discontinue site operations and to evacuate to an unaffected area until further determinations as to the source of the readings are established.	Initial/Periodically	Level C

Figure 4-1

DAILY INSTRUMENT CALIBRATION CHECKSHEET

SITE NAME: _____ PROJECT NO. _____

Date of Calibration	Instrument Name and Model	NUS Instrument I.D. Number	Person Performing Calibration	Instrument Settings		Instrument Readings		Calibration Standard (Lot No.)	Remarks/ Comments
				Pre-Calibration	Post-Calibration	Pre-Calibration	Post-Calibration		

It should be noted that some of the contaminants of concern will not be able to be detected with the provided instruments. Additionally, many of these contaminants may be in the form of particulates or bound to particulates. As a result, any observations of airborne particulates (dusts) will require that control measures such as area wetting be employed. If these measures are not feasible or are not adequate in controlling the generation of dusts, appropriate respiratory protection will be required.

Table 4-2 will be followed for air monitoring activities as specified for each activity.

4.3 INSTRUMENT USE

The photoionization detector (PID) and flame ionization detector (FID) will be used primarily as screening tools during sampling. Selection is based on chemicals readily released into the environment. The PID will be used at SWMU 9 for screening of chlorinated solvents at the five subsurface soil borings.

4.4 LEVELS OF PROTECTION

A minimum of Level D protection is needed to perform work onsite; Level C may be required, as described in Tables 4-2 and 4-3, and will be available onsite (as necessary).

4.5 RESPIRATORY PROTECTION

Based on the low concentrations anticipated to be encountered (based on previous sample results), and the dispersion of potential vapors via natural ventilation (i.e., wind currents), vapor concentrations in worker breathing zones are not anticipated to be at levels which would warrant respiratory protection. However, air purifying respirators will be available at the site in the event that established action levels are exceeded. It should be noted, some of the contaminants of concern (vinyl chloride, 1,1-dichloroethane, and 1,2-dichloroethane) are either regulated by OSHA or exhibit poor or questionable warning properties (low odor thresholds, perceived at concentrations higher than established exposure limits) and as such usually require that supplied air respiratory protection be utilized for adequate protection. However, given the low concentrations (parts per billion range) and low frequency of detection, volatile concentrations in workers breathing zones are not anticipated to be encountered and as a result the use of air purifying respirators shall be adequate in the event that established action levels are exceeded. Consideration regarding the contaminants of concern has been given in the establishment of the assigned action levels provided in Table 4-2.

If air purifying respirators are required, full-face respirators equipped with combination high efficiency particulate cartridges and organic vapor cartridges will be used.

TABLE 4-3
PROTECTIVE EQUIPMENT FOR ONSITE ACTIVITIES

Activity	Level	Protective Equipment
Soil, Sediment, Groundwater, or Surface Water Sampling, Installation of Monitoring Wells, and Other Ecological Assessment Activities	D	• Coveralls/work clothes[1] • Hard hat[2] • Safety boots • Safety glasses/goggles • Outer nitrile or butyl rubber gloves
	C	• Chemical-resistant (Tyvek) clothing • Outer nitrile or butyl rubber and inner (chemical-resistant) gloves • Safety boots, with nitrile or butyl rubber outer boots (or rubber steel-toed boots) • Full-face respirator with cartridges designated in Section 4.5[3] • Hard hat

[1] Personnel may substitute chemical resistant (Tyvek) clothing for coveralls/ work clothes if desired.

[2] When overhaed hazards are present or when working around machinery such as drill rigs.

[3] If dusty or dry conditions exist during onsite activities and there is the potential for inhalation of contaminated dusts, use a full-face respirator with high-efficiency dust and mist cartridges. The area should be hosed down to minimize the potential for inhalation of contaminated dust.

All activities will be initiated at Level D. The need for higher levels of protection (i.e., Level C) will be determined for each site utilizing the action levels specified in Table 4-2. All ambient air measurements taken to evaluate personnel exposure must be taken within the individual's breathing zone and be fairly constant for a duration of at least 30 seconds.

Respirators belong to, and are only used and maintained by, the individual to whom they have been issued. All personnel working onsite must be trained, fit-tested, and declared medically fit to wear respiratory equipment prior to participating in field activities. Respirators shall be cleaned, sanitized, and properly stored by the user after each day's usage.

5.0 PERSONAL PROTECTIVE EQUIPMENT

Personal Protective Equipment (PPE) anticipated for use has been summarized in Table 4-3. PPE will be provided by B&RE and its subcontractors.

5.1 PPE SELECTION CRITERIA/LIMITATIONS

- Safety glasses, steel-toe steel-shank boots, and hardhats will be worn as minimum requirements to protect personnel from the physical hazards which may exist onsite. Nitrile outer and butyl inner gloves will be worn as a precaution against direct skin contact with site contaminants. Tyvek coveralls will be worn for tasks that involve a potential for contamination only by dust or dirt. Rubber boots or chemical-resistant boot covers should be worn to prevent contamination and saturation of work boots. One-piece rubber boots equipped with integral steel-toe protection may be used as an option to the steel-toe work boot/boot cover requirement.

- Respiratory protection will be worn in accordance with the action levels set forth in this Health and Safety Plan.

- Hip or chest waders may be required if sampling in especially muddy areas or minimum-depth water is necessary. In such instances, U.S. Coast Guard approved personal flotation devices shall be used, and lifelines, and lifeline attendants may be used at the discretion of the FOL, based on depth of water and current.

- Hearing protection will be provided to personnel in areas (or during tasks identified) as high-noise-potential areas.

5.2 ACTION LEVELS FOR IMPLEMENTATION AND MODIFICATION OF PPE

This document is written for conditions of normal use and foreseeable emergencies dictated by site conditions and activity. However, action levels for modifications have been established to maintain the performance-oriented approach of this document. Tables 4-2 and 4-3 illustrate the basis for changes to levels of protection based on data obtained from monitoring during the planned activities.

5.3 PPE INSPECTION

As part of donning, all personnel will be responsible for performing inspections on their items of PPE. These activities will include glove leak tests and close visual inspection of all coverall seams. Proper PPE inspection techniques will be required as part of initial site-specific safety training.

5.4 PPE TRAINING

Site-specific training will include information concerning use, proper fit, donning, doffing, and the limitations of the protective garments. In addition, as part of physical hazards, the temperature extremes associated with PPE will be discussed.

6.0 DECONTAMINATION

This section describes the steps site personnel must follow to prevent site contaminants from spreading and thus affecting unprotected, unsuspecting site personnel or the public. It includes requirements for personnel and sampling equipment.

6.1 STANDARD PROCEDURES

Minimal procedures for decontamination can be established when Level D protection is utilized, when the type and degree of contamination are known, or when the potential for transfer is judged to be minimal by the SSO. These procedures generally may involve one or two washdowns only, and/or progressive removal (and disposal, as appropriate) of items of PPE.

6.2 EMERGENCY DECONTAMINATION PROCEDURES

Any person who becomes ill or is injured must be decontaminated to the maximum extent possible. If the injury or illness is minor, full decontamination should be completed. If the victim's condition is serious, a partial decontamination should be performed if it does not place the injured person at greater risk (i.e., complete disrobing of the victim and redressing in clean coveralls or wrapping in a blanket). In the event of a catastrophic incident (explosion or large release) personnel shall evacuate to a safe location without performing any decontamination

efforts, unless it can be determined that doing so would further jeopardize the welfare of an individual.

6.3 CLOSURE OF THE PERSONNEL DECONTAMINATION STATION

All disposable PPE, clothing, and plastic sheeting used during the operation will be washed via regular decontamination procedures and contained onsite in a dumpster to await disposal. Decontamination-generated wastes will also be contained onsite for ultimate disposal by B&RE. Reusable rubber clothing will be dried and prepared for future use. (If gross contamination has occurred, discard the item.) Cloth items will be bagged and removed from the site for final cleaning. All wash tubs, pail containers, etc., will be thoroughly washed, rinsed, and dried prior to removal from the site. The SSO will be responsible for inspecting and clearing equipment to proceed to the next location and to leave the site.

6.4 DECONTAMINATION EVALUATION

Visual observation of stains or sheens on equipment or a cursory scan of the equipment with monitoring instruments will be done periodically to determine adequacy of decontamination.

7.0 TRAINING REQUIREMENTS

This section describes the minimum requirements for initial, refresher, and site-specific training. All training requirements will comply with OSHA Standard 29 CFR 1910.120.

7.1 INTRODUCTORY AND REFRESHER TRAINING

7.1.1 Requirements for B&RE Personnel

All B&RE personnel must complete 40 hours of introductory hazardous waste site training prior to performing work at NAS Key West. Additionally, B&RE personnel who have had introductory training more than 12 months prior to site work must have completed 8 hours of refresher training within the past 12 months before being cleared for site work. Additionally, 8-hour Supervisory Training will be required for site supervisory personnel. All personnel who have had 40 hours of introductory hazardous waste site training will be required to have 3 days of onsite supervision by an experienced supervisor unless documented field experience demonstrates the equivalent.

Documentation of B&RE Health and Safety Training will be maintained at the project site. Copies of certificates or other official documentation will be used to fulfill this requirement.

7.1.2 Requirements for Subcontractors

All B&RE subcontractor personnel must have completed introductory hazardous waste site training or equivalent work experience as defined in OSHA Standard 29 CFR 1910.120(e) and 8 hours of refresher training meeting the requirements of 29 CFR 1910.120(e)(8) prior to performing fieldwork at NAS Key West. All personnel who have had 40 hours of introductory hazardous waste site training will be required to have 3 days of onsite supervision by an experienced supervisor unless documented field experience demonstrates the equivalent. B&RE subcontractors must certify that each employee has had such training by sending B&RE a letter, on company letterhead, containing the information in the example letter provided as Figure 7-1. Figures 7-1 and 8-2 can be combined into one letter. Copies of training certificates for all site personnel must accompany the letter and must be submitted prior to the initiation of site mobilization activities.

7.2 SITE-SPECIFIC TRAINING

B&RE will provide site-specific training in accordance with OSHA regulations specified in 29 CFR 1910.120 to all B&RE employees and subcontractor personnel who will perform work on this project. Site-specific training will include:

- Names of personnel and alternates responsible for site safety and health
- Safety, health and other hazards present onsite
- Use of PPE
- Work practices to minimize risks from hazards
- Safe use of engineering controls and equipment
- Medical surveillance requirements
- Signs and symptoms of overexposure
- The contents of the HASP
- Emergency response procedures (evacuation and assembly points)
- Review the contents of relevant Material Safety Data Sheets

7.2.1 Site-Specific Training Documentation

B&RE and subcontractor personnel will be required to sign a statement indicating receipt of site-specific training and understanding of site hazards and control measures. Figure 7-2 will be used to document site-specific training.

FIGURE 7-1

OSHA TRAINING CERTIFICATION

The following statements must be typed on company letterhead and signed by an officer of the company:

LOGO
XYZ CORPORATION
555 E. 5th Street
Nowheresville, Kansas 55555

Month, day, year

Mr. Kevin Walter
Project Manager
Brown & Root Environmental
900 Trail Ridge Road
Aiken, South Carolina 29803

Subject: Hazardous Waste Site Training - NAS Key West

Dear Mr. Walter,

The employees listed below have had introductory hazardous waste site training or equivalent work experience as required by 29 CFR 1910.120(e). In addition, those employees listed below who have received their introductory training more than 12 months ago have also received 8 hours of refresher training in accordance with 29 CFR 1910.120 (e)(8) within the past 12 months.

LIST FULL NAMES OF EMPLOYEES AND THEIR SOCIAL SECURITY NUMBERS HERE

Should you have any questions, please contact me at (555) 555-5555.

Sincerely,

(Name of Company Officer)

Enclosure (Training Certificate)

FIGURE 7-2

SITE-SPECIFIC TRAINING DOCUMENTATION

My signature below indicates that I am aware of the potential hazardous nature of performing investigation activities at NAS Key West, and that I have received site-specific training which included the elements presented below:

- Names of personnel and alternates responsible for site safety and health
- Safety, health and other hazards present on-site
- Use of personal protective equipment
- Work practices to minimize risks from hazards
- Safe use of engineering controls and equipment
- Medical surveillance requirements
- Signs and symptoms of overexposure
- The contents of the health and safety plan
- Emergency response procedures (evacuation and assembly points)
- Review contents of relevant Material Safety Data Sheets

I further state that I have been given the opportunity to ask questions and that all of my questions have been answered to my satisfaction.

Name	Signature	Date

8.0 MEDICAL SURVEILLANCE

8.1 REQUIREMENTS FOR B&RE PERSONNEL

All B&RE personnel participating in project field activities will have had a physical examination meeting the requirements of the B&RE medical surveillance program and will be medically qualified to perform hazardous waste site work using respiratory protection. The B&RE medical surveillance program meets the requirements of 29 CFR 1910.120(f).

Documentation for medical clearances will be maintained onsite.

8.2 REQUIREMENTS FOR SUBCONTRACTORS

Subcontractors are required to obtain a certificate of their ability to perform hazardous waste site work and to wear respiratory protection. The "Subcontractor Medical Approval Form" (Figure 8-1) can be used to satisfy this requirement provided it is properly completed and signed by a licensed physician.

Subcontractors who have a company medical surveillance program meeting the requirements of paragraph (f) of OSHA 29 CFR 1910.120 can substitute Figure 8-1 with a letter, on company letterhead, containing all the information in the example letter presented as Figure 8-2. Figures 7-1 and 8-2 can be combined into one letter.

8.3 REQUIREMENTS FOR ALL FIELD PERSONNEL

Each field team member (including subcontractors) shall be required to complete and submit a copy of the Medical Data Sheet (see Appendix B). This shall be provided to the SSO prior to participating in site activities.

FIGURE 8-1

SUBCONTRACTOR MEDICAL APPROVAL FORM

For employees of _____
Company Name

Participant Name: _____ Date of Exam: _____

Part A

The above-named individual has:

1. Undergone a physical examination in accordance with OSHA Standard 29 CFR 1910.120, paragraph (f) and found to be medically -

   ( ) qualified to perform work at the NAS Key West work site
   ( ) not qualified to perform work at the NAS Key West work site

and,

2. Undergone a physical examination as per OSHA 29 CFR 1910.134(b)(10) and found to be medically -

   ( ) qualified to wear respiratory protection
   ( ) not qualified to wear respiratory protection

My evaluation has been based on the following information, as provided to me by the employer.

( ) A copy of OSHA Standard 29 CFR 1910.120 and appendices.
( ) A description of the employee's duties as they relate to the employee's exposures.
( ) A list of known/suspected contaminants and their concentrations (if known).
( ) A description of any personal protective equipment used or to be used.
( ) Information from previous medical examinations of the employee which is not readily available to the examining physician.

Part B

I, _____, have examined _____
Physician's Name (print) Participant's Name (print)

and have determined the following information:

FIGURE 8-1
SUBCONTRACTOR MEDICAL APPROVAL FORM
PAGE TWO

1. Results of the medical examination and tests (excluding finding or diagnoses unrelated to occupational exposure):

_____

_____

_____

2. Any detected medical conditions which would place the employee at increased risk of material impairment of the employee's health:

_____

_____

_____

3. Recommended limitations upon the employee's assigned work:

_____

_____

_____

I have informed this participant of the results of this medical examination and any medical conditions which require further examination or treatment.

Based on the information provided to me, and in view of the activities and hazard potentials involved at the NAS Key West work site, this participant

( ) may
( ) may not

perform his/her assigned task.

Physician's Signature _____

Address _____

Phone Number _____

NOTE: Copies of test results are maintained and available at:

_____

Address

FIGURE 8-2

MEDICAL SURVEILLANCE LETTER

The following statements must be typed on company letterhead and signed by an officer of the company:

LOGO
XYZ CORPORATION
555 E. 5th Street
Nowheresville, Kansas 55555

Month, day, year

Mr. Kevin Walter
Project Manager
Halliburton NUS
900 Trail Ridge Road
Aiken, South Carolina 29803

Subject: Medical Surveillance - NAS Key West, Florida

Dear Mr. Walter,

As an officer of XYZ Corporation, I hereby state that the persons listed below participate in a medical surveillance program meeting the requirements contained in paragraph (f) of Title 29 of the Code of Federal Regulations (CFR), Part 1910.120 entitled "Hazardous Waste Operations and Emergency Response." I further state that the persons listed below have had physical examinations under this program within the past 12 months and that they have been cleared, by a licensed physician, to perform hazardous waste site work and to wear positive and negative pressure respiratory protection. I also state that, to my knowledge, no person listed below has any medical restriction that would preclude him/her from working at NAS Key West.

LIST FULL NAMES OF EMPLOYEES AND THEIR SOCIAL SECURITY NUMBERS HERE

Should you have any questions, please contact me at (555) 555-5555.

Sincerely,

(Name of Company Officer)

9.0 STANDARD WORK PRACTICES

The following Standard Work Practices are to be applied in addition to the Health and Safety SOPs:

- Eating, drinking, chewing gum or tobacco, taking medication, and smoking are prohibited in the exclusion or decontamination zones, or any location where there is a possibility for contact with site contaminants.

- Upon leaving the exclusion zone, hands and face must be thoroughly washed with soap and potable water. Any protective outer clothing is to be decontaminated and removed as specified in this HASP, and left at a designated area prior to entering the clean area.

- Contact with potentially contaminated substances must be avoided. Contact with the ground or with contaminated equipment must also be avoided.

- No facial hair, which interferes with a satisfactory fit of the mask-to-face seal, is permitted on personnel required to wear respiratory protective equipment.

- All personnel must satisfy all training requirements (40-hour, 8-hour refresher, site specific training) prior to commencing site activities.

- All personnel must have a working knowledge of this HASP, including being aware of the action levels for upgrading/downgrading levels of protective equipment, and emergency procedures.

- All personnel must satisfy medical monitoring procedures.

- All personnel must complete a medical data sheet, to be maintained onsite (see Appendix B).

- All personnel working in sight restriction areas of heavy vegetation or where the topography does not permit line-of-sight contact must utilize the buddy system.

- When lifting or moving equipment or material, use proper lifting techniques.

- All work areas must be kept free of ground clutter.

- No flames or open fires will be permitted onsite. No matches or lighters (sparking devices) are permitted onsite. Hot work permits must be obtained from the base fire department for all planned hot work activity.
- Site personnel must immediately notify B&RE Health Sciences of all incidents for OSHA recordkeeping purposes.

- If personnel note any warning properties of chemicals (irritation, odors, symptoms, etc.) or even remotely suspect the occurrence of exposure, they must immediately notify the SSO for further direction.

- Site personnel are not to undertake any activity which would be considered a confined-space entry without first being trained in the proper procedures by the SSO and obtaining a Confined Space/Limited Egress Permit from the B&RE Health and Safety Manager or his designee.

- A full-sized copy of the OSHA poster included as Appendix C of this HASP shall be conspicuously posted onsite.

- Any new information must be promptly conveyed to the Project SSO and the FOL.

- All compressed gas cylinders used (empty or full) must be stored, secured, and used properly to protect from damage.

- Material Safety Data Sheets for all chemical substances brought onsite will be collected and maintained at the Command Post (the site trailer). These documents will be reviewed with the users of the substances prior to any usage or handling.

The following drilling related Health and Safety SOPs are also to be applied:

- No drilling or any other operation which will bring a drill mast or any other projecting device within 20 feet in any direction of overhead power lines will be permitted. Prior to any subsurface investigations by the FOL shall ensure, the locations of all underground utilities will be identified and marked prior to initiating any subsurface activity.

- Hand signals with the driller will be established prior to the commencement of drilling activities.

- All drill rigs and other machinery with exposed moving parts must be equipped with an operational emergency stop device. All personnel working in a close proximity must be aware of the location of this emergency stop device and its operation. This device will be tested initially (and then periodically) to insure its operational status. The driller and the helper shall not simultaneously handle moving augers or flights unless there is a standby person able to activate the emergency stop device.

- The driller must never leave the controls while tools are rotating unless all personnel are clear of the rotating equipment.

- A long handled shovel or the equivalent shall be used to clear away drill cuttings from the hole and rotating equipment. Hands or feet shall **not** be used for this purpose.

- A remote sampling device must be used to sample drill cuttings near rotating tools. The driller shall shut down operations if the sampler must go near the tools to obtain samples.

- All personnel working in the vicinity of the drill rig while its operating shall secure all loose clothing.

- Only manufacturer-approved equipment may be used in conjunction with site equipment (i.e. pins for auger flights etc.). Pins or other protruding items from rotating equipment shall not be permitted.

- No person shall climb a drill mast while equipment is rotating.

- No person shall climb a drill mast without use of ANSI approved fall protection (i.e., belts, lanyards and a fall protection slide rail) or portable ladders which meet OSHA's requirements.

10.0 EMERGENCY RESPONSE

In the event of an emergency, all site personnel will be evacuated to a predetermined location away from the work place. Emergency Response Planning will follow in accordance with 29 CFR 1910.38(a). B&RE shall coordinate site activities with Base Fire Protection and Emergency Services in order to avoid potential emergencies. B&RE shall utilize Base Fire Protection and

Emergency Services as a first response to any emergency. For Police services, B&RE shall call Base Security first. If outside Police are required, Base Security will call off-base Police and escort them on-base. Table 10-1 provides emergency telephone numbers for NAS Key West and depicts emergency response routes to the hospital. A map of emergency routes to the hospital is provided in Appendix D.

10.1 PRE-PLANNING

Upon initial arrival at the base, the B&RE FOL/SSO will contact the Base Fire Protection Department and Emergency Services and Base Security Personnel to notify coordinators of the activities to be undertaken and where. All site personnel will be required to follow base emergency procedures and will rely on base services to handle emergency situations if encountered. Medical service will be provided off-site by the Lower Florida Keys Health System on Stock Island.

Another task in Emergency Pre-Planning efforts will be to designate appropriate emergency escape routes and safe places of refuge for the site activity areas. These designations may change on a daily basis due to factors such as wind direction and the type and extent of emergency situation warranting the need for evacuation, among others. The FOL will identify any changes in escape routes and refuge points in the morning briefing.

10.2 EMERGENCY ESCAPE PROCEDURES AND ASSIGNMENTS

Upon notification of a site emergency requiring evacuation, all site personnel will proceed to predetermined locations based on emergency location and wind directions. Extent of decontamination procedures will be dependent upon extent of the emergency requiring evacuation. If personnel cannot reach those locations without endangering life or health, an alternate meeting place will be selected. Personnel should select locations which are <u>not</u> low-lying areas such as valleys or ditches, since many of the contaminants of concern have vapor densities greater than 1 (i.e., vapors will accumulate in low-lying areas). Personnel shall be trained to remain at the refuge location until directed to resume work or to leave the site.

10.3 PROCEDURE TO ACCOUNT FOR SITE PERSONNEL

The site work force will be small enough so that accounting for personnel will not be a problem. Accounting for personnel will be the FOL's responsibility. This will be accomplished by taking a roll call using the site logbook.

10.4 RESCUE AND MEDICAL DUTIES

A physician-approved first aid kit, ANSI-approved eye wash station, and a Class ABC fire extinguisher will be readily available on-site. Site personnel shall not be authorized to participate in emergency rescue operations.

TABLE 10-1

EMERGENCY INFORMATION

EMERGENCY SERVICES	
Base Officer of the Day (OOD)	(305) 293-2971
Base Police	(305) 293-2114
Base Fire Department	(305) 296-3333
Lower Florida Keys Health System (Hospital) 5900 College Road, Stock Island	(305) 294-5531
Base Ambulance Boca Chica	(305) 293-2337
Key West Police/ Rescue Service	(305) 293-2971
EMERGENCY CONTACTS	
CLEAN Health and Safety Officer (Matt Soltis)	1-800-245-2730 (412) 921-8912 (direct)
Project Manager (Kevin Walter)	1-800-368-5497 (direct) 1-800-564-8603 (pager) (803) 652-2357 (home)
Field Operations Manager (Scott Flickinger)	(305) 293-2194 (Public Works)
SouthDiv Remedial Project Manager (Dudley Patrick)	(803) 820-5541 (803) 881-0857 (home)
Navy ROIC (Mark Ewing)	(305) 293-2069
NAS Key West NAVOSH (Edward Donahue)	(305) 293-2314
Public Works Environmental Installation Restoration Coordinator (Phillip Williams)	(305) 293-2061
Environmental Branch Installation Restoration Coordinator (Helen Stanley)	(305) 293-2060

Directions to Hospital (Lower Florida Keys Health System):

From Boca Chica, exit NAS Key West and get on U.S. 1 South. Go west across the bridge; pass Texaco and turn right on Junior College Road. Golf course will be on left; and on right, you will see hospital sign. Follow road to Hospital which will be on the left. Hospital is located at 5900 College Road on Stock Island.

10.5 ACTIVATION OF EMERGENCY RESPONSE PROCEDURES

Should any emergency occur which requires the support of outside services, the FOL/SSO will make the appropriate contacts in the order provided below:

10.6 EMERGENCY RESPONSE NOTIFICATION

A list of these contacts is given in Table 10-1. Mobile phones will be available onsite to provide for timely communication between field team members.

Examples requiring outside services are as follows:

- Any field team member involved in an accident or experiencing signs and symptoms of exposure.
- A condition discovered which suggests the activity is more hazardous than anticipated.
- Emergency Services in nearby areas which directly impact operations.

Persons who observe an emergency situation must notify Base contacts, Base Services and Office Contacts once the situation is assessed as being out of local control. Telephone numbers are provided on Table 10-1.

10.7 INCIDENT FOLLOW-UP

On receiving a report of an incident (or near-incident), the FOL/SSO shall immediately investigate and make the appropriate recommendations to prevent recurrence. The CLEAN HSM (Matt Soltis, B&RE) shall immediately be notified by telephone. At his discretion he may wish to participate in the investigation. Details of the incident shall be documented on an Incident Report within 24 hours of its occurrence and distributed to the Project Manager and CLEAN HSM. Contractor shall fill out an Incident Report within 24 hours of occurrence, and submit it to the Base Environmental Office.

11.0 CONFINED SPACE

No Confined-Space Operations will be part of the NAS Key West Supplemental RFI/RI Fieldwork in the planned scope. Therefore, specific procedures for such efforts are not applicable and are not addressed. Should any confined-space situations arise, the site health and safety officer should be notified immediately before any action is taken.

12.0 SPILL CONTAINMENT AND CONTROL

Every member of the site team will be responsible to observe and report liquid chemical releases or conditions that could lead to releases.

If field operations onsite result in a release of liquid chemicals in the absence of vapor, field personnel will attempt to contain the liquid by means of berms constructed with available equipment. If the work team cannot achieve control of the spill, they will leave the area for the reassembly point quickly. The B&RE FOL/SSO will notify the base fire department (911). Due to the nature of planned activities, this is not considered a significant potential event. However, in the unlikely instance that it should occur, field personnel may effect defensive efforts such as these, providing that such a response does not appear to present a chemical overexposure or other personal health or safety concern.

13.0 SITE CONTROL

This section outlines the means by which B&RE will delineate work zones and use these work zones in conjunction with decontamination procedures to prevent the spread of contaminants into previously unaffected areas of the site. It is anticipated that a three-zone approach will be used during work at this site: exclusion zone, contamination reduction zone, and support zone.

13.1 EXCLUSION ZONE

The exclusion zone will be considered those areas of the site of known or suspected contamination. However, significant amounts of surface contamination may not be encountered in the proposed work areas of this site until/unless contaminants are brought to the surface by soil boring activities. Furthermore, once such activities have been completed and surface contamination has been removed, the potential for exposure is again diminished and the area can then be reclassified as part of the contamination reduction zone. Therefore, the exclusion zones for this project will be limited to those areas of the site where active work is being performed and/or anywhere there is believed to be the potential for inhalation and/or ingestion exposure to site contaminants.

13.2 CONTAMINATION REDUCTION ZONE

The contamination reduction zone (CRZ) will be a buffer area between the exclusion zone and any area of the site where contamination is not suspected. The personnel and equipment decontamination area established for this project will take place in the CRZ. This area will serve as a focal point in supporting exclusion zone activities. In addition, this area will serve as the access and control points to the exclusion zone.

13.3 SUPPORT ZONE

The support zone for this project will include a staging area where site vehicles will be parked, equipment will be unloaded, and where food and drink containers will be maintained. In all cases, the support zones will be established at areas of the site where exposure to site contaminants would not be expected during normal working conditions or foreseeable emergencies.

13.4 SITE MAP

Once the areas of contamination, access routes, topography, dispersion routes are determined, a site map will be generated and adjusted as site conditions change. These maps will be posted to illustrate up-to-date collection of contaminants and adjustment of zones and access points.

13.5 BUDDY SYSTEM

Personnel engaged in onsite activities will practice the "buddy system" to ensure the safety of all personnel involved in this operation.

13.6 MATERIALS SAFETY DATA SHEET (MSDS) REQUIREMENTS

B&RE personnel will provide MSDSs for all chemicals brought on site. The contents of these documents will be reviewed by the Health and Safety officer with the user(s) of the chemical substances prior to any actual use or application of the substances on site. The MSDSs will then be maintained in a central location (i.e., temporary office) and will be available for anyone to review upon request. The SSO will create and maintain n inventory of those substances and perform other functions necessary to comply with OSHA 1910.1200 Hazard Communication requirements.

13.7 COMMUNICATION

As personnel will not always be working in close proximity to one another during field activities, a supported means of communication may be necessary. For this purpose, two-way radio communication will be used. All means of communication will have the NAS Key West approval.

External communication will be done utilizing the telephones at predetermined and approved locations where work is being conducted. External communication will primarily be used for the purpose of resource and emergency resource communications. Prior to the commencement of site activities, the FTL and Base contact will determine and arrange for telephone communications.

13.8 SITE SECURITY AND VISITORS

Access to the exclusion zone (EZ) and the contamination reduction zone (CRZ) by any site visitors will be carefully controlled. While active work is on-going at each site, the EZ and the CRZ will be marked with traffic cones or flagging. All visitors must receive initial health and safety training from the Field Operations Leader, read and be familiar with this H&SP, and sign authorization that they have done so. This must be accomplished prior to visiting the EZ and CRZ of any site under active field work. All visitors must also show compliance with the training and medical monitoring requirements of OSHA 29CFR1910.120.

14.0 DOCUMENTATION AND EQUIPMENT

This section summarizes documentation and equipment required for the support of this HASP. Its purpose is a final checklist to help ensure that all the necessary resources are available to carry out the requirements of this HASP.

14.1 DOCUMENTATION

- Health and Safety Logbook
- HASP (Signed Copy)
- OSHA Poster 11 x 14
- MSDSs (if applicable)
- Medical Data Sheets
- Employee Training Certificates

14.1 DOCUMENTATION (continued)

- Medical Surveillance Documentation
- Incident Reports
- Respirator Fit Test Records
- Site-Specific Training Records

14.2 HEALTH AND SAFETY EQUIPMENT

- First Aid Kit (Physician-Approved)
- ANSI-Approved Eye Wash
- Class ABC Fire Extinguishers
- Nitrile Gloves
- Inner Gloves
- Tyvek
- Chemical Resistant Tyvek
- Barricade Tape
- Boot Covers
- Duct Tape
- Decon Kit (Alconox tube, brush, sorbants, step stool)
- Hard Hats, Safety Glasses
- Splash Shield
- Steel Toe/Shank Boots
- Air Purifying Respirator with cartridges
- FID
- PID
- Hearing Protection

APPENDIX A

HEAT STRESS

HEAT STRESS

Heat Stress

The SSO shall visually monitor personnel to note signs of heat stress. Field personnel will also be instructed to observe for symptoms of heat stress and methods on how to control it. One or more of the following control measures can be used to help control heat stress:

- Provide adequate liquids to replace lost body fluids. Personnel must replace water and salt lost from sweating. Personnel must be encouraged to drink more than the amount required to satisfy thirst. Thirst satisfaction is not an accurate indicator of adequate salt and fluid replacement.

- Replacement fluids can be commercial mixes such as Gatorade®.

- Establish a work regime that will provide adequate rest periods for cooling down. This may require additional shifts of workers.

- Cooling devices such as vortex tubes or cooling vests can be worn beneath protective garments.

- Breaks are to be taken in a cool rest area (77°F is best).

- Personnel shall remove impermeable protective garments during rest periods.

- Personnel shall not be assigned other tasks during rest periods.

- Personnel shall be informed of the importance of adequate rest, acclimation, and proper diet in the prevention of heat stress.

The heat stress of personnel onsite may be monitored utilizing biological monitoring or the Wet Bulb Globe Temperature Index (WBGT) technique when workers are not wearing protective coveralls (i.e., Tyvek®). This method will require the use of a heat stress monitoring device.

One of the following biological monitoring procedures shall be followed when the workplace temperature is 70°F or above.

- Heart rate (HR) shall be measured by the pulse for 30 seconds as early as possible in the resting period. The HR at the beginning of the rest period should not exceed 110 beats/minute. If the HR is higher, the next work period should be shortened by 10 minutes (or 33 percent), while the length of rest period stays the same. If the pulse rate is 100 beats/minute at the beginning of the next rest period, the following work cycle should be

shortened by 33 percent. The length of the initial work period will be determined by using the table below.

PERMISSIBLE HEAT EXPOSURE THRESHOLD LIMIT VALUES

	Work Load		
Work-Rest Regimen	Light	Moderate	Heavy
Continuous	80.0°F	80.0°F	77.0°F
75% Work - 25% Rest, Each Hour	87.0°F	82.4°F	78.6°F
50% Work - 50% Rest, Each Hour	88.5°F	85.0°F	82.2°F
25% Work - 75% Rest, Each Hour	90.0°F	88.0°F	86.0°F

- Body temperature shall be measured orally with a clinical thermometer as early as possible in the rest period. Oral temperature (OT) at the beginning of the rest period should not exceed 99°F. If it does, the next work period should be shortened by 10 minutes (or 33 percent), while the length of the rest period stays the same. However, if the oral temperature exceeds 99.7°F at the beginning of the next rest period, the following work cycle shall be further shortened by 33 percent. OT should be measured at the end of the rest period to make sure that it has dropped below 99°F. At no time shall work begin with the oral temperature above 99°F.

NOTE: External temperatures in excess of those stated above shall be regarded as inclement weather. Work continuation or termination, or alteration of the work schedule will be at the discretion of the FOL and onsite health and safety representative. The heat stress related sections of this are applicable to the season when work will be completed.

APPENDIX B

MEDICAL DATA SHEET

MEDICAL DATA SHEET

This form must be completed by all on-site Brown & Root Environmental personnel and subcontractors, prior to the commencement of activities and shall be kept in the site command post during site activities. This form must be delivered to any attending physician when medical assistance is needed.

Site _____

Name _____ Home Telephone _____

Date of most recent physical examination ___/___/___

Age _____ Height _____ Weight _____

Name of next of kin _____ Telephone_____

Drug allergies or other allergies _____

_____

Previous Illnesses or Exposures to Hazardous Substances:

_____

_____

Current Medication (prescription and non-prescription):

_____

_____

Medical Restrictions_____

_____

Name, address, and phone number of personal physician _____

_____

*Confirmed by Site HSO _____ ___/___/___
Signature of HSO Date

APPENDIX C

OSHA POSTER

JOB SAFETY & HEALTH PROTECTION

The Occupational Safety and Health Act of 1970 provides job safety and health protection for workers by promoting safe and healthful working conditions throughout the Nation. Requirements of the Act include the following:

Employers

All employers must furnish to employees employment and a place of employment free from recognized hazards that are causing or are likely to cause death or serious harm to employees. Employers must comply with occupational safety and health standards issued under the Act.

Employees

Employees must comply with all occupational safety and health standards, rules, regulations and orders issued under the Act that apply to their own actions and conduct on the job.

The Occupational Safety and Health Administration (OSHA) of the U.S. Department of Labor has the primary responsibility for administering the Act. OSHA issues occupational safety and health standards, and its Compliance Safety and Health Officers conduct jobsite inspections to help ensure compliance with the Act.

Inspection

The Act requires that a representative of the employer and a representative authorized by the employees be given an opportunity to accompany the OSHA inspector for the purpose of aiding the inspection.

Where there is no authorized employee representative, the OSHA Compliance Officer must consult with a reasonable number of employees concerning safety and health conditions in the workplace.

Complaint

Employees or their representatives have the right to file a complaint with the nearest OSHA office requesting an inspection if they believe unsafe or unhealthful conditions exist in their workplace. OSHA will withhold, on request, names of employees complaining.

The Act provides that employees may not be discharged or discriminated against in any way for filing safety and health complaints or for otherwise exercising their rights under the Act.

Employees who believe they have been discriminated against may file a complaint with their nearest OSHA office within 30 days of the alleged discrimination.

Citation

If upon inspection OSHA believes an employer has violated the Act, a citation alleging such violations will be issued to the employer. Each citation will specify a time period within which the alleged violation must be corrected.

The OSHA citation must be prominently displayed at or near the place of alleged violation for three days, or until it is corrected, whichever is later, to warn employees of dangers that may exist there.

Proposed Penalty

The Act provides for mandatory penalties against employers of up to $1,000 for each serious violation and for optional penalties of up to $1,000 for each nonserious violation. Penalties of up to $1,000 per day may be proposed for failure to correct violations within the proposed time period. Also, any employer who willfully or repeatedly violates the Act may be assessed penalties of up to $10,000 for each such violation.

Criminal penalties are also provided for in the Act. Any willful violation resulting in death of an employee, upon conviction, is punishable by a fine of not more than $10,000, or by imprisonment for not more than six months, or by both. Conviction of an employer after a first conviction doubles these maximum penalties.

Voluntary Activity

While providing penalties for violations, the Act also encourages efforts by labor and management, before an OSHA inspection, to reduce workplace hazards voluntarily and to develop and improve safety and health programs in all workplaces and industries. OSHA's Voluntary Protection Programs recognize outstanding efforts of this nature.

Such voluntary action should initially focus on the identification and elimination of hazards that could cause death, injury, or illness to employees and supervisors. There are many public and private organizations that can provide information and assistance in this effort, if requested. Also, your local OSHA office can provide considerable help and advice on solving safety and health problems or can refer you to other sources for help such as training.

Consultation

Free consultative assistance, without citation or penalty, is available to employers, on request, through OSHA supported programs in most State departments of labor or health.

More Information

Additional information and copies of the Act, specific OSHA safety and health standards, and other applicable regulations may be obtained from your employer or from the nearest OSHA Regional Office in the following locations:

Atlanta, Georgia
Boston, Massachusetts
Chicago, Illinois
Dallas, Texas
Denver, Colorado
Kansas City, Missouri
New York, New York
Philadelphia, Pennsylvania
San Francisco, California
Seattle, Washington

Telephone numbers for these offices, and additional area office locations, are listed in the telephone directory under the United States Department of Labor in the United States Government listing.

Washington, D.C.
1988 (Revised)
OSHA 2203

Ann McLaughlin, Secretary of Labor

U.S. Department of Labor

Occupational Safety and Health Administration

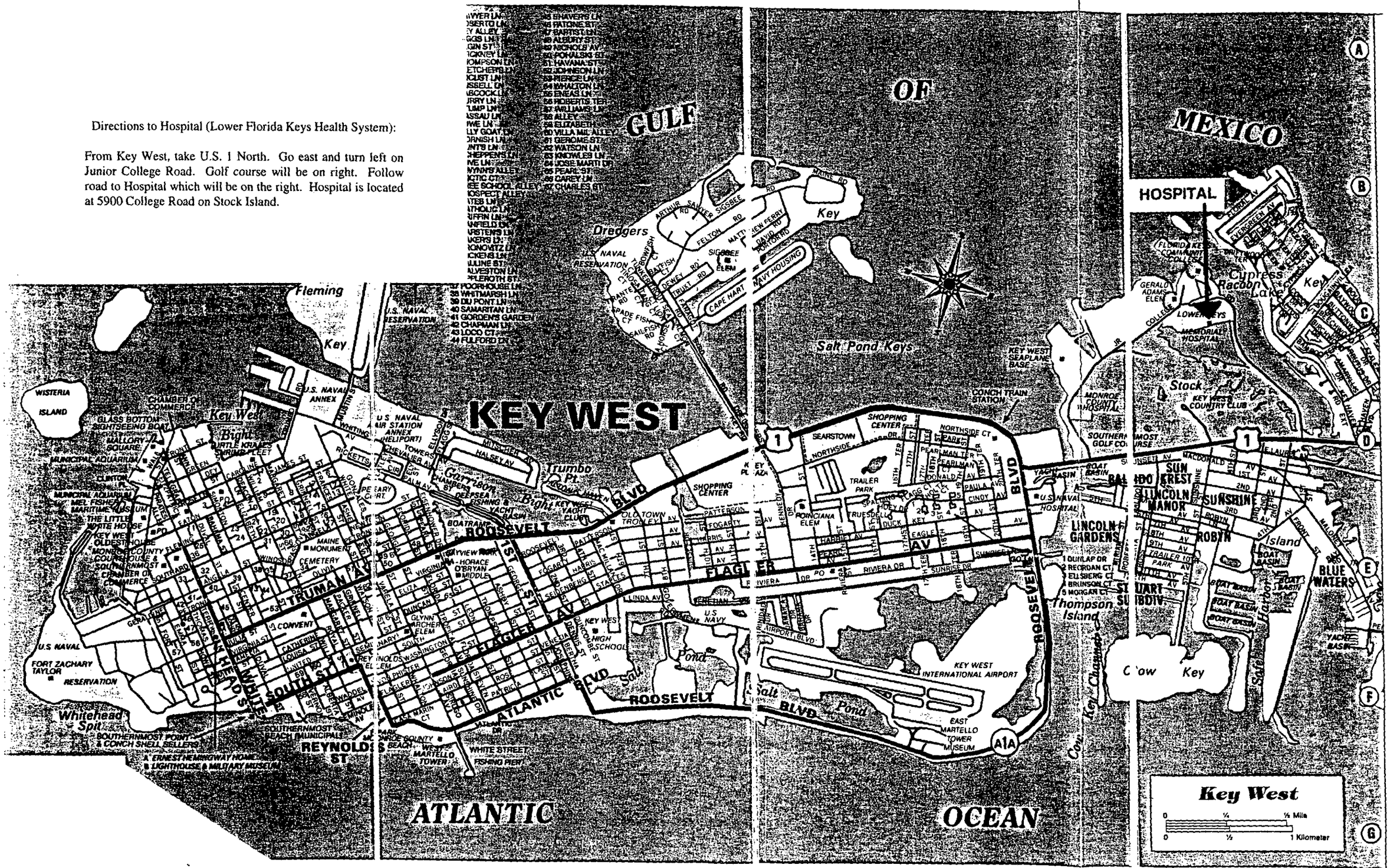
GPO : 1988 O - 219-467

APPENDIX D

ROUTE MAPS TO AREA HOSPITALS

Directions to Hospital (Lower Florida Keys Health System):

From Key West, take U.S. 1 North. Go east and turn left on Junior College Road. Golf course will be on right. Follow road to Hospital which will be on the right. Hospital is located at 5900 College Road on Stock Island.



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