QUALITY ASSURANCE PROJECT PLAN

REMEDIAL INVESTIGATION

Stratford Army Engine Plant
Stratford, Connecticut

Contract Number DACW41-96D-8014
Task Order 0011

Prepared for
U.S. Department of the Army
Corps of Engineers, New York District
26 Federal Plaza
New York, New York 10278-0090

October 26, 1998

Prepared by
Woodward-Clyde Federal Services
P.O. Box 290
201 Willowbrook Boulevard
Wayne, New Jersey 07470

K9716-6.1

ATTACHMENT 14
EMERGENCY TELEPHONE NUMBERS AND DIRECTIONS TO BRIDGEPORT HOSPITAL

EMERGENCY TELEPHONE NUMBERS

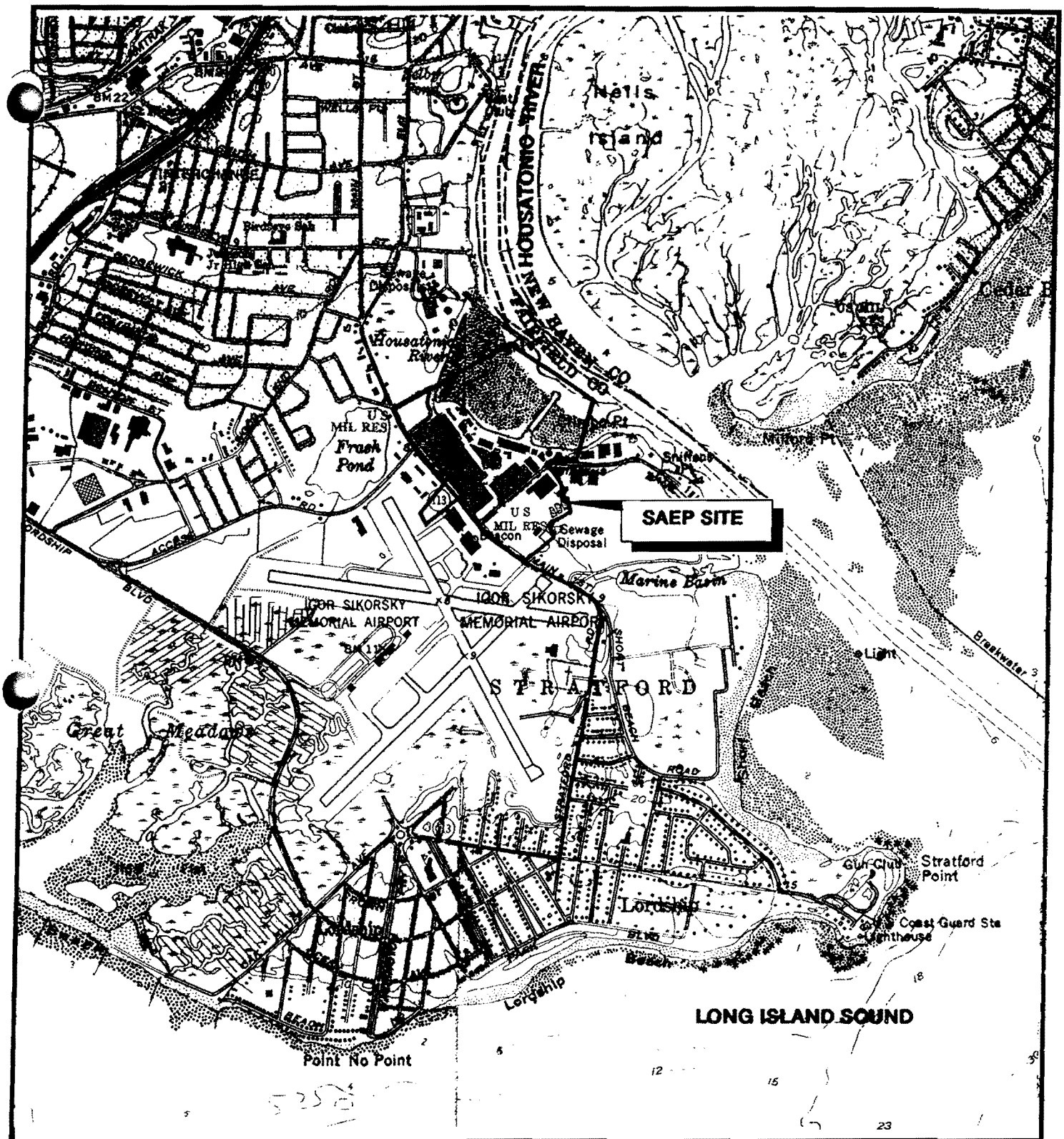
EMERGENCY SERVICES

Ambulance	911
Fire Department	(203) 385-4073
Police Department	(203) 385-4100
Bridgeport Hospital	(203) 384-3000
Poison Control Center	(800) 962-1253
USEPA National Response Center	(800) 438-2427
U.S. Coast Guard/USEPA National Response Center	(800) 424-8802

DIRECTIONS TO BRIDGEPORT HOSPITAL FROM SAEP

- Exit the SAEP and travel North on Main Street (SR 13).
- Continue for approximately 0.5 miles and turn left onto South Avenue.
- Continue to end (0.5 miles) and turn left onto Stratford Avenue.
- Continue approximately 0.5 miles and turn right onto Bruce Avenue.
- Continue another 0.5 miles and turn onto Barnum Avenue.
- Continue another 0.5 miles and turn right onto Grant Avenue. The Bridgeport Hospital is on the right.

THESE EMERGENCY TELEPHONE NUMBERS AND DIRECTIONS TO BRIDGEPORT HOSPITAL WILL BE VERIFIED BY THE W-C FIELD SUPERVISOR PRIOR TO THE INITIATION OF FIELDWORK.



MAP SOURCE:
FROM BRIDGEPORT & MILFORD, CT. USGS QUADRANGLE MAP, 1970 & 1960, PHOTOREVISED 1984.

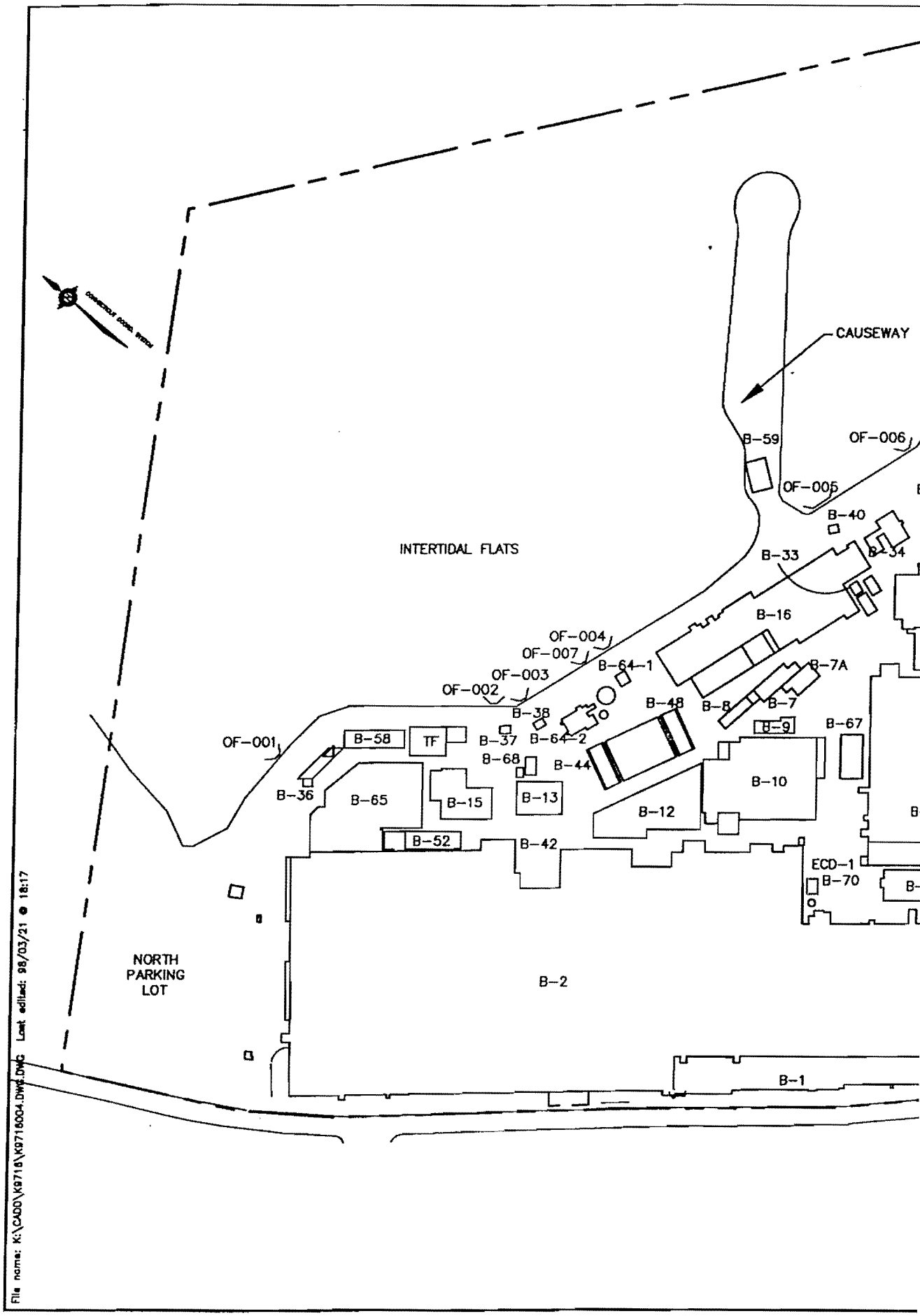
0 1000 2000 FT
SCALE

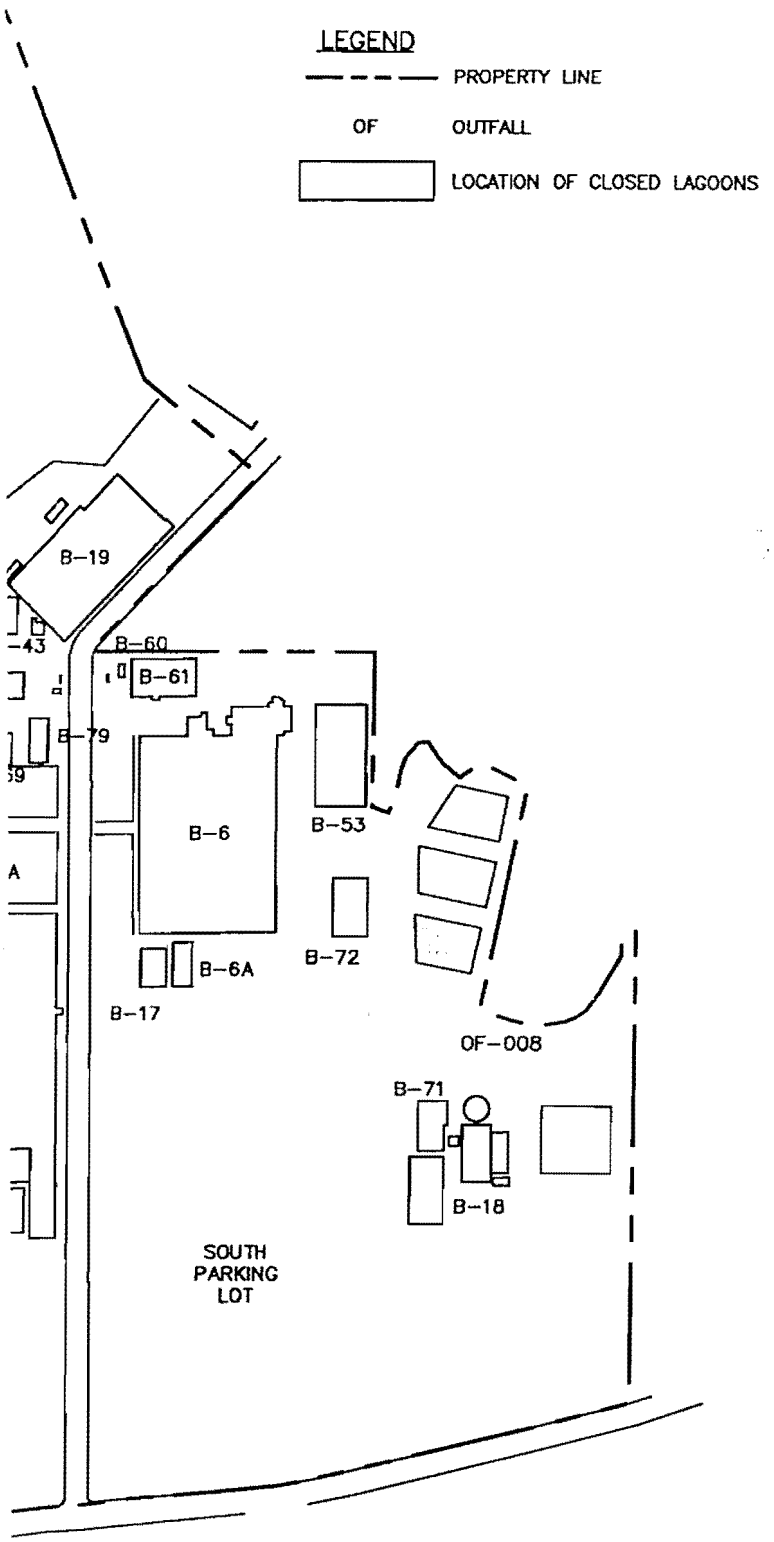
N

WOODWARD – CLYDE CONSULTANTS
ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS

VICINITY MAP
STRATFORD ARMY ENGINE PLANT
STRATFORD, CONNECTICUT

DR. BY: FWD	DATE: JAN 1992	PROJ. NO:	FIGURE NO.:
CK'D BY: MEC	DATE: JAN 1992	89C114CC	2-1


CAUSEWAY
B-59
OF-006
OF-005
B-40
INTERTIDAL FLATS
B-33
B-34
B-16
OF-004
OF-007
B-64-1
B-7A
OF-003
OF-002
B-38
B-48
B-8
B-7
B-9
B-67
OF-001
B-58
TF
B-37
B-64-2
B-68
B-44
B-10
B-36
B-65
B-15
B-13
B-12
B-52
B-42
ECD-1
B-70
NORTH
PARKING
LOT
B-2
B-1
File name: K:\CADD\K9718\K9718004.DWG Last edited: 98/03/21 @ 18:17

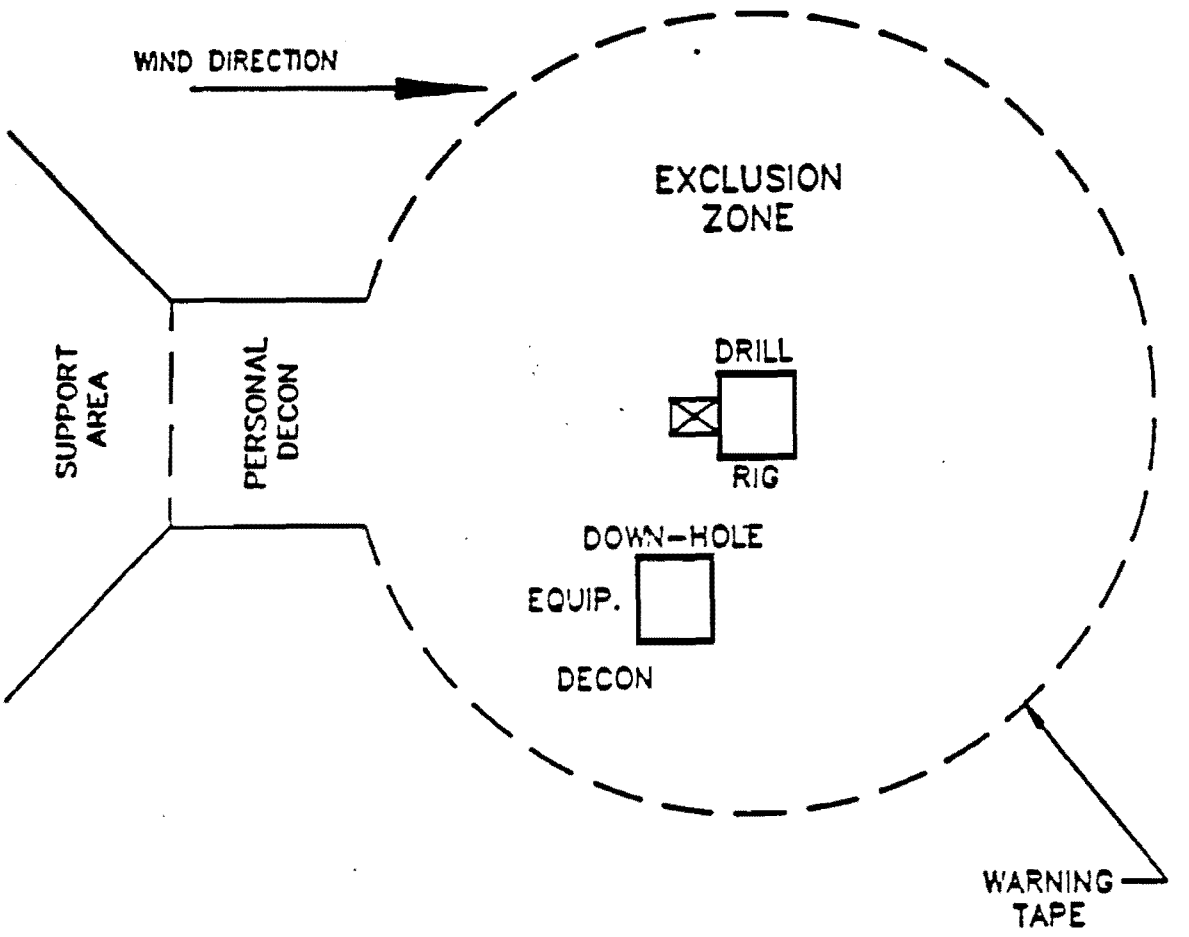


BUILDING NUMBER	BUILDING NAME
B-1	MAIN ADMINISTRATIVE & GOVERNMENT OFFICES
B-2	MANUFACTURING OPERATIONS
B-3	RESEARCH & DEVELOPMENT ENGINEERING
B-3A	ENGINEERING LABORATORIES
B-4	STORES AND AGT-1500 REPAIR
B-5	FUEL SYSTEM TEST
B-6	ENGINE ENVIRONMENTAL & COMPONENT TEST
B-6A	ENGINE MECHANICAL COMPONENT TEST
B-7	ENGINE FUEL SYSTEM TEST
B-7A	ENGINE FUEL SYSTEM TEST
B-8	VOLATILE STORAGE
B-9	AUTOMOTIVE MAINTENANCE
B-10	RECUPERATOR MANUFACTURE
B-12	MAINTENANCE DEPARTMENT
B-13	SCRAP & MATERIAL RECLAMATION
B-15	LUBRICATION STORAGE & FIRE HOUSE
B-16	PRODUCTION & DEVELOPMENTAL TEST CELLS
B-17	ENGINEERING TEST FACILITY
B-18	CHEMICAL WASTE TREATMENT PLANT (CWTP)
B-19	COMPONENT TEST FACILITY
B-33	COOLING TOWER PUMP STATION
B-34	FUEL PUMPING STATION
B-36	STORM DRAIN PUMPING STATION (OF-001)
B-37	STORM DRAIN PUMPING STATION (OF-002)
B-38	STORM DRAIN PUMPING STATION (OF-003)
B-40	STORM DRAIN PUMPING STATION (OF-004)
B-41	STORM DRAIN PUMPING STATION (OF-005)
B-42	SPRINKLER BOOST PUMP STATION (400K GAL.)
B-43	FUEL PUMPING STATION
B-44	STORES & CARPENTER SHOP
B-48	ENGINE CONTAINER REBUILD
B-52	STORES & ADJUNCT TO B-2
B-53	SURPLUS EQUIPMENT STORAGE
B-58	QUALITY & TESTING FACILITY
B-59	ENGINEERING STORAGE
B-60	HI-PRESSURE NATURAL GAS PUMPING STATION
B-61	REFRIGERATION PLANT
B-63	CWTP PUMPING STATION
B-64-1	OIL ABATEMENT PLANT PUMP HOUSE
B-64-2	OIL ABATEMENT TREATMENT PLANT (OATP)
B-65	STORAGE FACILITY
B-67	GENERAL STORES
B-68	EMERGENCY GENERATOR
B-69	USACE RESIDENT ENGINEER
B-70	CYANIDE DESTRUCTION FACILITY (CDF)
B-71	CWTP SOLIDS HANDLING
B-72	FUEL PUMPING STATION
B-77	OFFICE
B-79	SSE BUILDING

SITE MAP
STRATFORD ARMY ENGINE PLANT
STRATFORD, CONNECTICUT

WOODWARD-CLYDE CONSULTANTS
ENGINEERING & SCIENCES APPLIED TO THE EARTH & ITS ENVIRONMENT
OMAHA, NEBRASKA

DR. BY	JL	SCALE	1" = 300'	DWG. NO. K9716004	PROJ. NO. K9716
CK'D. BY	SH	DATE	MAR 21, 1998	FIG. NO.	2-2



TYPICAL WORK ZONES
AROUND DRILLING OPERATIONS
STRATFORD ARMY ENGINE PLANT
STRATFORD, CONNECTICUT

FIGURE 9-1

Scale 1:28,125 (at center)

2000 Feet

1000 Meters

Local Road

Major Connector

State Route

ROUTE TO BRIDGEPORT HOSPITAL
STRATFORD ARMY ENGINE PLANT
STRATFORD, CONNECTICUT

WOODWARD-CLYDE CONSULTANTS

ENGINEERING & SCIENCES APPLIED TO THE EARTH & ITS ENVIRONMEN

DR BY BB	SCALE: as shown	PROJ. NO.:K971
CK'D BY: BB	DATE: MAR 26, 1998	FIG. NO : 12-1

Mar 26 15:13 1998

TABLE 4-1
PERSONAL EXPOSURE INFORMATION
CHEMICALS OF CONCERN
STRATFORD ARMY ENGINE PLANT

Chemical	OSHA			ACGIH		Acute Symptoms	Target Organs	Carcinogen
	TWA (ppm)	STEL (ppm)	Ceiling (ppm)	TLV-TWA (ppm)	TLV-STEL (ppm)			
VOLATILE ORGANIC COMPOUNDS								
Vinyl chloride	1	5	5	5	--	Weakness, abdominal pain	Liver, blood, CNS[7]	Confirmed
Methylene chloride	500	2000[6]	1000	50	--	Nausea, eye & skin irritation, fatigue, weakness, sleeplessness, limbs numb	Skin, eyes, CNS, cardiovascular system	Suspected
Trans-1,2-Dichloroethene	200	--	--	200	--	Skin irritation, CNS depressant, eye irritation	Liver, kidneys, heart, eyes	Suspected
Chloroform	2	--	--	10	--	Dizziness, skin & eye irritation, nausea, disorientation, heat fatigue	Liver, kidneys, heart, eyes, skin	Suspected
1,1,1-Trichloroethane	350	--	1000[8]	350	450	Irritation, CNS depressant	CNS, eyes, nose, kidneys	
Trichloroethene	50	200[6]	200	50	200	Irritation, CNS depressant	CNS, eyes, nose, kidneys	Suspected
Benzene	1	5	25	10	--	Eye & nose Irritation, nausea	Blood, CNS, respiratory system	Suspected

TABLE 4-1, Continued
PERSONAL EXPOSURE INFORMATION
CHEMICALS OF CONCERN
STRATFORD ARMY ENGINE PLANT

Chemical	OSHA			ACGIH		Acute Symptoms	Target Organs	Carcinogen
	TWA (ppm)	STEL (ppm)	Ceiling (ppm)	TLV-TWA (ppm)	TLV-STEL (ppm)			
VOLATILE ORGANIC COMPOUNDS, continued								
4-methyl 2-Pentanone	50	75	3000[8]	50	75	Eye irritation, dermatitis,drowsiness	Skin, eyes, CNS, respiratory system	
2-Butanone	200	300	3000[8]	200	300	Eye & nose irritation, dizziness, vomiting	CNS, lungs	
Tetrachloroethene	25	300[9]	--	50	200	Eye, nose, & throat irritation	Liver, kidneys, CNS, respiratory system	Suspected
Ethyl benzene	100	125	2000[8]	100	125	Eye and mucous membrane irritation, dermatitis	Eyes, skin, CNS, respiratory system	
Phenol	5	15.6	15.6	5	--	Eye, nose, & throat irritation, dermatitis	Liver, kidneys, skin	
1,2-Dichlorobenzene	50	--	50	50	--	Eye & nose irritation, skin blisters	Liver, kidneys, skin, eyes	
1,2,4-Trichlorobenzene	5	--	5	5	--	Eye & skin irritation	Liver, kidneys, skin, eyes	
1,1-dichloroethane	100	--	4000[8]	200	250	CNS depressant, skin irritation	Kidneys, liver, skin	

TABLE 4-1, Continued
PERSONAL EXPOSURE INFORMATION
CHEMICALS OF CONCERN
STRATFORD ARMY ENGINE PLANT

Chemical	OSHA			ACGIH		Acute Symptoms	Target Organs	Carcinogen
	TWA (ppm)	STEL (ppm)	Ceiling (ppm)	TLV-TWA (ppm)	TLV-STEL (ppm)			
VOLATILE ORGANIC COMPOUNDS, Continued								
1,2 Dichloroethane	1	2	4000[8]	10	--	CNS depressant, skin & eye irritation, nausea, vomiting, irritation	Kidneys, liver, skin, eyes, CNS	Suspected
2-Methylphenol	5	--	250[8]	5	--	Confusion, rapid respiration, eye and skin burns	CNS, respiratory system, kidneys, liver, skin, eyes	
4-Methylphenol	5	--	250[8]	5	--	Confusion, rapid respiration, eye and skin burns	CNS, respiratory system, liver, skin, eyes	
Naphthalene	10	15	500[8]	10	15	Eye irritant, excitement, vomiting, nausea	Eyes, blood, liver, kidneys, skin, RBC[10], CNS	

TABLE 4-1, Continued
PERSONAL EXPOSURE INFORMATION
CHEMICALS OF CONCERN
STRATFORD ARMY ENGINE PLANT

Chemical	OSHA			ACGIH		Acute Symptoms	Target Organs	Carcinogen
	TWA (ppm)	STEL (ppm)	Ceiling (ppm)	TLV-TWA (ppm)	TLV-STEL (ppm)			
SEMI-VOLATILE COMPOUNDS Bis (2-Ethylhexyl) phthalate	5	--	--	--	10	Eye irritation	Eyes, upper respiratory system, GI[11]	
Di-n-Butyl phthalate	5	--	9300[2]	--		Upper respiratory irritation, stomach irritation/discomfort	Respiratory system, GI	
Coal Tar Pitch Volatiles	0.2 mg/m^3 0.1 mg/m^3 (cyclohexane extractibles)	--	700[2] mg/m^3	0.2 (as Benzene Solubles)	--	Dermatitis,bronchitis	Respiratory system, bladder, kidneys, skin	Confirmed
Bromoform	0.5 ppm	--	Unknown[8]	.5	--	Eye and respiratory system irritation, CNS depressant	Liver, CNS,kidneys, skin, respiratory system	Suspected
Chlorodiphenyl (PCB) 48% Chlorine	1 mg/m^3 skin	--	10[8]mg/m^3	1 mg/m^3 skin	--	Eye irritation Chloracne Derm.	Liver, skin, eyes	Confirmed
Chlorodiphenyl (PCB) 54% Chlorine	0.5 mg/m^3 skin	--	5[8]mg/m^3	0.5 mg/m^3 skin		Eye irritation Chloracne	Liver, skin, eyes	Confirmed

TABLE 4-1, Continued
PERSONAL EXPOSURE INFORMATION
CHEMICALS OF CONCERN
STRATFORD ARMY ENGINE PLANT

Chemical	OSHA			ACGIH		Acute Symptoms	Target Organs	Carcinogen
	TWA (ppm)	STEL (ppm)	Ceiling (ppm)	TLV-TWA (ppm)	TLV-STEL (ppm)			
METALS								
Lead	0.05 mg/m^3	--	700[2] mg/m^3	0.15 mg/m^3	--	Weakness, eye irritation, trembling	GI, CNS, kidneys, blood, gingival tissue	Suspected
Mercury	0.01 mg/m^3 Alkyl Compounds (organic mercury)	.03 mg/m^3	10 $mgm^{3(8)}$	0.01 mg/m^3 Alkyl Compounds (organic mercury)	0.03	Irritation, cough, chest pain, weakness, dizziness, vomit, skin burns, bronchial pneumonia, impaired vision, diarrhea, insomnia, emotional disturbance	CNS, respiratory system, eyes, kidneys, skin	
	0.05 mg/m^3 vapor/skin (inorganic compounds)		28 $mg/m^{3(8)}$	0.05 mg/m^3 vapors (inorganic compounds)	--			
				0.1 mg/m^3 skin Alkyl and inorganic compounds	--			
Nickel	1 mg/m^3 (metal dust) 0.1 mg/m^3 (soluble compounds)	--	N/A	--	--	Allergic asthma, eye and respiratory system irritation, vertigo, nausea, vomiting	Lungs, skin, nasal cavities, CNS	Suspected

TABLE 4-1, Continued
PERSONAL EXPOSURE INFORMATION
CHEMICALS OF CONCERN
STRATFORD ARMY ENGINE PLANT

Chemical	OSHA			ACGIH		Acute Symptoms	Target Organs	Carcinogen
	TWA (ppm)	STEL (ppm)	Ceiling (ppm)	TLV-TWA (ppm)	TLV-STEL (ppm)			
METALS, Continued								
Chromium	1 mg/m^3 (metal dust)	--	N/A	0.5 mg/m^3 (metal dust)	--	Irritation, dermatitis	Lungs, skin	Suspected
	0.05 mg/m^3 Hexavalent Cr(VI)	--	--	0.05 mg/m^3 Hexavalent Cr(VI)	--	Irritation, dermatitis	Lungs, skin	Suspected
Bromine	0.1 (metallic dust)	0.3	10	0.1	0.3	Irritation, headaches, dizziness, pneumonia, diarrhea, eye burns, skin burns	Lungs, CNS, eyes	
Thorium	N/A (metallic dust)		N/A		N/A		Liver, kidneys, blood, bone marrow, respiratory system	Suspected

TABLE 4-1, Continued
PERSONAL EXPOSURE INFORMATION
CHEMICALS OF CONCERN
STRATFORD ARMY ENGINE PLANT

Chemical	OSHA			ACGIH		Acute Symptoms	Target Organs	Carcinogen
	TWA (ppm)	STEL (ppm)	Ceiling (ppm)	TLV-TWA (ppm)	TLV-STEL (ppm)			
INORGANIC COMPOUNDS Cyanides	5 mg/m^3		50 mg/m^3		5 mg/m^3	Asphyxia, weakness, headache, confusion, nausea, incoherence, eye & skin irritation	Liver, kidneys, skin, lungs, cardio-vascular system, CNS	
Asbestos	0.2 fiber/cm^3 0.1 fiber/cm^3 (action level)	--	--	0.2 fiber/cm^3	--	Restricted pulmonary function, finger clubbing	Lungs	Confirmed
Arsenic trioxide	0.010 mg/m^3	0.002[4] mg/m^3	0.002[4] mg/m^3	--	--	Ulceration of nasal septum, dermatitis, GI[(11)] disturbances, respiratory irritation, peripheral neuropathy, hyper-pigmentation of skin	Liver, kidneys, skin, lungs, lymphatic system	Confirmed

ACTION LEVELS WILL BE A MAXIMUM OF ONE-HALF OF THE OSHA AND/OR ACGIH. IN THE EVENT THAT THE OSHA PELs DIFFER FROM ACGIH TLV THE MORE RESTRICTIVE SHALL PREVAIL.

REFERENCES:

Threshold Limit Values and Biological Exposure Indices for 1991-1992 American Conference of Governmental Industrial Hygienists (ACGIH).
Air Contaminants - Permissible Exposure Limits (Title 29 CFR Part 1910.1000) Occupational Safety and Health Administration (OSHA), 1989.

TABLE 4-1, Continued
PERSONAL EXPOSURE INFORMATION
CHEMICALS OF CONCERN
STRATFORD ARMY ENGINE PLANT

NOTES:

(1)OSHA TWA - Occupational Safety and Health Administration Time-Weighted Average: the employee's average airborne exposure in any 8-hour work shift of a 40-hour work week which shall not be exceeded, as established by OSHA.

(2)OSHA STEL - Occupational Safety and Health Administration Short-Term Exposure Limit: the employee's 15-minute time-weighted average exposure which shall not be exceeded at any time during a work day unless another time limit is specified in a parenthetical notation below the limit. If another time period is specified, the time-weighted average exposure over that time limit shall not be exceeded at any time during the working day. These limits are established by OSHA.

(3)OSHA Ceiling - Occupational Safety and Health Administration Ceiling: the employee's exposure which shall not be exceeded during any part of the work day. If instantaneous monitoring is not feasible, then the ceiling shall be assessed as a 15-minute time weighted average exposure which shall not be exceeded at any time over a working day.

(4)TLV-TWA - Threshold Limit Value - Time-Weighted Average: the time-weighted average concentration for a normal 8-hour workday and a 40-hour workweek, to which nearly all workers may be repeatedly exposed, day after day, without adverse effect (ACGIH). These values are updated annually by the ACGIH and represent guidelines based on the latest toxicological data.

(5)TLV-STEL - Threshold Limit Value - Short Term Exposure Limit: the concentration to which workers can be exposed continuously for a short period of time without suffering from 1) irritation, 2) chronic or irreversible tissue damage, or 3) narcosis of sufficient degree to increase the likelihood of accidental injury, impair self-rescue or materially reduce work efficiency, and provided that the daily TLV-TWA is not exceeded. It is not a separate independent exposure limit; rather, it supplements the time-weighted average (TWA) limit where there are recognized acute effects from a substance whose toxic effects are primarily of a chronic nature. STELs are recommended only where toxic effects have been reported from high short-term exposures in either humans or animals. A STEL is defined as a 15-minute TWA exposure which should not be exceeded at any time during a workday even if the 8-hour TWA is within the TLV-TWA. Exposures above the TLV-TWA up to the STEL should not be longer than 15 minutes and should not occur more than four times per day. There should be at least 60 minutes between successive exposures in this range. An averaging period other than 15 minutes may be recommended when this is warranted by observed biological effects (ACGIH). These values are updated annually by the ACGIH and represent guidelines based on the latest toxicological data.

(6) - Maximum peak duration of 5 minutes in any 2 hours

(7)CNS - Central Nervous System

(8) - IDLH - Immediately Dangerous to Life or Health

TABLE 4-1, Continued
PERSONAL EXPOSURE INFORMATION
CHEMICALS OF CONCERN
STRATFORD ARMY ENGINE PLANT

NOTES, Continued

(9) - Maximum peak duration of 5 minutes in any 3 hours

(10)RBC - Red Blood Cell Count

(11)GI - Gastrointestinal

TABLE 4-2
CHEMICAL AND PHYSICAL PROPERTIES
CHEMICALS OF CONCERN
STRATFORD ARMY ENGINE PLANT

Chemical	CAS #	Boiling Pt. (°C) (760 mm Hg)	Vapor Pressure (mm Hg)	Flash Pt. (°C)	Vapor Density (air=1.0)	Solubility	Spec Gravity d^{20}_4	Reactivity
Volatile Organic Compounds Vinyl Chloride	75-01-4	-13.37	2530 (20°C)	-78°		Slight	0.9106	
Methylene Chloride	75-09-2	39.75				2%	1.3255	
Trans-1, 2- Dichloroethene		47.2	180-264^N			Insoluble	~1.28	Oxidizes in air
Chloroform	67-66-3	61-62				1 ml/250 ml H_20	1.484	Light sensitive
1,1,1-Trichloroethane		74.1		Non-Flammable		Insoluble	1.3376	
Trichloroethene	79-01-6	86.7		Non-Flammable	4.53	Very Low	1.4649	
Benzene	71-43-2	80.1		-11 (12°F)		0.188%	0.8787	
4-methyl 2-Pentanone		117		73°F		1.91%	0.801	
2-Butanone	78-93-3	79.6		21°F		27.5%	.805	
Tetrachloroethene	127-18-4	121		Non-Flammable			1.623	
Ethyl benzene	100-41-4	136.25		64°F		Insoluble	0.866	
Phenol	108-95-2	182		175°F		1 g/15 ml H_20	1.071	
1,2 Dichlorobenzene	95-50-1	180.5		151°F		Insoluble	1.3059	
1,2,4-Trichlorobenzene		213		230°F		Insoluble	1.4634	
1,1-Dichloroethane	75-34-3	57.3				.5%	1.1757	
1,2-Dichloroethane		83		56°F		1 part/120 parts	1.2569	

TABLE Continued
CHEMICAL AND PHYSICAL PROPERTIES
CHEMICALS OF CONCERN
STRATFORD ARMY ENGINE PLANT

Chemical	CAS #	Boiling Pt. (°C) (760 mm Hg)	Vapor Pressure (mm Hg)	Flash Pt. (°C)	Vapor Density (air=1.0)	Solubility	Spec Gravity d^{20}_4	Reactivity
2-Methyl-phenol		191		81-83°		1 part/40 parts	1.047	
4-Methyl-phenol		201.8				2.5 g/100 cc @ 50°	1.0341	
Napthalene	91-20-3	217.9		174°F		Insoluble	1.162	
Bis (2-ethylhexyl) phthalate								
Di-n-Butylpthalate (dibutylphthalate)		340°		170°C		1:2500	1.0459	Incompatible with Nitrates, Strong Oxidizers and Acids
Bromoform	75-25-2	149-150°				1:800	d^{15}_4 2.9035	Chemically Active Metals Sodium Potassium, Calcium Powdered Aluminum Zinc, Magnesium, Strong Caustics
<u>Metals</u> Lead	7439-92-1	1740°					11.34	Strong Oxidizers Hydrogen Peroxide Active Metals, Sodium, Potassium
Thorium								
Mercury			at 25° $2x10^{-3}$mm				d^{25} 13.534	Strong Oxidizers such as Chlorine
Nickel	7440-02-0	2837°						Strong Acids, Sulfur
Chromium	7440-47-3	2642°					7.14	Strong Oxidizers

TABLE , Continued
CHEMICAL AND PHYSICAL PROPERTIES
CHEMICALS OF CONCERN
STRATFORD ARMY ENGINE PLANT

Chemical	CAS #	Boiling Pt. (°C) (760 mm Hg)	Vapor Pressure (mm Hg)	Flash Pt. (°C)	Vapor Density (air=1.0)	Solubility	Spec Gravity d^{20}_4	Reactivity
Bromine	7726-95-6	59.47°						Compostible Organics, Oxidizable Material Aqueous Ammonia. Anhydrous Br_2 reacts with Aluminum Titanium Mercury Potassium, Wet Br_2 reacts with other metals
<u>Inorganics</u> Cyanide								Strong Oxidizers such as Nitrates, Chlorates, Acids, Acid Salts
Asbestos	1332-21-4							
Arsenic Trioxide	7740-38-2	465°				1:15 Hot H_20		

TABLE 4-3

PHYSICAL HAZARDS
STRATFORD ARMY ENGINE PLANT

Hazard	Description	Location	Procedure Used to Monitor/Reduce Hazard
Heavy Equipment	Construction Machinery	Throughout Site	Personnel maintain eye contact with operators; hard hats, safety shoes, and eye protection worn (as appropriate) during equipment operation. Avoid interfering with SAEP operations.
Refuse and Materials	Construction refuse and construction materials	Throughout Site	Maintain clean work areas; dispose of refuse immediately; do not block access routes with materials.
Heat Producing/Electrical Equipment	Generators, Construction Equipment and Steam Cleaners Power Washing Equipment	Throughout Site	Operate equipment away from vegetation and other materials that may ignite. Maintain fire-fighting equipment in the vicinity of operating equipment. Personnel should position themselves upwind of steam cleaning activities.
Heat Stress(1)/Cold Exposure(2)	Personnel working under extreme temperature are subject to adverse temperature-related effects.	Throughout Site	Employ buddy system. Each worker is responsible for visually monitoring his/her partner for signs of heat stress/cold exposure. Site safety personnel will also monitor worker's conditions and establish work/rest regimens.

NOTES:

(1) Heat stress monitoring protocols shall be implemented, as appropriate. Work/rest schedules shall be determined based upon ambient temperature, humidity, wind speed, solar radiation intensity, duration and intensity of work, and protective equipment ensembles. In cases where impervious clothing is worn (full-body), the NIOSH/OSHA/USCG/EPA "Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities" protocol for prevention of heat stress shall be followed, and heat stress monitoring shall commence at temperatures of 70 degrees Fahrenheit and above. Where impervious clothing is not worn, the most current published ACGIH heat stress standard shall be used. Both of these guidance documents are contained in Attachment 3.

(2) Cold stress monitoring protocols shall be implemented, as appropriate. Work/rest schedules shall be determined based upon ambient temperature, humidity, wind speed (wind chill), solar radiation intensity, duration and intensity of work, and protective equipment ensembles. For cold stress monitoring to help prevent frostbite and hypothermia, the ACGIH cold stress standard contained in Attachment 4 must be followed.

TABLE 8-1
LEVELS OF PROTECTION FOR FIELD ACTIVITIES
AT THE STRATFORD ARMY ENGINE PLANT (SAEP)

Activity	Potential Hazards	Initial Level of Protection	Monitoring Requirements*(1)	Action Levels
Installation of Monitoring Wells	Metals, VOCs, Semi-Volatile Organic Compounds, Halogenated Organic Compounds	Level D	Explosive Gases (CGI) Hydrogen Sulfide (H_2S) (CGI) Total VOCs (HNu PID, OVA FID or Draeger Tubes*(3))	Total VOCs*(2): <5 ppm - Modified Level D 5-50 ppm - Level C >50 ppm - Evacuate Explosive gases: <20% - Modified Level D >20% - Evacuate H_2S: <1.5 ppm - Modified Level D 1.5-5 ppm - Level C >5 ppm - Evacuate
Sampling of Monitoring Wells	Metals, VOCs, Semi-Volatile Organic Compounds, Halogenated Organic Compounds	Level D	Hydrogen Sulfide (CGI) Total VOCs (HNu PID, OVA FID or Draeger Tubes*(3))	Total VOCs*(3): <5 ppm - Modified Level D 5-50 ppm - Level C >50 ppm - Evacuate Explosive gases: <20% - Modified Level D >20% - Evacuate H_2S: <1.5 ppm - Modified Level D 1.5-5 ppm - Level C >5 ppm - Evacuate
Soil Sampling	Metals, VOCs, Semi-Volatile Organic Compounds, Halogenated Organic Compounds	Level D	Total VOCs (HNu PID, OVA FID or Draeger Tubes*(3)) Hydrogen Sulfide (CGI)	Total VOCs*(3): <5 ppm - Modified Level D 5-50 ppm - Level C >50 ppm - Evacuate H_2S: <1.5 ppm - Modified Level D 1.5-5 ppm - Level C >5 ppm - Evacuate
Sediment Sampling	PCBs, Semi-Volatile Organic Compounds, VOCs	Level D*(2)	Total VOCs (HNu PID, OVA FID or Draeger Tubes*(3)) Hydrogen Sulfide (CGI) Draeger Tubes *(2)	Total VOCs*(3): <5 ppm - Modified Level D 5-50 ppm - Level C >50 ppm - Evacuate H_2S:

TABLE 8-1 (Continued)
LEVELS OF PROTECTION FOR FIELD ACTIVITIES
AT THE STRATFORD ARMY ENGINE PLANT (SAEP)

Activity	Potential Hazards	Initial Level of Protection	Monitoring Requirements*(1)	Action Levels
				<1.5 ppm - Modified Level D 1.5-5 ppm - Level C >5 ppm - Evacuate
Benthic Macroinvertebrate Community Characterization	PCBs, Semi-Volatile Organic Compounds, VOCs	Level D*(2)	Total VOCs (HNu PID, OVA FID or Draeger Tubes*(3)) Hydrogen Sulfide (CGI)	Total VOCs*(3): <5 ppm - Modified Level D 5-50 ppm - Level C >50 ppm - Evacuate H_2S: <1.5 ppm - Modified Level D 1.5-5 ppm - Level C >5 ppm - Evacuate
Biological Tissue Samples	PCBs, Semi-Volatile Organic Compounds	Level D*(2)	None	None

Note:

*(1) The frequency of air quality monitoring for worker protection will be at the discretion of the SSHO and will be based on the likelihood of changes in air quality, the nature of the work being performed, and the previous measurements. Initially, air quality measurements with the HNu PID or OVA FID will be made at 15-minute intervals in the breathing zone of the most highly exposed worker(s) (i.e., closest to sources) at the Site. Air quality monitoring will initially be performed using a CGI at least each 30 minutes in areas where flammable conditions, oxygen deprivation or enrichment, and/or elevated levels of hydrogen sulfide may develop.

*(2) Individual(s) involved in these field activities should wear polycoated Tyvek or Saranex impregnated coveralls.

*(3) Draeger tubes shall be used if the Total VOC readings are detected above background airborne concentrations.

*(4) Monitoring will take place near individuals with the greatest potential for exposure in all work zones.