Final Health and Safety Plan
Dallas Housing Authority
Remedial Investigation
Dallas, Texas

November 1993

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DALLAS, TEXAS

Prepared by:
Camp Dresser & McKee Inc.
Dallas, Texas

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HEALTH AND SAFETY PLAN FORM

CDM Health and Safety Program

This document is for the exclusive use of CDM and its subcontractors

CAMP DRESSER & McKEE INC.

PROJECT DOCUMENT #: 2509-110

PROJECT NAME Dallas Housing Authority (DHA)

WORK ASSIGNMENT # _____ **REGION** SOC

JOBSITE ADDRESS Corner of Singleton Blvd. and Westmoreland Rd.

CLIENT Dallas Housing Authority

PROJECT # 2509-110-ST-AMD9

CONTACT Lori Henderson / Tim Lott

CONTACT PHONE # 214-951-8302

AMENDMENT # 9

(X) AMENDMENT TO EXISTING APPROVED HSP **( ) DATE EXISTING APPROVED HSP** _____

OBJECTIVES: ***Summarize below***

The objective of the remedial investigation is to fill data gaps that were identified in the Site Investigation.

Tasks to be conducted during the remedial investigation are:
1) surface water sampling of Fish Trap Lake and small streams;
2) oversight of monitor well installation;
3) groundwater sampling of 4 monitor wells and newly installed well;
4) sediment sampling of Fish Trap Lake and small streams;
5) soil borings from an area to the west of Fish Trap Lake.

TYPE: *Check as many as applicable*

Active	(X)	**Landfill**	( )	**Unknown**	( )
Inactive	( )	**Uncontrolled**	(X)	**Other** *specify*	
Secure	( )	**Industrial**	( )		
Unsecure	(X)	**Recovery**	( )		
Enclosed space	( )	**Well Field**	( )		

This H & S Plan incorporates all elements of CDM's Health and Safety Assurance Manual for Hazardous Waste Operations

DESCRIPTION AND FEATURES: ***Summarize below.*** *Include principal operations and unusual features (containers, buildings, dykes, power line, terrain, etc.)*

The West Dallas Development is a 460 acre area comprised of 3,500 housing units along with several maintenance facilities, schools, and day care facilities. The DHA site is utilized solely for public housing. The DHA site is bounded by Westmoreland Road on the west, Hampton Road to the east, Canada Drive and the west fork of the Trinity River on the north, and Singleton Boulevard to the south. The RSR lead smelter facility (the suspected source of contamination) is located approximately 600 feet south of Singleton Boulevard (see enclosed map).

SURROUNDING POPULATION: (X) Residential (X) Industrial ( ) Rural (X) Urban OTHER:

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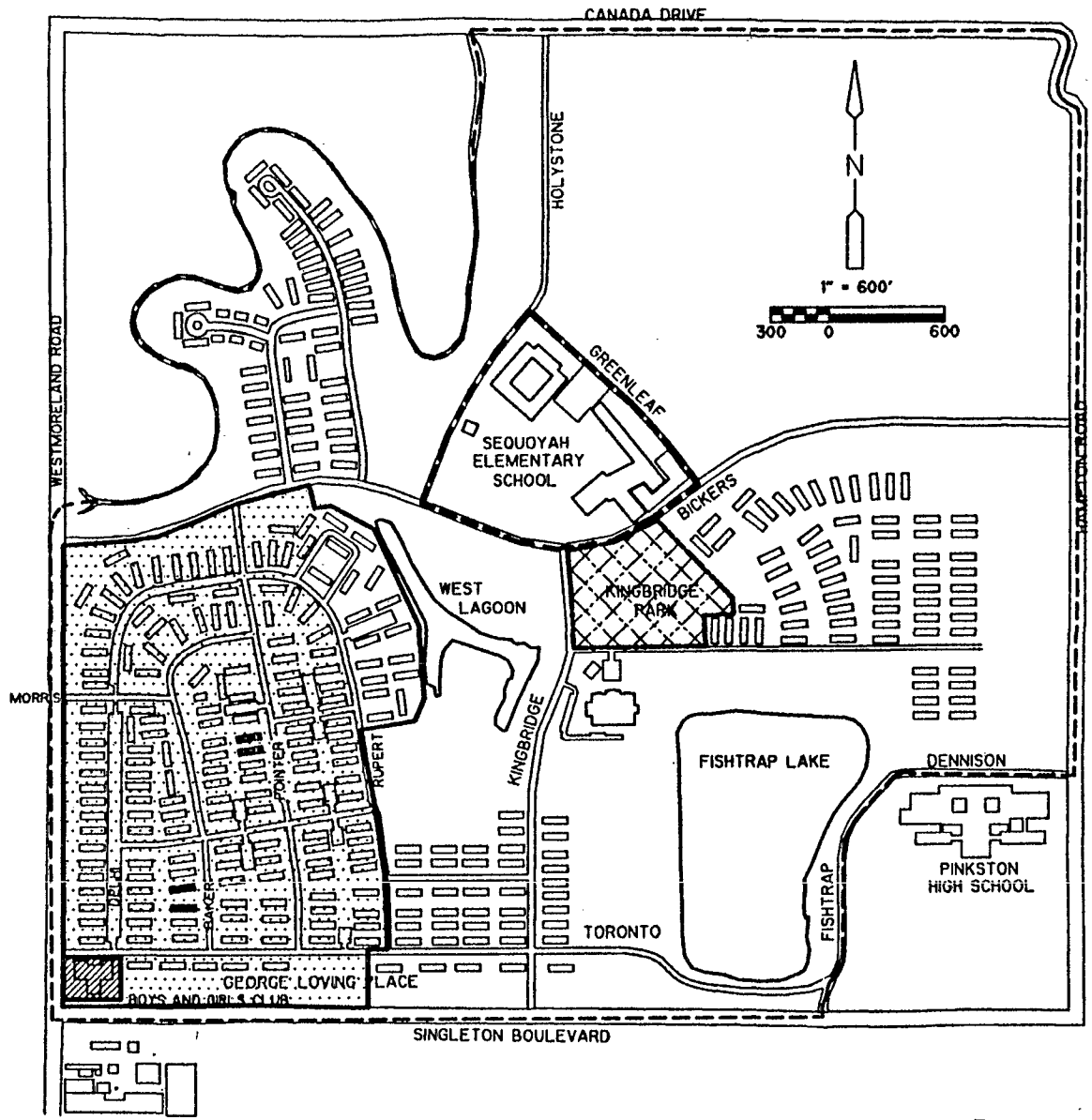
SITE MAP



- LIMITS OF DEMOLITION AND REMOVAL ACTION
- DHA SITE BOUNDARY
- AREA NOT INCLUDED IN DHA SITE
- GEORGE LOVING PLACE
- BOYS & GIRLS CLUB
- KINGBRIDGE PARK

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HISTORY: *Summarize below. In addition to history, include complaints from public, previous agency actions, known exposures or injuries, etc.*

The DHA site was relatively undeveloped prior to 1942. Between the years of 1942 and 1951, private residences increased and several industrial facilities were developed along Singleton Boulevard. No manufacturing or industrial activities occur on this property. Concerns regarding human and environmental exposures to lead began in the early 1970s as a result of smelter emissions from nearby RSR smelter. The State of Texas and the City of Dallas instituted a cleanup program for portions of the DHA site and areas adjacent to the RSR facility which was completed by 1985. The Texas Water Commission, however, sampled the RSR facility in 1991 and identified lead concentrations in the soil as high as 64,000 mg/kg as well as elevated cadmium (100 mg/kg) and arsenic (2,000 mg/kg) levels. The highest observed level of soil lead at the DHA site was 2,500 mg/kg, while cadmium and arsenic levels were 6 mg/kg and 62 mg/kg, respectively.

WASTE TYPES: **(X) Liquid** **(X) Solid** **( ) Sludge** **( ) Gas** **( ) Unknown** **(X) Other** *specify:* Dust

WASTE CHARACTERISTICS: *Check as many as applicable.*

( ) Corrosive **( ) Flammable** **( ) Radioactive**
(X) Toxic **( ) Volatile** **( ) Reactive**
( ) Inert **( ) Unknown** **( ) Other** *specify:*

WORK ZONES: ***Describe the exclusion, contamination reduction, and support zones in terms familiar to on-site personnel***

The exclusion zone will include all locations within twenty five feet of any sample location. Only OSHA-certified personnel will be allowed in this area during excavation. The support and contamination reduction zones will be established in a location upwind of the sample location. These zones will be restricted for as long as the intrusive activity continues.

HAZARDS OF CONCERN:

(X) Heat Stress *attach guidelines*
(X) Cold Stress *attach guidelines*
( ) Explosive/Flammable
( ) Oxygen Deficient
( ) Radiological
( ) Biological
( ) Noise
(X) Inorganic Chemicals
( ) Organic Chemicals
(X) Other *specify*
Dust, metals, and asbestos

PRINCIPAL DISPOSAL METHODS AND PRACTICES: *Summarize below.*

Air deposition of particulates from the smelter has occurred at the DHA site and surrounding area. Slag and other smelter materials have been identified in residences surrounding the DHA site, but not on the DHA property. An old landfill was identified in the Kingbridge Park area which was a former sand and gravel pit that has been filled in over the years.

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HAZARDOUS MATERIAL SUMMARY: *Circle waste type and estimate amounts by category*

CHEMICALS: Amount/Units:	SOLIDS: Amount/Units:	SLUDGES: Amount/Units:	SOLVENTS: Amount/Units:	OILS: Amount/Units:	OTHER: Amount/Units:
Acids	Flyash	Paint Pigments	Halogenated	Oily Solvents	Laboratory Wastes Pharmaceutical
Pickling Liquors	Asbestos	Metals Sludges	Non-Halogenated Solvents	Other *specify:* None	Hospital
Caustics	Milling/Mine Tailings	POTW Sludge	Other *specify:* None		Radiological
Pesticides	Ferrous Smelter	Aluminum			Municipal
Dyes/Inks	Non-Ferrous Smelter	Other *specify:* None			Other *specify:*
Cyanides	Other *specify:*				
Phenols					
Halogens					
PCBs					
Metals					
Other *specify:*					

OVERALL HAZARD EVALUATION: ( ) High ( ) Medium (X) Low ( ) Unknown *(Where tasks have different hazards, evaluate each. Attach additional sheets if necessary)*

JUSTIFICATION: The metals of concern and asbestos may be an inhalation hazard, dust will be controlled.

FIRE/EXPLOSION POTENTIAL: ( ) High ( ) Medium (X) Low ( ) Unknown

BACKGROUND REVIEW: (X) COMPLETE ( ) INCOMPLETE

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KNOWN CONTAMINANTS	HIGHEST OBSERVED CONCENTRATION *(specify units and media)*	PEL/TLV *ppm or mg/m3 (specify)*	IDLH *ppm or mg/m3 (specify)*	WARNING CONCENTRATION (in ppm)	SYMPTOMS & EFFECTS OF ACUTE EXPOSURE	Photo Ionization Potential
Arsenic	62 mg/kg (S)*	0.01 mg/m3	100 mg/m3 Carc.	NA	Nasal irritation, ulcers, GI disturbances	NA
Asbestos+	35% / W	0.2 fibers/cm3	Carc.	Dust	Dyspnea, restricted pulmonary function	Dust
Cadmium	112 mg/kg (S)*	0.2 mg/m3	50 mg/m3 Carc.	None	Pulmonary edema, tight chest, chills, headache	NA
Lead	5,400 mg/kg (S)*	0.05 mg/m3	700 mg/m3	NA	Lassitude, insomnia, weakness abdominal pain	NA
Zinc	U / S	5.0 mg/m3	NE	NA	Sweet metal taste, dry throat, cough, chills, fever	NA

* DHA site only
\+ In pipe insulation of building units.

NA = Not Available **NE = None Established** **U = Unknown**

S =Soil **SW = Surface Water** **T = Tailings** **F = Flyash** **TK = Tanks**
A = Air **GW = Groundwater** **S L= Sludge** **D = Drums** **L = Lagoon**

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FIELD ACTIVITIES COVERED UNDER THIS PLAN

TASK DESCRIPTION/SPECIFIC TECHNIQUE-STANDARD OPERATING PROCEDURES/SITE LOCATION *(attach additional sheets as necessary)*	TYPE	LEVEL OF PROTECTION Primary	Contingency	SCHEDULE
1 Surface Water - samples will be collected from Fish Trap Lake and small streams just below the water surface using a water bottle or bailer.	Intrusive / Non-intrusive	A B C (D) Modified	A B (C) D Modified	Nov. 1993 to Nov. 1994
2 Monitor Well Installation - CDM will provide oversight during the installation of a monitor well in the Fish Trap Lake area.	Intrusive / Non-intrusive	A B C (D) Modified	A B (C) D Modified	Nov. 1993 to Nov. 1994
3 Groundwater - a second round of samples will be collected from 4 monitor wells and newly installed well using a bailer.	Intrusive / Non-intrusive	A B C (D) Modified	A B (C) D Modified	Nov. 1993 to Nov. 1994
4 Sediment - bottom sediment samples will be collected from Fish Trap Lake and small streams with a core sampler or hand auger.	Intrusive / Non-intrusive	A B C (D) Modified	A B (C) D Modified	Nov. 1993 to Nov. 1994
5 Soil - samples will be collected in the area west of Fish Trap Lake using a split-spoon sampler or 5 ft. continous sampler.	Intrusive / Non-intrusive	A B C (D) Modified	A B (C) D Modified	Nov. 1993 to Nov. 1994

PERSONNEL* AND RESPONSIBILITIES (includes subcontractors)

NAME	FIRM/REGION	CDM HEALTH CLEARANCE	RESPONSIBILITIES	ON SITE ?
Chuck McLendon	CDM/Dallas	B	Project Manager	1-2-3-4-5
Mark Mihm	CDM/Dallas	B-T/D-S	Health & Sfty Coordinator	1-2-3-4-5
Reagan Rorschach	CDM/Dallas	B-T/C-S	Sample Team Leader	1-2-3-4-5
Craig Crowder	CDM/Dallas	D-T	Geologist/Sampler	1-2-3-4-5
Steve Lynk	CDM/Dallas	D-T	Engineer/Sampler	1-2-3-4-5

*Personnel listed on this page have completed the training, medical, and respiratory program requirements of the CDM Health and Safety Assurance Manual (HSAM) and OSHA standard 29 CFR 1910.120.

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PROTECTIVE EQUIPMENT: *Specify by task. Indicate type and/or material, as necessary. Use copies of this sheet if needed.*

BLOCK A

1-2-3-4-5 A-B-C-(D)-Modified ( ) Contingency

TASKS: LEVEL: (X)Primary

Respiratory: (X) Not needed
( ) SCBA, Airline: _____
( ) APR: _____
( ) Cartridge: _____
( ) Escape Mask: _____
(X) Other: Dust Mask (Optional)

Head and Eye: ( ) Not needed
(X) Safety Glasses: _____
( ) Face Shield: _____
( ) Goggles: _____
(X) Hard Hat: Drilling
( ) Other: _____

Boots: ( ) Not Needed
Boots: Steel Toe & Shank, Leather
Overboots: for Muddy Soil

Prot. Clothing (X) Not needed
( ) Encapsulated Suit: _____
( ) Splash Suit: _____
( ) Apron: _____
(X) Tyvek Coverall (Optional)
( ) Saranex Coverall
(X) Coverall: Cloth
( ) Other: _____

Gloves: ( ) Not Needed
(X) Undergloves: Surgical
( ) Gloves: _____
( ) Overgloves: _____

Other: *Specify below*

Floatation Device
Sun Screen

BLOCK B

1-2-3-4-5 A-B-(C)-D-Modified (X) Contingency

TASKS: LEVEL: ( )Primary

Respiratory: ( ) Not needed
( ) SCBA, Airline: _____
( ) APR: _____
( ) Cartridge: _____
( ) Escape Mask: _____
(X) Other: Half-face respirator

Head and Eye: ( ) Not needed
( ) Safety Glasses: _____
( ) Face Shield: _____
(X) Goggles: _____
(X) Hard Hat: _____
( ) Other: _____

Boots: ( ) Not Needed
Boots: Steel Toe & Shank, Leather
Overboots: for Muddy Soil

Prot. Clothing ( ) Not needed
( ) Encapsulated Suit: _____
( ) Splash Suit: _____
( ) Apron: _____
(X) Tyvek Coverall
( ) Saranex Coverall
( ) Coverall: _____
( ) Other: _____

Gloves: ( ) Not Needed
(X) Undergloves: Surgical
( ) Gloves: _____
(X) Overgloves: Optional

Other: *Specify below*

Floatation Device
Sun Screen

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MONITORING EQUIPMENT: *Specify by task. Indicate type as necessary. Attach additional sheets as necessary.*

INSTRUMENT	TASK	ACTION GUIDELINES	COMMENTS *(includes schedules of use)*
Combustible Gas Indicator		**0-10%LEL** *No explosion hazard.* **10-25%LEL** *Potential explosion hazard; notify SHSC.* **>25%LEL** *Explosion hazard; interrupt task/evacuate* **21.0%O_2** *Oxygen normal.* **<21.0%O_2** *Oxygen Deficient; notify SHSC.* **<19.5%O_2** *Interrupt task/evacuate*	**(X) Not Needed**
Radiation Survey Meter		**3 x Background:** *Notify SHSC.* **>2mR/hr:** *Interrupt task/evacuate*	*Note: Annual exposure not to exceed 100mrem/ yr. or 50 urem/hr average* **(X) Not Needed**
Photoionization Detector **( ) 11.7ev** **( ) 10.2 ev** **( ) 9.8 ev** **( ) ___ ev** **Type_____**		*Specify:*	**(X) Not Needed**
Flame Ionization Detector **Type_____**		*Specify:*	**(X) Not Needed**
Detector Tubes/ Monitox **Type_____** **Type_____**		*Specify:*	**(X) Not Needed**
Respirable Dust Monitor **Type** Miniram **Type_____**	1-2-3-4-5	*Specify:* Less than 2.5 mg/m3: Level D Greater than 2.5 mg/m3: Level C	**( ) Not Needed** It team members notice unusual odors or experience eye or throat irritation, they will leave the area or upgrade to Level C.
Other *Specify:*	1-2-3-4-5	*Specify:* The action level is subject to change based on analytical results.	

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DECONTAMINATION PROCEDURES

ATTACH SITE MAP INDICATING EXCLUSION, DECONTAMINATION, AND SUPPORT ZONES

Personnel Decontamination	Sampling Equipment Decontamination	Heavy Equipment Decontamination
Summarize below and/or attach diagram; discuss use of work zones.	*Summarize below and/or attach diagram; discuss use of work zones.*	*Summarize below and/or attach diagram; discuss use of work zones.*
Workers will remove protective clothing in this order: 1) Boots 2) Tyvek (or coverall) 3) Respirator (if worn) 4) Latex gloves 5) Wash face and hands. Workers will remove protective clothing before eating or drinking. Workers must also shower as soon as possible after work.	Rinse sampling equipment between collection of samples with Alconox/tap water solution followed by rinse with DI water. Air dry on plastic or with paper towels.	Steam clean all downhole drilling and sampling equipment on a lined decontamination pad. Decontamination pad specs will be supplied to drilling subcontractor prior to site entry. Additionally, all sampling equipment (ie. split spoon) will be decontaminated with alconox/water solution followed by DI water rinse.
( ) Not needed	**( ) Not needed**	**( ) Not needed**
Containment and Disposal Method	**Containment and Disposal Method**	**Containment and Disposal Method**
Gloves, disposable protective clothing, and solid waste material associated with sample decontamination will be placed in lined 55 gallon drums. These drums will be disposed of at a Class I nonhazardous waste facility. Soil samples from surface sampling and drilling will be stored in 55 gallon drums on-site until sample analysis is completed. Once the containerized material is classified, the Contractor will ensure proper disposal.	Water and sludge generation from sampling equipment decontamination will be containerized into lined 55 gallon drums and stored on-site until sample analyses of the groundwater and soil samples are completed. Once the containerized material is classified, the Contractor will ensure proper disposal.	Decon pad wastewater and sludge will be containerized into lined 55 gallon drums and stored on-site until sample analyses of the groundwater and soil samples are completed. Once the containerized material is classified, the Contractor will ensure proper disposal.

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EMERGENCY CONTACTS

Water Supply	DHA Central Maintenance	214-741-7758
Telephone	Southwestern Bell	Dial 611
Radio		
Other *(specify)*	TU Electric	214-653-1311
	Lone Star Gas Co.	214-741-2911 or 214-426-7936
USEPA Environmental Response Team		201-321-6660
US Coast Guard Environmental Response Team		800-424-8802
Association of American Railroads Response Team		202-293-4048
CHEMTREC		800-424-9300

CONTINGENCY PLANS *Summarize below*

Work will cease in the event of severe lightning and thunderstorms. In case of emergency, exit site and notify Health and Safety Manager and appropriate emergency agencies.

If the Miniram dust monitor reading exceeds 2.5 mg/m3, upgrade to Level C. , Follow attached procedures in Appendix A to prevent heat and cold stress.

Driller must inspect its drill rig(s) and certify their suitablitiy to CDM. All personnel will stay a safe distance away from drill rig.

If CDM personnel observe a hazardous condition for which they have not prepared, they will withdraw and call the Health and Safety Manager.

HEALTH AND SAFETY PLAN APPROVALS

Prepared by Mark A. Mihm **Date** 11/19/93

SHSC Signature Mark A. Mihm **Date** 11/23/93

HSM Signature Chris Marlowe **Date** 11/22/93

EMERGENCY CONTACTS	**NAME**	**PHONE**
CDM 24-Hour Emergency #	**1-800/SKY-PAGE**	**31821#**
Health and Safety Manager	Chris Marlowe	908/225-7000
Project Manager	Chuck McLendon	214/308-9000
Site Health and Safety Coordinator	Mark Mihm	214/308-9000
EPA Contact	Carlos Sanchez	214/655-8507
Other *(specify)*		
State Environmental Agency	TNRCC	512/463-7910
State Spill Contractor	TNRCC	214/298-6171
Fire Department		911
Police Department		911
State Police		911
Health Department		214/920-7900
Poison Control Center		214/590-5000

MEDICAL EMERGENCY

Hospital Name: Parkland Memorial **Phone:** 214-590-8000 OR

Hospital Address: 5201 Harry Hines Blvd., Dallas, TX

St Paul's Hospital
5909 Harry Hines Blvd.,Dallas, TX

Name of Contact at Hospital: 214-879-1000 **Phone:**

Name of 24-Hour Ambulance: 911

Route to Hospital: The hospital map is attached on the following page.

Distance to hospital Approximately 1 mile

Attach map with route to hospital

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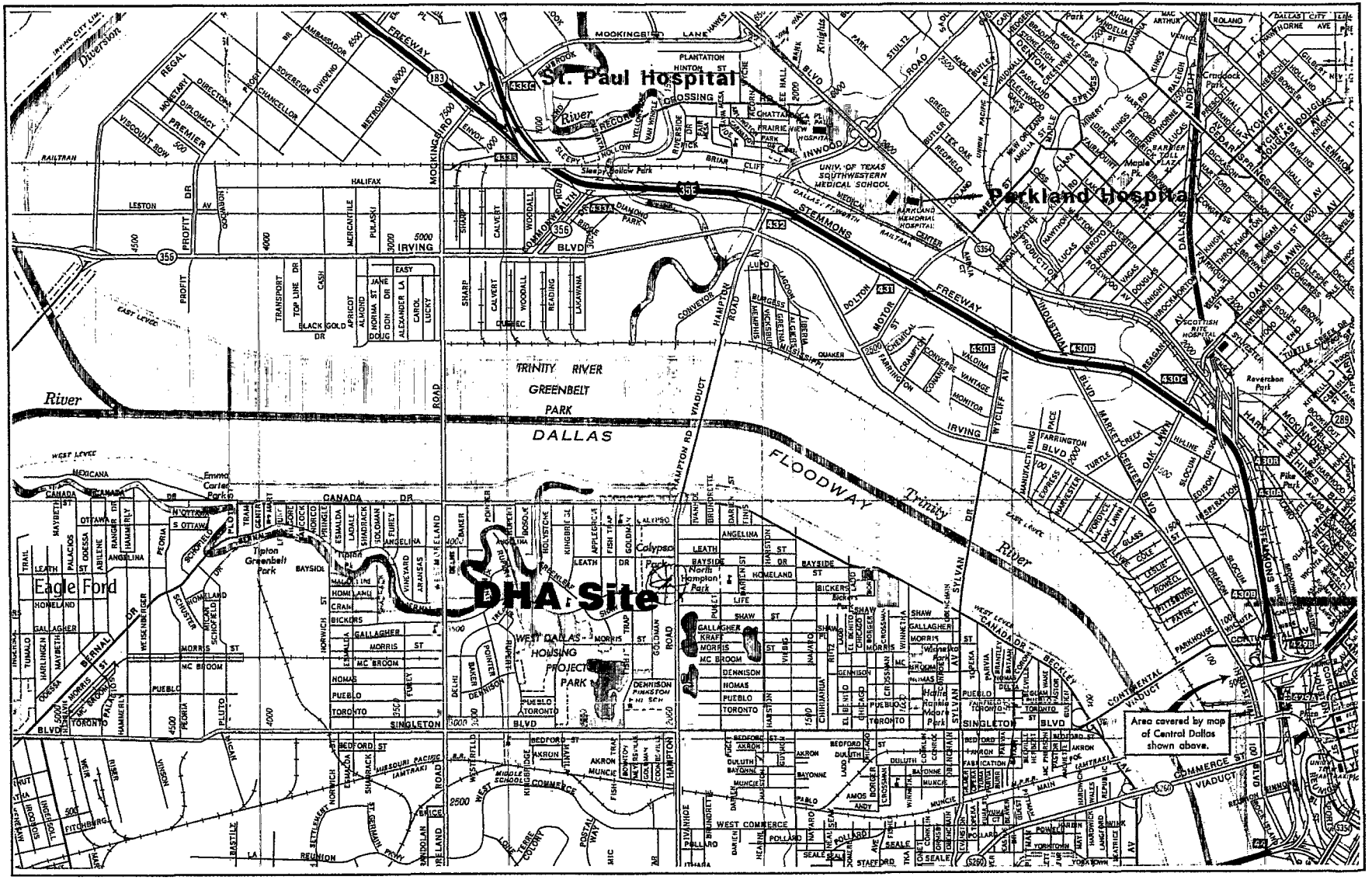
HOSPITAL MAP



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HEALTH AND SAFETY PLAN SIGNATURE FORM

INSTRUCTIONS: Site personnel are required to receive a copy of the final site Health and Safety Plan (HSP), and read, understand, and agree to the provisions of the plan. The Site Manager is responsible to distribute the HSP to personnel as they are assigned to the site. Personnel are required to sign this form indicating agreement. The original of this form is maintained by the Site Manager, and becomes part of the permanent site project files upon completion of site work. Copies of this form are to be sent to the Regional Health and Safety Supervisor (RHSS) and Health and Safety Manager (HSM). Updated copies of this form are sent to the RHSS and HSM as additional personnel are assigned to the site.

SITE NAME / NUMBER _____

REGION / LOCATION _____

SITE HEALTH AND SAFETY PLAN DOCUMENT NUMBER _____

I have recieved a copy, read, understood, and agree to comply with the provisions of the above referenced site Health and Safety Plan for work activities on this site.

PRINTED NAME	SIGNATURE	DATE

1.0 HEAT AND COLD STRESS

1.1 Heat Stress

Heat stress frequently occurs in the field because chemical protective clothing decreases natural body ventilation. It may occur any time work is being performed at elevated temperatures.

When CDM employees perform a hazardous waste operation in ambient air temperatures above 80°F (If they perform physical labor or wear chemical protective clothing; 70°F), they will:

- Monitor temperature, humidity, radiative heat load, or subjective heat stress conditions by a method described in Section 1.1.1.
- Implement heat stress control procedures as described in Section 1.1.2 and 1.1.3, and
- Prepare to implement the first aid procedures described in Section 1.1.4.

1.1.1 Heat Stress Monitoring

When CDM employees perform a hazardous waste operation in ambient air temperatures above 80°F (If they perform physical labor or wear chemical protective clothing; 70°F), they will monitor heat stress, or subjective heat strain, by one of the following procedures.

- Measure team members' heart rates by the radial pulse for 30 second before they begin working. Measure it again as soon as possible after they begin a break.
- Measure team members' body temperature with an oral clinical thermometer before they begin working. Measure it again as soon as possible after they begin a break.
- Measure air temperature, humidity, and radiative heat load with a commercial heat stress monitor like the Reuter - Stokes UBGT or the Metrosonics Model 371.
- Measure air temperature with a standard thermometer. Estimate fraction of sunshine (Fxn) by judging what percent the sun is out: No cloud cover - 100% sunshine, Fxn = 1.0, 50% cloud cover = 50% sunshine, Fxn = 0.5; full cloud cover - 0% sunshine, Fxn = 0.0). Calculate the adjusted temperature from the equation:

  T (°F, adjusted) = T (°F, actual) + (13°F x Fxn)

  This procedure is easy to implement, but often results in shorter work periods than the other methods, because its action levels incorporate safety factors to compensate for limited information.

1.1.2 Work/Rest Schedules for Heat Stress

Work teams shall compare the heat stress measurements to the action levels described in this section. When their readings indicate a heat stress hazard, the work team will decrease the length of the work period as described below.

Any break taken for control of heat stress must be at least 30 minutes long. When the heat stress potential is high and workers must maintain a continuing presence on the site, they should work in rotating shifts.

- If the team monitors heat stress by the adjusted temperature procedures, use this work/rest schedule (from the NIOSH/OSHA/USCG/EPA Guidance Manual) as a guideline to determine the maximum length of work periods between breaks.

	Duration of Active Work Time (minutes)	
Adjusted Temperature	**Cloth Clothing**	**Impermeable Clothing**
-75° F	150	120
-80° F	120	90
-85° F	90	60
-90° F	60	30
≥95° F	30	15

- If the team monitors heat stress with a commercial heat stress monitoring device, observe the work/rest schedule specified in its manual for the temperature, humidity, radiative heat, protective clothing and work load conditions.

- If the team measures heat strain by monitoring the workers' heart rates, control the length of the work and rest periods as follows. If the heart rate at the end of work period exceeds the action level (110 beats/minute or 40 bpm over the employee's initial rate, if that is higher), the next work period should be shortened by 33%, while the length of the rest period stays the same. If the pulse rate still exceeds the action level, at the end of the next work period, the following work cycle should be further shortened by 33%. Continue this procedure until the heart rate stays below the action level.

- If the team measures heat strain by monitoring body temperature, control the length of the work and rest periods as follows. If body temperature at the end of a work period exceeds the action level (the reading at the start of the day plus 1°F), the next work period should be shortened by 33%, while the length of the rest period stays the same. If the team member's temperature is elevated at the end of the next work period, the following work cycle should be further shortened by 33%. Continue this procedure until the body temperature stays below the action level.

1.1.3 Other Heat Stress Control Measures

When their heat stress measurements indicate a heat stress hazard, the work team will implement as many of the following procedures as are feasible in the circumstances. Field team members shall:

- Drink 16 ounces of water in the morning and after lunch.
- Drink one or two 4 ounce cups of cool (50 - 60°F) water every 20 minutes (unless this practice would promote ingestion of contaminants), for a total of 1 - 2 gallons per day.
- Avoid use of coffee during working hours and the consumption of alcohol during working and non-working hours.
- Acclimate to site work conditions by performing relatively non-strenuous activities the first three to five days on site. Schedule the most demanding site activities after the workers have a chance to acclimate.
- Use cooling devices to aid natural body ventilation. For example, long cotton underwear acts as a wick to help absorb moisture and protect the skin from direct contact with hot protective clothing. These devices, however, add weight, and their use should be balanced against worker efficiency.
- Use mobil showers and/or hose-down facilities to cool workers' or their waterproof protective clothing if a source of uncontaminated water is available.
- Conduct field activities in the early morning or evening in very hot weather.
- Erect break shelters to protect workers from heat. (Note: tent-like structures can intensify heat stress in some conditions). If possible, set up the site command point in the shade.
- Consider the use of cooling devices, such as ice vests, for extreme conditions.
- Maintain good hygienic standards by frequency changes of clothing and showering. Clothing should be permitted to dry during rest periods. Persons who notice skin problems should immediately consult medical personnel.

1.1.4 Heat Stress Symptoms and First Aid

If the body's physiological processes fail to maintain a normal body temperature because of excessive heat, a number of physical reactions can occur ranging from mild (such as fatigue, irritability, anxiety, and decreased concentrations, dexterity, or movement) to fatal. Because heat stress is one of the most common and potentially serious illnesses at hazardous waste sites, site workers must learn to recognize and treat the various forms of heat stress.

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1.1.4.1 Heat Stroke

Heat stroke is an acute and dangerous reaction to heat stress caused by a failure of heat regulating mechanisms of the body. Brain damage and death will result if the person is not cooled quickly. Other team members shall implement the treatment described below immediately. A person with the following symptoms may have heat stroke.

- Symptoms: Red, hot, dry skin, nausea, dizziness, confusion, high body temperature, and rapid respiratory and pulse rates, coma, or unconsciousness.

- Treatment: Use any means at hand to cool the victim quickly. Soak the victim in cool but not cold water, sponge the body with cool water, or pour water on the body to reduce the temperature to a safe level (102°F). Obtain medical help as soon as possible. Do not give coffee, tea or alcoholic beverages.

1.1.4.2 Heat Exhaustion

Heat exhaustion is a state of exhaustion or deep weakness caused by the loss of fluids from the body. Other team members shall implement the described treatment quickly. A person with the following symptoms may have heat exhaustion.

- Symptoms: Pale, clammy, moist skin, profuse perspiration and extreme weakness. Body temperature is normal, pulse is weak and rapid, breathing is shallow. The person may have a headache, may vomit, and may be dizzy.

- Treatment: Remove the person to a cool place, loosen clothing, place in a head-low position. Consult physician, especially in severe cases. Have patient drink 1 - 2 cups water immediately, and every 20 minutes thereafter, until symptoms subside. Total water consumption should be about 1 - 2 gallons per day. Consult a physician prior to returning to work.

1.1.4.3 Heat Cramps

Heat cramps are often the first sign of a condition that can lead to heat stroke. Team members shall implement the described treatment quickly. A person with the following symptoms may have heat cramps.

- Symptoms: Acute painful spasms of voluntary muscles; e.g., legs and arms.

- Treatment: Remove victim to a cool area and loosen clothing. Have patient drink 1 - 2 cups water immediately, and every 20 minutes thereafter, until symptoms subside. Total water consumption should be 1 - 2 gallons per day. Consult with physician.

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1.1.4.4 Heat Rash

A person with the following symptoms may have heat rash. That person should implement the described treatment.

- Symptoms: Mild red rash, especially in areas of the body in contact with protective gear.
- Treatment: Decrease amount of time in protective gear, and apply powder to help absorb moisture and decrease chafing. Wear cotton, as opposed to synthetic, clothing.

1.2 Cold Stress

Field teams working at temperatures at or below freezing are subject to cold stress. Exposure to extreme cold can cause severe injury to the body or death. The fingers, toes, and ears are the most susceptible to local injury.

When field teams operate outdoors in temperatures below 32°F, they will:

- Monitor their cold stress exposure by the methods described in Section 1.2.1.
- Implement cold stress control procedures described in Section 1.2.2.
- Prepare to implement the first aid procedures described in Section 1.2.3.

1.2.1 Cold Stress Monitoring

Whenever the outdoor temperature is below 32°F, CDM team shall monitor cold stress conditions or their bodies' response to cold by one of the following methods.

- Measure team members' body temperature with an oral clinical thermometer as soon as possible after they begin a break.
- Measure air temperature with a thermometer and wind speed with an anemometer. Estimate the equivalent wind chill temperature from Exhibit 1.
- Measure air temperature with a standard thermometer. Subtract ten degrees from the measured temperature to adjust for wind chill.

1.2.2 Controls for Cold Stress

When outdoor temperatures are below 32°F, CDM Team shall implement the following cold stress control procedures. Field team members shall:

- Wear dry insulated clothing. Team members may wear Saranex coveralls for its excellent wind-breaking capacity.

- Wear one or more pairs of heavy socks in their work shoes. Properly insulated steel-toe safety boots do not represent a cold hazard.
- Avoid contact with water, metals, and organic liquids, like gasoline.
- Advise the SHSC of the warnings prints on the pharmaceutical preparations they are taking.
- Station on erect shelters as appropriate to protect themselves from the wind.
- Take frequent breaks (15 to 30 minutes in length) when the wind chill equivalent temperature is 15°F or below.
- Curtail field activities when the wind chill equivalent temperature is 0°F, or below.
- Bring a spare set of dry clothing to the site so they can re-dress if their clothing gets wet.
- Use a nose cup in any full face respirator they wear.

1.2.3 Cold Stress Symptoms and First Aid

If the body's physiological processes fail to maintain a normal body temperature because of excessive cold, a number of physical reactions can occur ranging from mild (such as fatigue, depression, or decreased concentration, dexterity, or movement) to fatal. Because cold stress is common on hazardous waste sites, site workers must learn to recognize and treat the various forms of cold stress.

1.2.3.1 Hypothermia

Systemic hypothermia consists of a drop in the temperature of the body as a whole. Field team members will immediately implement the treatment shown. A person with the following symptoms may have hypothermia.

- Symptoms: Shivering, apathy, listlessness, sleepiness, unconsciousness, glassy stare, slow pulse, and slow respiratory rate, freezing of the extremities and, ultimately, death.
- Treatment: Warm the victim quickly by any means at hand. If possible, place the victim in water between 100° of 105°F. Give a warm drink - not coffee, tea or alcohol. The victim must not smoke. Keep victim warm and get immediate medical care.

1.2.3.2 Frostbite

Persons who have the following symptoms may have frostbite, which is any local injury resulting from cold. Team members will provide the first aid described.

- Symptoms:
  — Sudden blanching or whitening of skin may indicate frost nip or incipient frostbite.

  — Skin with a waxy or white appearance that is firm to the touch, over lower tissue that is resilient indicate superficial frostbite.

  — Tissues that are cold, pale, and solid may indicate deep frostbite.

- Treatment: Warm the victim quickly by any means at hand. If possible, place the victim in water between 100° and 105°F. Give a warm drink - not coffee, tea or alcohol. The victim must not smoke. Keep victim warm and get immediate medical care. Keep the frozen parts in warm water or covered with warm clothes for 30 minutes, even those the tissue will be very painful as it thaws. Then elevate the injured area and protect it from injury. Do not allow any blisters to be broken. Use sterile, soft, dry material to cover the injured areas.

After thawing, the victim should try to move the injured areas a little, but no more than this can be done alone, without help.

Note:

- Do <u>not</u> rub the frostbitten part (this may cause gangrene).
- Do <u>not</u> use ice, snow, gasoline or anything cold on the frostbitten area.
- Do <u>not</u> use heat lamps or hot water bottles to re-warm the part.
- Do <u>not</u> place the part near a hot stove.

1.2.3.3 Immersion Foot

Immersion foot (trench foot) is characterized by anoxia (lack of oxygen) in tissues that are frequently cold. Persons with the following symptoms may have immersion foot.

- Symptoms: feet or fingers that remain white and painful for hours after they have been warmed up.
- Treatment: The team members affected should get medical care quickly.

WIND CHILL EQUIVALENT TEMPERATURE

EXHIBIT 1: Cooling Power On Exposed Flesh Expressed As An Equivalent Temperature Under Calm Conditions

Estimated Wind Speed (in mph)	Actual Temperature Reading (°F)											
	50	40	30	20	10	0	-10	-20	-30	-40	-50	-60
	Equivalent Chill Temperature (°F)											
calm	50	40	30	20	10	0	-10	-20	-30	-40	-50	-60
5	48	37	27	16	6	-5	-15	-26	-36	-47	-57	-68
10	40	28	16	4	-9	-24	-33	-46	-58	-70	-83	-95
15	36	22	9	-5	-18	-32	-45	-58	-72	-85	-99	-112
20	32	18	4	-10	-25	-39	-51	-67	-82	-96	-110	-121
25	30	16	0	-15	-29	-44	-59	-74	-88	-104	-118	-133
30	28	13	-2	-18	-33	-48	-63	-79	-94	-109	-125	-140
35	27	11	-4	-20	-35	-51	-67	-82	-98	-113	-129	-145
40	26	10	-6	-21	-37	-53	-69	-85	-100	-116	-132	-148
(Wind speeds greater than 40 mph have little additional effect).	**Little Danger** In <1 hr. with dry skin. Maximum danger of false sense of security.				**Increasing Danger** Danger from freezing of exposed flesh within one minute.			**Great Danger** Flesh may freeze within 30 seconds.				
Trenchfoot and immersion foot may occur at any point on this chart.												

*Developed by U.S. Army Research Institute of Environmental Medicine, Matrick, MA.
SOURCE: ACGIH, Threshold Limit Values for Chemical Substances in the Work Environment for 1984-1985.

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