IBM

EAST FISHKILL FACILITY

International Business Machines Corporation
Hopewell Junction, New York

RCRA FACILITY INVESTIGATION WORK PLAN FOR SOLID WASTE MANAGEMENT UNITS AT B/330, B/322, B/308/310 AND B/309/310

AND

RCRA FACILITY ASSESSMENT SAMPLING VISIT WORK PLAN FOR THE SOUTHEAST QUADRANT AREA OF CONCERN

VOLUME 2

FEBRUARY 1996

WILLIAM F. COSULICH ASSOCIATES, P.C.
ENVIRONMENTAL ENGINEERS AND SCIENTISTS

VOLUME 2

RCRA FACILITY INVESTIGATION (RFI) WORK PLAN

FOR

SOLID WASTE MANAGEMENT UNITS (SWMUs)

AT

B/330, B/322, B/308/310 AND B/309/310

and

RCRA FACILITY ASSESSMENT SAMPLING VISIT (RFA-SV) WORK PLAN

FOR THE

SOUTHEAST QUADRANT AREA OF CONCERN (SEQ AOC)

INTERNATIONAL BUSINESS MACHINES CORPORATION

EAST FISHKILL FACILITY

PREPARED BY

WILLIAM F. COSULICH ASSOCIATES, P.C.

WOODBURY, NEW YORK

FEBRUARY 1996

TABLE OF CONTENTS

Section	Title	Page
7.0	**SITE SPECIFIC HEALTH AND SAFETY PLAN**	7-1
7.1	General	7-1
7.1.1	Site Information	7-1
7.2	Purpose and Scope	7-4
7.2.1	Purpose and Scope of the Field Investigation	7-4
7.2.2	Purpose and Scope of this SHSP	7-4
7.3	Summary of Existing Information	7-4
7.3.1	Site Location and Ownership	7-4
7.3.2	Site Description and History	7-5
7.3.3	Previous Investigations	7-6
7.4	Personnel Organization and Responsibilities	7-12
7.4.1	WFC Project Director	7-12
7.4.2	WFC Project Manager	7-12
7.4.3	WFC Health and Safety Officer	7-12
7.4.4	WFC Field Operations Manager	7-13
7.4.5	IBM Project Manager	7-13
7.4.6	Technical Support	7-13
7.4.7	Security Officer	7-14
7.4.8	Physician	7-14
7.4.9	Designations of Personnel	7-14
7.4.10	General Health and Safety Requirements for All Employees	7-15
7.5	Hazard Assessment and Risk Analysis	7-16
7.5.1	Potential Health Hazards	7-16
7.5.1.1	Health Hazard Identification	7-16
7.5.1.2	Health Hazard Evaluation	7-26
7.5.1.3	Potential Exposures	7-26
7.5.1.4	Physical an Biological Hazards	7-26
7.5.2	Activity Safety and Health Hazard Analysis	7-27
7.5.2.1	Drilling of Soil Borings and Soil Sampling	7-28
7.6	Training Requirements	7-30
7.6.1	General Health and Safety Training	7-30
7.6.2	Site Specific Training	7-31
7.7	Personal Protective Equipment	7-33
7.7.1	General	7-33
7.7.2	General Site Safety Equipment Requirements	7-33
7.7.2.1	Equipment	7-33
7.7.3	Level D Protection	7-34
7.7.3.1	Equipment	7-34
7.7.4	Level C Protection	7-34
7.7.4.1	Equipment	7-34

TABLE OF CONTENTS (continued)

Section	Title	Page
	7.7.5 Confined Spaces	7-35
	7.7.6 Standing Orders	7-35
7.8	Medical Surveillance	7-36
	7.8.1 Medical Surveillance Protocol	7-37
	7.8.2 Non-Scheduled Medical Examinations	7-37
	7.8.3 Documentation and Recordkeeping	7-38
7.9	Environmental and Personal Monitoring Program	7-38
	7.9.1 General	7-38
	7.9.2 Air Monitoring	7-39
	7.9.2.1 Air Monitoring Instrumentation	7-39
	7.9.2.2 Contaminants of Concern	7-40
	7.9.2.3 Air Monitoring Locations and Action Level Criteria	7-40
	7.9.2.4 Personal Exposure Monitoring	7-46
	7.9.2.5 Heat/Cold Stress Monitoring	7-46
	7.9.3 Quality Assurance and Control	7-46
7.10	Site Control Measures	7-47
	7.10.1 Site Management	7-47
	7.10.2 Work Zones	7-47
	7.10.2.1 Exclusion Zone	7-48
	7.10.2.2 Equipment Decontamination	7-48
	7.10.2.3 Support Zone	7-49
	7.10.3 Operations Start-up	7-49
	7.10.4 Buddy System	7-49
	7.10.5 Site Communications Plan	7-50
	7.10.6 Medical Assistance	7-52
	7.10.7 Safe Work Practices	7-54
	7.10.7.1 General	7-54
	7.10.7.2 Site Personnel	7-55
	7.10.7.3 Traffic Safety Rules	7-56
	7.10.7.4 Equipment Safety Rules	7-56
	7.10.7.5 Drilling Equipment Safety Rules	7-58
	7.10.7.6 Daily Housekeeping	7-66
	7.10.7.7 Site Personnel Conduct	7-66
7.11	Personal Hygiene and Decontamination	7-67
	7.11.1 General	7-67
	7.11.2 Contamination Prevention	7-68
	7.11.3 Personal Hygiene Policy	7-68
	7.11.4 Personnel Decontamination Procedures	7-68
	7.11.5 Emergency Decontamination	7-70
	7.11.6 Equipment Decontamination - General	7-70
	7.11.7 Small Equipment Decontamination Procedures	7-71

TABLE OF CONTENTS (continued)

Section	Title	Page
	7.11.8 Heavy Equipment Decontamination Procedures	7-72
7.12	Emergency Response and Contingency Plan	7-72
	7.12.1 General	7-72
	7.12.2 Emergency Equipment	7-73
	7.12.3 Special Requirements	7-73
	7.12.4 Emergency/Accident Reporting and Investigation	7-73
	7.12.5 Emergency Medical Care	7-75
	7.12.6 Emergencies Outside the East Fishkill Site	7-75
	7.12.7 Emergencies Within the East Fishkill Site	7-76
	7.12.8 Personnel Exposures	7-76
	7.12.9 Site Evacuation	7-76
7.13	Posted Regulations	7-76
7.14	Logs, Reports, and Recordkeeping	7-77
	7.14.1 Initial Site Specific Training Log	7-77
	7.14.2 Refresher Training Log	7-78
	7.14.3 Daily Safety Logs	7-78
	7.14.4 Employee/Visitor Log (Site Entry and Exit Log)	7-79
	7.14.5 Weekly Safety Reports	7-80
8.0	**COMMUNITY RELATIONS PLAN**	8-1
8.1	Introduction	8-1
8.2	Identification of Affected and/or Interested Public	8-1
8.3	Identification of IBM, NYSDEC and USEPA Contacts	8-2
8.4	Identification of Document Repositories	8-3
8.5	Description of Community Relations Activities	8-3
9.0	**REFERENCES**	9-1

List of Exhibits

Health and Safety Officer Qualifications ..... A
Field Team Review Form ..... B
WFC Confined Space Entry Procedures C
Site Worker Training and Medical Examination Record ..... D
Weekly Safety Meeting ..... E
Daily Tool Box Safety Meeting Record ..... F
Respiratory Certification Records ..... G
Care and Cleaning of Respirators ..... H
Medical Data Sheet I
Air Monitoring Results Report ..... J
Heat Stress/Cold Stress ..... K
Emergency Signals L
Emergency Information ..... M
Daily Safety Inspection Checklist ..... N
Weekly Safety Inspection List ..... O
Incident Notification Form ..... P
OSHA Form 200 ..... Q
Regulation 1 - Use of Personal Protective Equipment ..... R
Regulation 2 - Personal Hygiene ..... S
Regulation 3 - Provisions for Smoking, Eating, Chewing, and Drinking ..... T
Refresher Training Documentation ..... U
Weekly Safety Report V
Site Entry and Exit Log ..... W

List of Figures

7-1 Site Location Map 7-2
7-2 Site Plan - East Complex 7-3

List of Tables

7-1 Organic Chemicals Detected in Soils - B/322 Area 7-8
7-2 Principal Organic Chemicals Detected in Groundwater - West of B/322 and at the B/320B Linkway 7-9
7-3 Summary of Characteristics and Health Hazards at the Site 7-17
7-4 Summary of Contaminants of Concern 7-18
7-5 Permissible Exposure Limits and Primary Health Hazards for Contaminants of Concern 7-23
7-6 Summary of Air Monitoring Program and Action Levels 7-41
7-7 Location of Emergency Equipment 7-73

Section 7

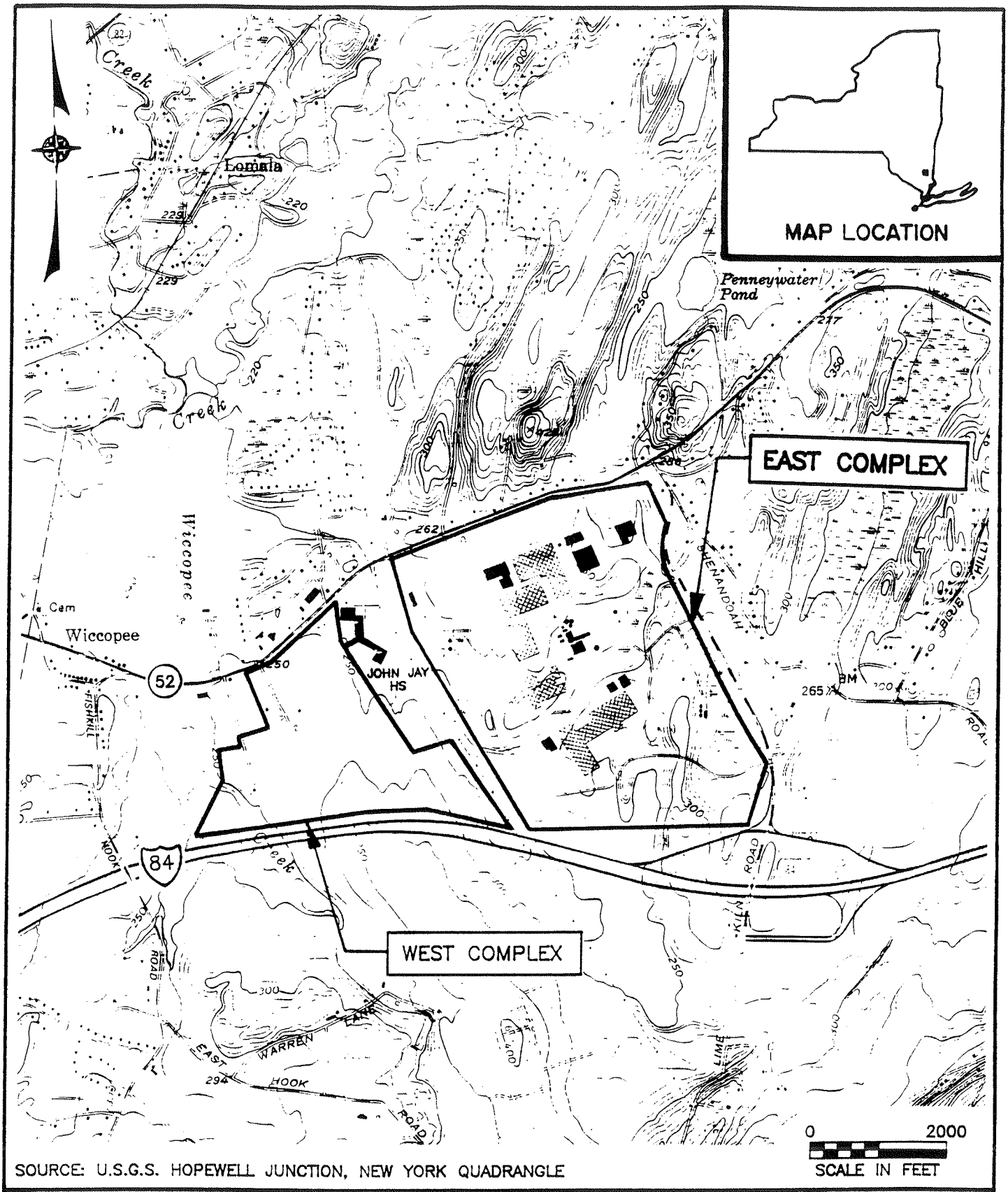
7.0 SITE SPECIFIC HEALTH AND SAFETY PLAN

7.1 General

This Site Specific Health and Safety Plan (HASP) was prepared in conformance with the William F. Cosulich Associates, P.C. (WFC) Health and Safety Program and is intended to meet the requirements found in 29 CFR §1910.120 and §1926, the NIOSH/OSHA/USCG/EPA Guidance Manual for Hazardous Waste Site Activities (NIOSH No. 85-115), US EPA "Standard Operating Safety Guides", and Superfund Amendments Reauthorization Act (SARA), Title I, Section 126. The HASP addresses hazardous activities associated with the field investigation and soil sampling activities for a RCRA Facilities Investigation at the International Business Machines (IBM) Corporation facility in East Fishkill, New York, Dutchess County (see Figures 7-1 and 7-2). The facility shall be referred to in this plan as "the site". Compliance with the HASP is required of all on-site personnel entering the site. Visitors to the site shall be subject to the requirements of this HASP and be accountable to the authorities having jurisdiction at the site. Visitors, contractors and other personnel associated with this assignment are also required to comply with all IBM procedures addressing health and safety at the facility.

7.1.1 Site Information

Site Name:	International Business Machines Corporation (IBM) Corporation East Fishkill Facility
Address:	Hopewell Junction, NY 12533-0999
Date of HASP Preparation:	October 1995



SOURCE: U.S.G.S. HOPEWELL JUNCTION, NEW YORK QUADRANGLE

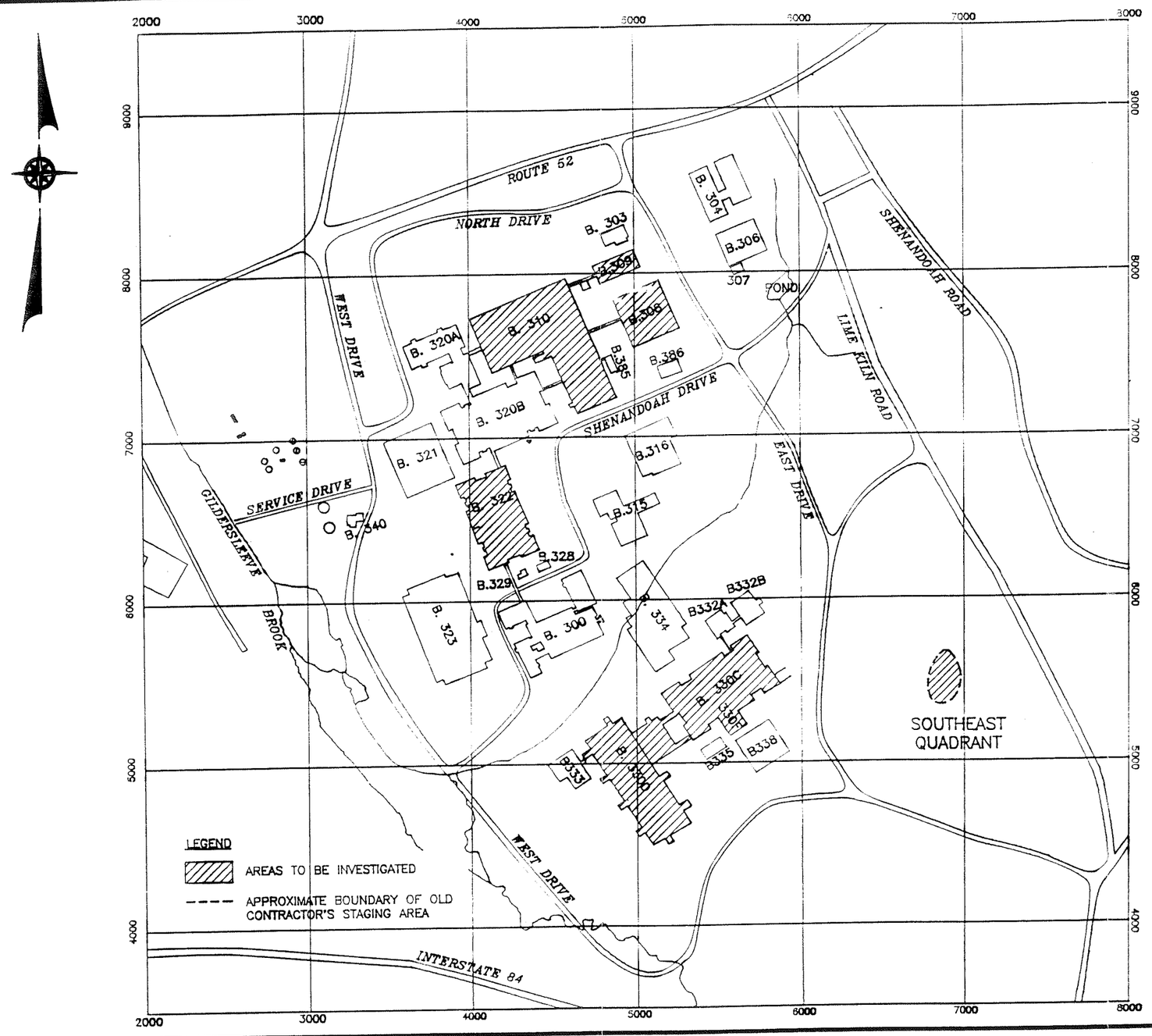
IBM CORPORATION
EAST FISHKILL, NEW YORK

SITE LOCATION MAP

William F. Cosulich Associates, P.C.
Environmental Engineers

FIGURE 7-1

DIR: 1349 FILE: 1349-SP RDS-09/15/95



INTERNATIONAL BUSINESS MACHINES CORPORATION
EAST FISHKILL, NEW YORK

SITE PLAN
EAST COMPLEX

William F. Cosulich Associates, P.C.
Environmental Engineers

FIGURE 7-2

7.2 Purpose and Scope

7.2.1 Purpose and Scope of the Field Investigation

IBM retained WFC to conduct a RCRA Facility Investigation (RFI) at its East Fishkill site. This RFI is part of the RCRA Part 373 permit requirements and focuses exclusively on soil contamination. Soils in and around four active areas on-site, each containing several solid waste management units (SWMUs) will be investigated, primarily by the drilling and sampling of soil borings. In addition, a RCRA Facility Assessment (RFA) of soils in the Southeast Quadrant, an on-site Area of Concern (AOC), will be included in this program.

7.2.2 Purpose and Scope of this SHSP

To ensure health and safety during drilling, sampling, and related investigative activities in the Restricted Zones by setting forth requirements for on-site health and safety supervision, air monitoring, medical monitoring, personal protective equipment, controls, safe work practices, and proper decontamination.

7.3 Summary of Existing Information

7.3.1 Site Location and Ownership

IBM East Fishkill is located on approximately 750 acres in the town of East Fishkill, Dutchess County, New York. The facility develops and manufactures semiconductor logic and memory devices and modules for many of IBM's product lines. IBM began operations in East Fishkill in 1963. Prior use of the site was for agricultural purposes.

The IBM East Fishkill Facility is wholly owned by the IBM Corporation, headquartered in Armonk, New York. Since 1993, several non-IBM tenants (including FED Corp., SIBond L.L.C., and MiCrus) have leased office and manufacturing space in three buildings on-site.

The facility is located in a semi-rural area with private residences adjacent to the north and eastern facility boundaries. John Jay High School is located in between the Main Site and West Complex, the Wicoppee Creek and commercial property form the western perimeter and I-84 is the southerly facility boundary (see Figure 1-2). Municipal services such as water and sewers are not available; thus, IBM relies on it's own waste treatment systems and production wells for drinking and production water. The production wells are located both on the main site and off-site properties. The site is totally dependent on groundwater, and uses approximately 2.5 million gallons per day.

7.3.2 Site Description and History

IBM's East Fishkill plant occupies approximately 4 million square feet of building space on two neighboring parcels of land (the East or Main Complex and the West Complex). Organic and inorganic chemicals are used on-site in manufacturing and development operations.

As part of IBM's corporate environmental policy, the facility began a series of environmental investigations in 1978. These investigations indicated that chlorinated hydrocarbons were present in the groundwater and in the soils on-site. These principal compounds of concern are:

Tetrachloroethene (PCE)
Trichloroethene (TCE)
cis-1,2-dichloroethene (DCE)

The concentrations of these solvents in the glacial overburden soils ranged from non-detect (<1 ug/l) to pure product. Solvents were also detected in the fractured dolomite bedrock beneath the site at concentrations ranging from non-detect to 10 mg/l.

The sources of the solvent contamination were determined to include releases and spills of both virgin product and waste from on-site storage and/or handling areas as well as a contractor staging area.

To prevent any further spills or releases, in the late 1970's, IBM East Fishkill began a program to replace all buried chemical tanks with above ground, double-walled tanks. In addition, much of the underground waste solvent piping has since been replaced with double-walled, above ground piping. A majority of the industrial waste and solvent lines located within buildings have also been replaced with above ground piping.

Soil remediation was performed at the old construction debris landfill, which was found to contain chemical contaminants. A total of 20,000 cubic yards of material were removed from the landfill and transported to a secure hazardous waste landfill for disposal. The area was then refilled and capped with clay. In addition, the residual groundwater contamination at the old landfill site is being remediated with a pump and treat system, one of the four active groundwater pump and treat systems currently in operation.

7.3.3 Previous Investigations

Many localized investigations of soil contamination have been conducted, some as part of studies on groundwater. Residual soil contamination is considered to be an on-going secondary source of hazardous constituents to the groundwater. Several recent studies have focused on soil contamination in and around buildings, in preparation for planned building expansions, including:

- "Building 322 Soil Borings and Utilities Search" by Chazen Environmental Services, July 1989;
- "The Installation of Thirteen Soil Borings and Five Monitor Wells Inside Building 330 C/D Phases IBM Corp. E. Fishkill Facility" by Chazen Environmental Services, January 1990;
- "Soil Sampling Completion Report Building 322 Upgrade" by Handex Environmental Management, March 1991; and
- Supporting investigation reports by IBM dated July 1990 and September 1993.

The most comprehensive investigation of soils was the soil gas study the Tracer Research Corporation entitled, "Shallow Soil Gas Investigation at IBM East Fishkill", November 1989. The results of the soil gas investigation defined five areas on-site with elevated levels of VOCs in the soil:

- Building 322
- Building 330 (comprised of 2 adjoining parts, B330/C and B330/D)
- Building 310 corridor with Building 308
- Building 310 corridor with Building 309
- The Southeast Quadrant area (SEQ), also known as the "former contractor's staging area"

Each of the four building areas is considered a SWMU and will be addressed as part of this RFI, while the SEQ is considered an AOC and will be addressed as part of the RCRA Facility Assessment Sampling Visit.

Building 322 (B/322)

Building 322 is a manufacturing facility for semi conductors, constructed in the late 1960's - early 1970's. It is linked to B/320B to the north, and B/300 to the south. The processes in this building utilize solvents and generate hazardous waste.

Documented releases from above ground tanks and associated underground piping have occurred, releasing various waste solvent mixtures to the ground. Table 7-1 lists the chemicals detected in the analyses of the excavated soils. Table 7-2 presents the principal organic chemicals detected in groundwater west of B/322 and the 322-320B linkway.

Table 7-1

ORGANIC CHEMICALS DETECTED IN SOILS FOLLOWING DOCUMENTED RELEASES B/322 AREA

xylene
trichloroethene - alcohol
n-butyl acetate (NBA)
acetone
NMP (n-methyl - 2 pyrrolidone)
2 - ethoxyl ethyl acetate
dichloromethane
trichloroethene
isopropyl alcohol (IPA)
n-butyl acetate
ethyl cellosolve
"waste solvent" (F001, F002, F003, F005)
"fluoride/heavy metals waste water" (D002, D007)
may also contain:
trace amounts arsenic compounds
chlorofluorocarbons
phenols
lead
methyl ethyl ketone

Table 7-2

PRINCIPAL ORGANIC CHEMICALS DETECTED IN GROUNDWATER WEST OF BUILDING 322 AND AT THE BUILDING 322-320B LINKWAY

Chlorinated Aliphatics
Tetrachloroethene (perchloroethene)
Trichloroethene
cis-Dichloroethene
Vinyl Chloride
Freon Compounds
Trichlorotrifluoroethane (113)
Dichlorotrifluoroethane (123a)
Aromatic Hydrocarbons
Benzene
Toluene
o-Xylene
p and m-Xylene
Ethyl Benzene
Chlorinated Aromatics
ortho-Dichlorobenzene

Building 330

Building 330 consists of two adjoining buildings, B/330C and B/330D, both are active manufacturing facilities with gravity drain systems for waste solvents. Both buildings have been in operation since the mid 1960's.

IBM's packaging department which produces the substrates for the semiconductors occupies both B/330C and B/330D. The eastern part of B/330C also houses IBM's Organic Manufacturing Facility (OMF), where resist developers and binders are formulated. Chemicals used in the OMF include acetone, methanol, methyl isobutyl ketone and propylene glycol methyl ether acetate. The Packaging Department also utilizes perchloroethene.

The perchloroethene used in both B/330C and B/330D is recycled on-site in the nearby perchloroethene recycling plant, B/335. B/335 is located approximately 80 feet south of B/330C and 300 feet east of B/330D. The "perc" recycling plant is connected by piping to both B/330C and B/330D.

Building 308/310

Building 308 is primarily used as a warehouse, and at one time housed a tool cleaning area. It is connected by a linkway on the west side to Building 310. Building 310 is a manufacturing building built in the mid 1960's and used for the production of semiconductors. B/310 is also connected by a linkway to Building 309, the Waste Management Center. Other nearby buildings include B/384, a waste treatment facility, B/320A and B/320B with an abandoned buried gravity drain system for waste solvents, and B/385, originally a fluoride heavy metals treatment plant, and now the drum rinse facility.

Documented releases associated with tanks in and around B/308/310 and B/308/310 are described in Section 2 of the work plan.

On the north side of the Building 308/310 Linkway there were three underground tanks, now closed, where releases of perchloroethene waste or perchloroethene sludge are known to have occurred. PCE has been detected in the groundwater, at concentrations exceeding 100,000 ug/l and in soil gas up to 1,500 g/L, and in soil borings up to 260 ppm.

Buildings 309/310

Building 309 is the waste storage building and chemical storage building. New product as well as waste generated on-site are stored there. There are six storage rooms within the building, where waste is segregated by compatibility. Nearby is a former tank farm with underground tanks once used to store methylene chloride waste, n-butyl acetate waste, freon TP35 waste, PCE waste, isopropyl alcohol waste, xylene waste, freon TF waste, and mixed solvent waste. There are a number of SWMUs in the vicinity of B/309/310, where known releases of chemicals have apparently occurred.

The chemicals of concern, based on the analytical data available are perchloroethene (PCE), methylene chloride (MC), freon TP35, xylene and IPA.

Southeastern Quadrant (SEQ)

The SEQ is an undeveloped area on-site that falls within a listed New York State Wetlands. At some point in the past, the area was backfilled. The nature and source of the fill material is not known. This area was known as the former contractor staging area due to the fact that contractors were allowed to store trailers, equipment, and supplies there.

The soil gas survey detected trace levels of volatiles (cis-1,2 DCE, 111-TCA, TCE, PCE, benzene, and toluene) in this area. Soil gas results also indicate an area of light hydrocarbon contamination (C1 - C3). These results are more fully presented in Section 2.0 of the work plan.

7.4 Personnel Organization and Responsibilities

This project will require the interaction of contractors and technical specialists, both on-site and off-site. The project team will be composed of representatives of WFC and various subcontractors.

7.4.1 WFC Project Director

The WFC Project Director will have overall responsibility for implementation of the corporate and site-specific health and safety plan, and the supervision and monitoring of WFC employees and drilling subcontractors.

7.4.2 WFC Project Manager

The WFC Project Manager will assure that all elements of this SHSP are implemented where applicable and that all project staff are protected and working in a safe manner.

7.4.3 WFC Health and Safety Officer (HSO)

The WFC HSO has overall responsibility for ensuring that the policies and procedures of this SHSP are implemented. For the purposes of this work plan, WFC HSO is also the WFC Field Operations Manager (FOM).

The WFC HSO will be on-site during the project. The HSO has the authority to stop work at any time unsafe work conditions are present. Any potentially hazardous condition posing a risk beyond the defined role or mission which WFC currently anticipates will require the WFC HSO to consult with the WFC Project Director and the Technical Advisors from Field Safety Corporation.

The HSO shall document daily, activities with health and safety relevance including references to maintenance and calibration of health and safety equipment. See Exhibit A for HSO qualifications.

7.4.4 WFC Field Operations Manager (FOM)

The WFC FOM, or designee, will be responsible for conducting the work and for assuring that the work is conducted in accordance with the requirements of the work plan. The FOM will be on-site as needed during the project and will manage all day-to-day activities of all parties on this project.

The FOM will be responsible for implementing safety precautions and procedures during all investigation phases.

The FOM has authority to resolve health and safety issues at the site in consultation with the WFC Project Director and the Technical Advisors available from Field Safety Corporation.

7.4.5 IBM Project Manager

The IBM Project Manager will be responsible for providing existing documents of all known hazards and facility related information to the WFC FOM. Should IBM personnel become involved with investigative work of the project, IBM Project Manager shall provide IBM personnel with the Site Specific Health and Safety Plan as well as any other information concerning chemical or other safety concerns.

7.4.6 Technical Support

Technical support shall be provided by a Certified Hazardous Materials Manager (CHMM), a Certified Industrial Hygienist (CIH), or designee and shall remain available off-site on an as-needed basis to provide technical support to the Project Team. Any decisions requiring use or

selection of personal protective equipment (PPE) or monitoring devices other than those in this plan must be approved by the CHMM, CIH, or designee. In this instance, technical support will be provided by Field Safety Corporation.

7.4.7 Security Officer

A security officer will not be provided specifically for this RCRA Facility Investigation by IBM.

7.4.8 Physician

The Physician will be responsible for all medical review, diagnosis, and certification of all WFC site personnel.

7.4.9 Designations of Personnel

WFC Project Director

Richard M. Walka, William F. Cosulich Associates, P.C.
(516) 364-9880

WFC Project Manager

Brian M. Veith, P.E., William F. Cosulich Associates, P.C.
(516) 364-9880

WFC Field Operations Manager and On-site Health and Safety Officer

Loren R. Lasky
William F. Cosulich Associates, P.C.
(516) 364-9880

Health and Safety Technical Advisers

Michael H. Ziskin, CHCM, CHMM, Field Safety Corporation
(203) 964-9199

Mary A. Healy and/or Dawn Han, CIH, Field Safety Corporation
(203) 964-9199

IBM Project Manager

Michele J. West, IBM East Fishkill
(914) 894-5536

Physician (on-call)

Dr. Ronald E. Rosen, MD
269-11 76th Avenue
CCC Building, Third Floor, Room 313
New Hyde Park, NY 11042
(718) 470-4435

Medical Assistance

IBM Emergency Control 4-3333

7.4.10 General Health and Safety Requirements for all Employees

The following general health and safety requirements will apply to all persons working at the site:

1. All persons working on the investigation team shall read, sign and become familiar with this SHSP (a copy of the Field Team Review Form is provided in Exhibit B). If any information is unclear, the reader shall contact the HSO for clarification prior to any field work. A copy of the plan will be available for review through the Project Manager, FOM, or his designee.

2. No employee will be allowed in active investigation areas without the prior knowledge and approval of the HSO, Project Manager or FOM. All active areas shall be fenced or designated with warning tape to prevent access by other site personnel or the public.

3. Sufficient backup personnel will be available for all site activities. At a minimum, two persons shall be present at any location during investigation activities.

4. All personnel involved in the investigation at the site will notify the HSO, Project Manager or FOM of any unsafe conditions or activities.

5. Standard hygiene practices will be implemented such as no smoking, eating or drinking during site investigation work activities, and requiring a thorough washing of hands and face prior to smoking, eating, or drinking. These activities will only occur at a designated area within the facility. At all times, personnel should perform investigative activities from upwind directions.

6. Workers will avoid unnecessary contamination such as walking through, sitting on, leaning on or kneeling in areas that are known or suspected to be hazardous.

7. All site personnel shall observe their partners for any signs of adverse effects associated with the work activity and will inform their partner or supervisor of any unusual signs or symptoms that they are experiencing themselves.

7.5 Hazard Assessment and Risk Analysis

7.5.1 Potential Health Hazards

The general health hazard potential at the Site is characterized in Table 7-3. The primary concern at the Site is to protect the workers from potential exposure to contaminated subsurface soils, surfaces, or containers (e.g., floor, drums, sump pits), vapors, splashes, and concrete dust.

7.5.1.1 - Health Hazard Identification

A list of the chemicals of concern for the project related areas can be found in Table 7-4. These chemical were identified based on chemicals used or stored in related areas, chemical from known SWMU releases, and chemicals detected in previous sampling programs. The toxic chemicals may be present in the areas of concern at levels which upon volatilization may result in concentrations approaching Permissible Exposure Limits (PELs). Chemical hazard groups include:

- various chlorinated and aromatic volatile organic compounds (VOCs)
- corrosives
- metals, cyanides, etc.

In addition to inhalation hazards, potential skin exposure hazard exists. Table 7-5 lists the chemicals, PELs and primary health hazards.

Table 7-3

SUMMARY OF CHARACTERISTICS AND HEALTH HAZARDS AT THE SITES

Type of site	Industrial area
Classification	Active
Apparent hazard	Moderate for inhalation Moderate for skin exposure
Potential source	Contaminated soil and surfaces (floors, tanks, pits, trenches)
Contamination characteristics	Toxic, corrosive, flammable
Form of hazards	Dusts, liquids, vapors
Routes of exposure	Inhalation, ingestion, skin, eyes

Table 7-4

SUMMARY OF CONTAMINANTS OF CONCERN

Area to be Investigated	Activities Performed	Contaminants of Concern[1]
B/322	Manufacturing (semi conductors)	xylene
		trichloroethene
		n-butyl-acetate (NBA)
		acetone
		n-methyl-2-pyrrolidone (NMP)
		2-ethoxyethyl acetate
		dichloromethane
		trichloroethene (TCE)
		isopropyl alcohol (IPA)
		ethyl cellosolve
		chlorofluorocarbons
		lead
		methyl ethyl ketone (MEK)
		"J-100" (o-dichlorobenzene, phenol and PCE compound)
		fluoride
		chlorobenzene
		o-dichlorobenzene
		"fluoride/heavy metals waste water" (D002, D007)
		arsenic compounds

Table 7-4 (continued)

SUMMARY OF CONTAMINANTS OF CONCERN

Area to be Investigated	Activities Performed	Contaminants of Concern[1]
B/330	Manufacturing:	acetone
		methanol
	• substrates for semi conductors	methyl isobutyl ketone (MIK)
	• OMF (organic manufacturing facility): resist developers binders	propylene glycol methyl ether acetate
	Packaging:	perchloroethene (PCE)
	Loading and Unloading of Bulk	cis 1,2-dichloroethylene (DCE)
	Solvent (I/U)	1,1,1 trichloroethane (TCA)
		mixed waste solvent
		fluoride/heavy metals
		fluoride/heavy metals waste water
		corrosive waste water
		potassium ferrocyanide
		methylene chloride (MC)
B/308/310	B/308	freon 113
		IPA
	• warehouse	NBA
	• tool cleaning	NMP
	• F/HM (fluoride/heavy metals waste water pump station)	mixed waste solvent
		fluoroboric acid waste

Table 7-4 (continued)

SUMMARY OF CONTAMINANTS OF CONCERN

Area to be Investigated	Activities Performed	Contaminants of Concern[1]
	B/310 • manufacturing (semi conductors)	fluoride/heavy metal waste water
		fluoride/industrial waste water
		perchloroethene sludge
		perchloroethene waste
		acetone
		dichloromethane
		cis 1,2-dichloroethene
		TCE
		PCE
		toluene

Table 7-4 (continued)

SUMMARY OF CONTAMINANTS OF CONCERN

Area to be Investigated	Activities Performed	Contaminants of Concern[1]
B/309/310	B/309	freon TP35
	"waste management center"	xylene
	• chemical storage	perchloroethene
	• loading/unloading	IPA
	containerized hazardous waste	methylene chloride waste
	• loading/unloading solvents	NBA waste
	• tank farm	PCE waste
	• waste storage	IPA waste
		mixed solution waste
		xylene waste
		freon TF waste
		acid waste
		base waste
		fluoride developing waste
		molybdenum waste
		lead waste
		photo developing waste
		storage: PCBs, cyanide, arsenic, mixed arsenic

Table 7-4 (continued)

SUMMARY OF CONTAMINANTS OF CONCERN

Area to be Investigated	Activities Performed	Contaminants of Concern[1]
SEQ a.k.a. Contractor's Staging Area	Storage Contractors trailers, equipment, and supplies	perchloroethene
		benzene
		light hydrocarbons (C1 - C3)
		toluene
		cis 1,2 dichloroethene
		TCE
		"total hydrocarbons"
		TCA
		xylene

Table 7-5

PERMISSIBLE EXPOSURE LIMITS (PELS) AND PRIMARY HEALTH HAZARDS FOR CONTAMINANTS OF CONCERN

Chemical	ACGIH TLV	ACGIH STEL/ Ceiling	OSHA PEL	OSHA Acceptable Ceiling Concentration*	Primary Health Hazards (Target Organs)
Acetone	750 ppm	1000 ppm	1000 ppm	____	Eyes, skin, respiratory system, CNS
Arsenic	0.01 mg/m^3	____	0.5 mg/m^3	____	Skin, respiratory system, kidneys, CNS, liver, GI tract, reproductive system
Benzene	10 ppm	____	1 ppm	ST 5 ppm	Eyes, skin, respiratory system, blood, CNS, bone marrow
n-Butyl Acetate	150 ppm	200 ppm	150 ppm	____	Eyes, skin, respiratory system, CNS
Chlorobenzene	10 ppm	____	75 ppm	____	Eyes, skin, respiratory system, CNS, liver
Cyanides (as CN)	____	C5mg/m^3 skin	5 mg/m^3	____	CNS, cardiovascular system, liver, kidneys, skin
Dichloromethane (methyl chloride)	50 ppm	100 ppm	100 ppm	200 ppm (300 ppm 5 min. max peak in any 3 hours)	CNS, liver, kidneys, reproductive system
o-dichlorobenzene	25 ppm	50 ppm	____	50 ppm	Eyes, skin, respiratory system, liver, kidneys
cis 1,2-dichloroethylene	200 ppm	____	200 ppm	____	Eyes, respiratory system, CNS
2-ethoxy ethyl acetate	5 ppm	____	100 ppm	____	Eyes, respiratory system, GI tract, reproductive system, hemato. system
Freon 113 (1,1,2-trichloro- 1,2,2 - trifluoroethane)	1000 ppm	1250 ppm	1000 ppm	____	Skin, heart, CNS, CVS

Table 7-5 (continued)

PERMISSIBLE EXPOSURE LIMITS (PELS) AND PRIMARY HEALTH HAZARDS FOR CONTAMINANTS OF CONCERN

Chemical	ACGIH TLV	ACGIH STEL/ Ceiling	OSHA PEL	OSHA Acceptable Ceiling Concentration*	Primary Health Hazards (Target Organs)
Isopropyl alcohol	400 ppm	500 ppm	400 ppm	____	Eyes, skin, respiratory system, CNS
Lead	0.15 mg/m^3	____	0.050 mg/m^3	____	Eyes, GI tract, CNS
Methyl ethyl ketone	200 ppm	300 ppm	200 ppm	____	Eyes, skin, respiratory system, CNS
Methanol	200 ppm	250 ppm	200 ppm	____	Eyes, skin, respiratory system, CNS, GI tract
Methyl isobutyl ketone	50 ppm	75 ppm	100 ppm	____	Eyes, skin, respiratory system, CNS, liver, kidneys
Molybdenum	____	____	15 mg/m^3	____	Eyes, respiratory system, liver, kidneys
Perchloroethene (Tetrachloroethene)	25 ppm	100 ppm	100 ppm	200 ppm	Eyes, wkin, respiratory system, liver, kidneys, CNS
PCBs 40% chlorine	1 mg/m^3 skin	____	1 mg/m^3 skin	____	Skin, eyes, liver
PCBs 54% chlorine	0.5 mg/m^3 skin	____	0.5 mg/m^3 skin	____	Skin, eyes, liver
Trichloroethene	50 ppm	100 ppm	100 ppm	200 ppm	Eyes, skin, respiratory sytsem, heart, liver, CNS
1,1,1 trichloroethane (methyl chloroform)			350 ppm	____	Eyes, skin, CNS, CVS, liver

Table 7-5 (continued)

PERMISSIBLE EXPOSURE LIMITS (PELS) AND PRIMARY HEALTH HAZARDS FOR CONTAMINANTS OF CONCERN

Chemical	ACGIH TLV	ACGIH STEL/ Ceiling	OSHA PEL	OSHA Acceptable Ceiling Concentration*	Primary Health Hazards (Target Organs)
Toluene	50 ppm	____	200 ppm	300 ppm	Eyes, skin, respiratory system, blood, CVS, liver, CNS
Xylene	100 ppm	150 ppm	100 ppm	____	Eyes, skin, respiratory system, CNS, GI tract, kidneys

*See OSHA 1910.1000 Table Z-2

** See OSHA 1910.1017 (c)(2)

7.5.1.2 - Health Hazard Evaluation

The primary potential health hazards of concern to workers from contaminants are from the inhalation of vapors and dust, and skin exposure to corrosive substances or skin absorptive poisons. Potential for these exposures would exist during drilling of soil borings and sampling of soil.

OSHA Permissible Exposure Limits (PEL) and American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Values (TLV) may be exceeded during investigative activities. The activities include drilling soil borings and soil sampling. These activities will be closely monitored and evaluated to determine potential for exceeding standards and the need to implement control measures to protect personnel and the environment.

Based upon review of available data for the related areas, it is expected that the potential for exposure to hazardous levels of the above constituents is moderate for inhalation and skin exposure.

7.5.1.3 - Potential Exposures

Potentially contaminated materials include soil samples. The expected risk of exposure to these chemicals would be from inhalation, ingestion, skin or eye contact with volatile compounds, corrosives, dust and poisons. Potential exposures can be mitigated through appropriate investigation procedures, work practices, air monitoring, and personal protective equipment. Duration and frequency of exposure will be short and intermittent over a period of several weeks. All personnel related to the investigation should keep upwind of all soil disturbances and sampling activities at all times when possible.

7.5.1.4 - Physical and Biological Hazards

Due to the fact that the facility is currently an active industrial facility with on-going manufacturing, waste handling and treatment, potential physical hazards exist for the investigating team members. Careful consideration must be given to avoid such hazards. Workers may encounter

sharp objects or unsecured footing. Improper or careless use of sampling and drilling equipment increases the risks of accidents from underground or overhead utilities and operation of the equipment. In addition, workers may be exposed to poison ivy, stinging and biting insects, ticks and vermin.

Open excavations, pits, trenches, or other confined spaces also represent hazards and under no circumstances should be entered unless written procedures are in place and anyone performing confined space operations has received the necessary training.

7.5.2 Activity Safety and Health Hazard Analysis

Activities which will be performed by WFC during the RCRA soils RFI project at the site are drilling, construction of soil borings, and collecting soil samples.

Potential safety risks will vary with the specific activity and equipment used and with the sampling sites themselves. When any new data is collected, potential health and safety hazards will be evaluated and related to the current and planned activities at the site. All sampling work in which the potential hazards have not been identified may require additional precautions to assure protection against potential hazards. Any modifications of the Work Plan will require evaluation to determine if the existing health and safety plan is adequate in protecting on-site investigators.

With the drilling of soil borings and soil sample collections during the investigation, some safety risks inherent with these activities may be expected. All underground utilities must be located in areas where subsurface investigation is to be performed. IBM shall be contacted to provide "mark-outs" on and off site at all investigative locations prior to initiation of subsurface activities. **Due to rigorous IBM Health and Safety requirements for on-site utility clearance, each proposed boring location will be hand dug, hand augured or otherwise excavated (by hand or small backhoe) to a depth of at least 6 feet below ground surface prior to commencing any form of mechanical drilling utilizing a drill rig.**

The direct handling of contaminated drums, containers or concentrated pure chemicals is not expected during the investigation. In the event that such materials are encountered during the field program, the operation will cease, uncovered containers which have been damaged will be immediately covered with soil to minimize release of volatile compounds, the condition will be recorded and the field team will be instructed to secure the area until health and safety risks are properly assessed.

7.5.2.1 - Drilling of Soil Borings and Soil Sampling

Hazardous Substances and Conditions

Hazardous substances and conditions include: exposure to surface and/or subsurface contaminants or other mechanical hazards, slips/trips/falls, heavy equipment, "strike" or "struck-by" hazards, excessive noise, electrical hazards, active or inactive waste management units and pipes located below or above ground, heat/cold stress, sunlight and UV radiation, and biological hazards.

Due to rigorous IBM Health and Safety requirements for on-site utility clearance, each proposed boring location will be hand dug, hand augured or otherwise excavated (by hand or small backhoe) to a depth of at least 6 feet below ground surface prior to commencing any form of mechanical drilling utilizing a drill rig.

Gases such as methane or hydrogen sulfide may be encountered in drains, sump pits, dry wells, or ditches.

Initial Level of Protection and Monitoring Equipment

Initial non-intrusive work will be conducted in Level D. Intrusive work, particularly in "hot spots" of known contamination (e.g., backside of Building 330C), will be initiated in Level C and immediately downgraded to Level D consistent with the results of "first round" monitoring of field

conditions. Monitoring equipment to be used includes: portable PID, FID with methane filter colorimetric tubes, combustible gas and oxygen indicator, and a digital respirable dust indicator.

Other instrumentation and sampling systems may be utilized if deemed necessary by the HSO. The HSO may modify these requirements as deemed necessary.

Site Risks

Health Hazards

The presence of contaminated particulate and chemical vapors pose a potential for inhalation, ingestion, and dermal absorption of volatile and semivolatile solvents, toxic metals and respirable dusts. UV radiation and heat/cold stress also pose potential health hazards.

Safety Hazards

Drilling and related operations pose potential hazards to site personnel. There is the potential for mechanical and physical striking and "struck-by" hazards associated with the equipment and sampling activities, and potential electrical hazards from underground power lines, overhead lines, and use of electrical equipment and tools.

Due to rigorous IBM Health and Safety requirements for on-site utility clearance, each proposed boring location will be hand dug, hand augured or otherwise excavated (by hand or small backhoe) to a depth of at least 6 feet below ground surface prior to commencing any form of mechanical drilling utilizing a drill rig.

Confined Space Hazards

Confined space hazards are not anticipated, as all borings will be located out of doors, in open areas. However, should entry into any confined spaces be required, procedures for Permit

Required Confined Space Entry are contained in Exhibit C. These procedures shall be followed under the supervision of the HSO.

Conclusion/Risk Assessment

The tasks to be performed represent moderate health risk for inhalation and moderate for skin exposure given the potential to encounter contaminated material.

The risk associated with safety hazards for soil sampling and drilling activities will depend on the particular location. Safety hazard risk is low to moderate for routine activities, and moderate to high where special hazards exist, e.g., confined space, electrical, mechanical, fire/explosion. Potential levels of airborne contaminants may dictate use of appropriate personal protective equipment as deemed necessary by the HSO.

Proper wearing of protective equipment and employment of stringent personal hygiene practices should reduce potential health hazards.

Restricting access of on-site personnel to all equipment operations, maintaining safe distances from equipment, and wearing proper safety equipment will reduce risk of injuries.

7.6 Training Requirements

7.6.1 General Health and Safety Training

All on-site personnel assigned to or regularly entering areas of the site other than the Support Zone (once established) must be trained in accordance with 29 CFR 1910.120. This training will be required for personnel performing or supervising work; for health, safety, security, or administrative purposes; for maintenance; or for any other site related function. These training requirements also apply to site visitors who enter the Exclusion Zone or the Contaminant Reduction Zone (see Section 7.10 for clarification).

The training shall include a minimum of forty hours of general health and safety training and three days of on-site supervised experience. Documentation of all such training shall be made available to the HSO or FOM before any person shall be allowed to enter any potentially contaminated area, namely the Exclusion Zone or the Contaminant Reduction Zone (see Appendix D).

7.6.2 Site Specific Training

As mentioned previously, all site personnel shall attend a site specific refresher training program and become familiar with the SHSP and certify their understanding of this plan (see Section 7.4.10). This training program shall include, at a minimum, training in the following areas:

- Hazard analysis (chemical/physical hazards).
- Standard safety operating procedures.
- Personal hygiene.
- Safety equipment to be used.
- Personal protective equipment to be worn including care, use, and proper fitting.
- Decontamination procedures.
- Areas of restricted access and prohibitions in work areas.
- Emergency procedures and plans.
- Respiratory equipment training and qualitative fit-testing protocols (banana oil and irritant smoke).
- First aid procedures.
- On-site and off-site communications.
- Hazardous materials handling procedures.

- Air monitoring instrumentation use and calibration.
- Confined space entry and rescue operations.
- Sample collection.
- Hazardous materials recognition.
- The "Buddy System" to be used at the site.

Training sessions for visitors entering the Exclusion and Contaminant Reduction Zones shall be conducted by the HSO. See Section 7.10.2 for descriptions of the exclusion and contaminant reduction zones. Abbreviated awareness training for visitors who remain in the Support Zone will also be provided by the HSO.

Safety and health meetings shall be conducted weekly by the HSO for all personnel assigned to work at the site. (See Exhibit E for Weekly Safety Meeting Record.)

Proof of training for all on-site personnel can be found in Exhibit D. Personnel who have not successfully completed the required training shall not be permitted to enter the Exclusion Zone or the Contaminant Reduction Zone.

Daily "Tool Box" safety meetings shall be conducted to keep all on-site personnel aware of current safety and health hazards and changes to work site conditions. Any modifications that the HSO makes to the SHSP will be communicated to personnel at this time (see Exhibit F for the Daily "Tool Box" Safety Meeting Record).

As mentioned above, new employees involved in hazardous activities shall be indoctrinated by the HSO prior to entering the site to work. All training requirements must be completed by a new employee prior to indoctrination. Indoctrination will be comprised of the site-specific refresher training program, the task/operation safety and health risk analysis, and the phased accident prevention plan. This training shall be documented in the Site Worker Training and Medical

Examination Record (see Exhibit D), and on the Daily "Tool Box" Safety Meeting Record (see Exhibit F).

7.7 Personal Protective Equipment

7.7.1 General

All on-site personnel shall be issued appropriate PPE. All PPE is to be used properly and protective clothing is to be kept clean and well maintained. The HSO shall maintain constant communication with the WFC Project Director when conducting air monitoring and consult the WFC Project Director with regard to "action levels" at which the specified minimum levels of protection are either upgraded or downgraded based upon air monitoring results and direct contact potential. The HSO has the authority to require the use of additional equipment, if necessary, for specific operations.

7.7.2 General Site Safety Equipment Requirements

This is the basic work uniform and will primarily be worn outside the Exclusion Zone and the Contaminant Reduction Zone.

7.7.2.1 - Equipment

- Coveralls (Optional, may be disposable type).
- Boots/shoes (OSHA compliant construction footwear)
- Hard hat with splash shield - ANSI approved.
- Gloves (optional).
- Safety glasses - ANSI approved.

7.7.3 Level D Protection

Level D protection initially shall be worn in the Exclusion Zone and Contaminant Reduction Zone during non-intrusive sampling and investigative activities.

7.7.3.1 - Equipment

- One or two piece disposable suit, tyvek or equivalent.
- Gloves - Outer (neoprene, nitrile, or equivalent); Inner (latex).
- Boots - Outer (vulcanized rubber or equivalent); Inner (steel toe and shank) or equivalent combination (ANSI approved).
- Safety glasses or goggles (ANSI approved).
- Hard hat with splash shield, if needed (ANSI approved).
- Hearing protection (if work is near heavy or noisy equipment)

7.7.4 Level C Protection

Level C protection shall be selected and worn during intrusive activities and when a modified level of respiratory protection is needed. Selection shall be made when air monitoring results of the site or individual work areas exceed the action level criteria.

7.7.4.1 - Equipment

- Full facepiece, air purifying respirator with combination organic vapor and high efficiency particulate air (HEPA) cartridges (OSHA/NIOSH approved).
- Hooded one piece chemical resistant suit, PE - Tyvek or equivalent (modification of protective suits may be made upon the approval of the HSO).
- Gloves - Outer (nitrile or equivalent); Inner (latex).

- Boots - Outer (neoprene or equivalent); Inner (steel toe and shank) or equivalent combination (ANSI approved).
- Two way radio communications (for remote operations).
- Hard hat with splash shield (ANSI approved).
- Hearing protection (if work is near heavy or noisy equipment)

7.7.5 Confined Spaces

Under no circumstances shall confined spaces be entered unless discussed with the WFC Project Director and authorized by the HSO. Only employees who have received Confined Space Entry Training and are prepared to deal with confined space hazards shall be authorized to enter a confined space. See Exhibit C for specific procedures.

7.7.6 Standing Orders

All prescription eyeglasses in use on the site shall be safety glasses. Prescription lens inserts shall be provided for use with full-face respirators. All eye and face protection shall conform to OSHA 1910.133.

Programs for respiratory protection shall conform to OSHA 1910.134 and ANSI Z88.2-1980.

Personnel unable to pass a fit-test shall not enter or work in the Exclusion Zone or Contaminant Reduction Zone.

Each respirator shall be individually assigned and not interchanged between workers without cleaning and sanitizing. Cartridges/canisters and filters shall be changed daily or upon breakthrough, whichever occurs first. If breakthrough occurs, a reevaluation by the HSO of the protection level is warranted. A procedure for assuring periodic cleaning, maintenance, and change

of filters shall be followed by each respirator wearer. This procedure is described in Exhibit H - Respiratory Cleaning and Maintenance Procedure.

A hard hat shall be worn by all personnel. All head protection shall conform to the requirements in OSHA 1910.135.

All non-disposable Level C or D personal protective equipment worn on-site shall be decontaminated before being reissued. The HSO is responsible for ensuring all non-disposable personal protective equipment is decontaminated before being reissued (see Section 11.0). Disposable PPE shall be properly disposed of according to NYSDEC requirements and regulations.

All safety boots shall conform to OSHA 1910.136.

Power equipment may generate excessive noise levels (in excess of 85 decibels). Proper ear protection shall be provided and used in accordance with OSHA 1926.52.

7.8 Medical Surveillance

All on-site personnel involved in hazardous waste operations must have satisfactorily completed a comprehensive medical examination prior to the initiation of hazardous waste operations at the IBM East Fishkill site. Medical examinations are required for any and all personnel entering Exclusion or Contamination Reduction Zones (with the exception of visitors wearing respiratory protection as deemed necessary by the HSO).

Medical examinations are not required for people making periodic deliveries provided they do not enter Exclusion or Contamination Reduction Zones.

As mentioned previously, the date of physical examination of each site worker is documented in Exhibit D - Site Worker Training and Medical Examination Record. A specific

Medical Data Sheet for each individual will be filed with the HSO on-site prior to commencing operations, and with the Project Manager. See Exhibit I for Medical Data Sheet.

All WFC personnel who will enter the Exclusion Zone or the Contaminant Reduction Zone shall be provided with medical surveillance at the start of their employment (entrance examination), and, at a minimum, at the end of the on-site personnel's employment (exit examination). Non-scheduled medical exams may be conducted as described in 8.2.1. In addition to non-scheduled exams, any medical or biological monitoring required by an OSHA standard when OSHA Action Levels are exceeded will be performed.

7.8.1 Medical Surveillance Protocol

Medical surveillance protocol is the physician's responsibility but shall meet the requirements of OSHA Standard 29 CFR 1910.120 for all personnel. The protocol shall be selected by the physician.

Additional clinical tests may be included at the discretion of the attending Physician performing the medical examination.

7.8.2 Non-Scheduled Medical Examinations

The scope of the Non-Scheduled Medical Examinations shall be determined by the physician.

Companies contracted by WFC to perform work on-site in the Exclusion Zone or Contaminant Reduction Zone, shall provide equivalent medical surveillance to their on-site personnel, and supply WFC with documentation to that effect.

Non-scheduled medical examinations shall be conducted under the following circumstances:

- After acute exposure to any toxic or hazardous material.
- At the discretion of the WFC Project Director and/or the Physician, when an employee has been exposed to potentially dangerous levels of toxic or hazardous materials.
- At the discretion of the WFC Project Director and/or the Physician, and at the request of an employee with demonstrated symptoms of exposure to toxic or hazardous materials.

7.8.3 Documentation and Record Keeping

The examining Physician shall notify the WFC Project Director in writing that the individual has received a medical examination and shall advise as to any specific limitations upon such individual's ability to work at the project site which were identified as a result of the examination. Appropriate action shall be taken in light of the advice given pursuant to this paragraph.

The ability of on-site personnel to wear respiratory protection during hazardous waste activities shall be certified by the Physician. Cardiopulmonary system examination and pulmonary function testing are minimum requirements.

The Physician shall maintain and provide access for employees to his medical surveillance records according to OSHA requirement (29 CFR 1910.20). These records shall be maintained for a period of 40 years.

7.9 Environmental and Personal Monitoring Program

7.9.1 General

In order to protect site workers from harmful levels of airborne toxic materials, potentially explosive environment, or excessively hot/cold conditions, regular environmental and personnel monitoring may be accomplished to document exposures and to decide when to increase protective measures.

7.9.2 Air Monitoring

Particular phases of work or tasks may require the utilization of specific air monitoring equipment to detect relative levels of contaminants or identify unknown environments.

Air monitoring will be conducted by the HSO or FOM for the express purpose of safe-guarding the health and welfare of site workers.

7.9.2.1 - Air Monitoring Instrumentation

On-site air monitoring will be performed using the following direct reading instruments:

- Century OVA-128 portable flame ionization detector (FID) for detection of volatile organic vapors (with and without a methane filter)
- Photovac Microtip portable photoionization detector (PID) with a 10.6 eV lamp for the detection of organic vapors
- Colorimetric tubes for specific air contaminants; i.e., perchloroethene, etc. Multigas colorimetric detector tubes will be used in conjunction with the PID to detect and quantify the concentration of selected contaminants in the air. The detector tubes to be employed must be sensitive in the concentration ranges in the action levels range for those contaminants. It should be realized that some "compound specific" detector tubes will also detect interference from other aromatic or aliphatic hydrocarbons; readings do not differentiate between which compounds are present. A hand pump and detector tubes for target compounds will be utilized as needed.
- If PID/FID readings are elevated when compared to background (e.g., 1 ppm or more above background) or if separate phase product or odorous material is detected, then detector tubes for target compounds will be utilized.
- Portable combustible gas/oxygen/hydrogen sulfide detector will be available for determining lower explosive limits, oxygen and hydrogen sulfide levels in any identified confined spaces. Under no circumstances shall confined spaced be entered unless discussed with the WFC Project Director and authorized by the HSO. Only employees who have received confined space entry training and are prepared to deal with confined space hazards shall be authorized to enter a confined space.
- Digital respirable dust indicator for monitoring of particulate emissions.

- To monitor for methane, an FID equipped with a methane filter will be utilized. The methane filter screens out all organic vapors except for methane. The readings obtained from the FID with the methane filter will be compared to the FID without the methane filter to determine the level of methane present. A methane meter may also be utilized to screen for methane.

All monitoring and surveillance equipment will be operated, maintained and calibrated each working day in accordance with the manufacturer's instructions and WFC's quality assurance procedures. Organic vapor monitoring will be conducted by trained field staff prior to, during and following sampling, and disturbance of soils or sediments at a sampling site. Should contamination levels indicate high hazard potential, the HSO will review monitoring procedures and results.

A daily air monitoring form will be used to record monitoring data (see Exhibit J).

Monitoring and surveillance equipment is impacted by humidity (PID), cold weather (all electrical devices), communication transmissions and possibly high voltage electrical transmission wires and other interferences. Any unusual meter responses should be noted on the air monitoring form and a diagnosis of potential influencing factors made to determine and eliminate the cause.

7.9.2.2 - Contaminants of Concern

- VOCs (PCE, TCE, etc.)
- Corrosives
- Toxic Metals
- Respirable dust (Soil, Silica)

7.9.2.3 - Air Monitoring Locations and Action Level Criteria

The primary areas to be monitored during the project are the work zones established around drilling locations as identified by the Work Plan.

Air monitoring protocols for each area will differ since target populations, contaminant concentrations, and atmospheric conditions will vary. Monitoring will be conducted within and at the perimeter of these work zones.

Air monitoring conducted at the sampling locales will focus on workers' breathing zones and thus may include personal breathing zone samples. Air monitoring just outside of these locations will consist of instruments attempting to quantify the types and degrees of emissions originating from sampling sites. A summary of various air monitoring activities and associated action levels are presented in Table 7-6.

Duration, Frequency, and Protocol

Monitoring is required daily or as deemed necessary by the HSO, during all activities in the Exclusion Zone, particularly during intrusive activities. The HSO may modify the work zone sampling frequency upon review of previously analyzed work zone samples.

Background Air Monitoring

Background monitoring for contaminants must occur at the upwind perimeter of the Exclusion Zone prior to allowing workers to enter the Exclusion Zone.

Monitoring will occur continuously, or at the discretion of the HSO, downwind and crosswind while work is occurring in the Exclusion Zone. Data must be annotated in the Air Monitoring Form for that day.

Changes in wind direction will require reassessment of air monitoring locations. Wind directions may be determined with the aid of a wind sock. Levels of contaminants that warrant use of respiratory protection by site workers may require initiation of site perimeter and personal sampling as deemed necessary by the HSO.

Table 7-6

SUMMARY OF AIR MONITORING PROGRAM AND ACTION LEVELS

Action Level	Level of Protection	Action to be Taken
INTRUSIVE ACTIVITIES		
Starting intrusive activities	Level C	Work shall be started in Level C. If air monitoring results indicate condition is at background level, can be downgraded to Level D upon approval of HSO.
PID/FID		
Background (BKGD) to 5 units and no benzene is present	Level D	
5 units above BKGD at breathing zone and below 150 units	Level C	Halt work, evacuate area and allow area to ventilate prior to resuming work. Should levels persist, HSO, WPF Proj. Mgr., or FOM will evaluate conditions prior to upgrading to Level C.
> 150 units above BKGD	Level B	Proceed with caution and monitor continuously. Should levels above 150 units persist, HSO, WFC Proj. Mgr., or FOM will evaluate conditions prior to upgrading to Level B. This action would require the work area protocol be amended for Level B protection as discussed in the HASP.
DRAEGER COLORIMETRIC TUBE		
Benzene >1 ppm	Level C	Halt work, evaluate condition prior to upgrading to Level C protection.
Benzene >25 ppm	Level B	If levels persist, upgrade to Level B protection is required upon approval by HSO or FOM.
Other colorimetric detector tubes > PEL (used when necessary by HSO when PID readings are > 1 unit or if phase product or odorous material is detected)	Level C	Halt work, evaluate condition prior to upgrading to Level C protection.
DIGITAL DUST INDICATOR		
Respirable dust 0.15 ug/m^3	Level C	Halt work, evacuate area and allow to ventilate prior to resuming work. Should levels persist, upgrade to Level C protection is required upon approval by HSO or FOM.

Table 7-6 (continued)

SUMMARY OF AIR MONITORING PROGRAM AND ACTION LEVELS

Action Level	Level of Protection	Action to be Taken
COMBUSTIBLE GAS METER		
> 10% LEL scale		Halt work, evacuate area and allow to ventilate to below 10% LEL prior to resuming work. Contact HSO and FOM.
OXYGEN		
< 20.5%		Continuous monitoring. Consider engineering controls.
< 19.5%		Evacuate work area. Institute ventilation and engineering controls. Maintain site condition for at least 10 min. before proceeding. Notify HSO and FOM.
> 22%		Continuous monitoring. Identify combustion sources.
> 23.5%		Evacuate. Institute engineering controls as necessary before proceeding. Explosive condition may be present. Notify HSO and FOM.
OTHER		
Any worker experiences symptoms of chemical exposure		Stop work, evacuate the area, seek medical attention and notify HSO and FOM for proper incident reporting and follow-up.

Exclusion Zone Air Monitoring

Air monitoring conducted in the Exclusion Zone will focus on real time measurement of toxic compounds that pose inhalation hazards, levels of flammable compounds for explosive hazards, and oxygen deficient atmospheres. Such air monitoring will be conducted within the breathing zone at each locale.

Vapor Emission

If the ambient air concentration of organic vapors exceeds 5 ppm (or 5 units) above background in the breathing zone of the work area, activities at that location will be stopped, and the area evacuated until a review of work procedures, air monitoring needs, and use of appropriate respiratory protection and equipment is performed by the HSO or FOM. In addition, downwind monitoring at the site perimeter will be performed with direct reading instruments to determine whether off-site contaminant migration is occurring. Work will proceed only after review and approval by the HSO or FOM, and the appropriate corrective action is taken or level of protection established. More frequent intervals of monitoring will be conducted as directed by the HSO, including Draeger screening for specific contaminants.

If the organic vapor level decreases below 5 ppm (5 units), activities can resume but more frequent intervals of monitoring, as directed by the HSO, must be conducted. If the organic vapor levels are greater then 5 ppm but less than 150 ppm over background in the breathing zone within the work area, activities can resume provided Level B protection is worn.

If the organic vapor level is above 150 ppm within the breathing zone, work activities must be shutdown. When work shutdown occurs, downwind air monitoring as directed by the HSO will be implemented to ensure that vapor emission does not impact the nearest residential or commercial structure.

Respirable Dust

Dust may have the potential to be generated during field investigation activities. It may also be generated by activities not related to the investigation such as vehicle traffic or other site activities. Dust suppression techniques including the wetting of surface areas or the use of cover material will be implemented should the digital dust monitor indicate action is required **or** visible emissions can be avoided and dust may be as a result of investigative activities of contaminated areas. Vehicle speeds in unpaved areas of the site will be restricted to 5 mph.

Any dust generated will be monitored for the presence of respirable particles (< 10 um) in order to preclude potential hazards. Background and work area dust particulate levels will be determined prior to and during field activities that may generate dust. If respirable dust particulate levels exceed 2.5 times background or 150 g/m^3, then corrective action will be required. If the above action levels are exceeded, all operations will stop.

General visual observation shall also be used during all intrusive activities to identify airborne releases (vapors, smoke, etc.) changes in the coloration of excavated materials, changes to the structural integrity of the surface or mechanical integrity of the equipment. Should such conditions be noticed or encountered, work shall be halted, and the area evacuated until such time the WFC FOM can be contacted and specific procedures for characterizing and handling the hazard can be developed.

The HSO, or his on-site designee, shall observe site conditions daily with special attention to the aforementioned conditions. Depending on site conditions, additional personal protection measures shall be implemented during the course of site work.

7.9.2.4 - Personal Exposure Monitoring

In addition to direct reading measurements, personal sampling may be conducted based on results of air monitoring and site conditions. The results of personal monitoring will be evaluated by the CIH or designee.

If results are above the OSHA PELs an exposure monitoring program will be set up for the duration of the project. Personal samples for respirable silica dust may be taken depending on results of the Digital Respirable Dust Indicator readings and effectiveness of work practices and controls.

7.9.2.5 - Heat/Cold Stress Monitoring

Heat/Cold Stress guidelines are described in detail in Exhibit K.

7.9.3 Quality Assurance and Control

All monitoring instruments will be protected from surface contamination during use to allow easy decontamination. All instrumentation shall be calibrated before and after use and operational checks conducted periodically in the field over the duration of the day's field activities.

The following data shall be recorded by the HSO on the Air Monitoring Results form:

- Date and time of monitoring;
- air monitoring location;
- instrument, model number, serial number;
- calibration/background levels;
- results of monitoring; and
- HSO signature.

Note: See Exhibit J for Air Monitoring Results Form

Interpretation of the data and any further recommendations shall be made by the HSO.

Air monitoring results shall be given verbally to WFC FOM following each site scan that indicates volatile organic vapor concentrations in excess of the action levels. Results will then be documented in writing and provided to the WFC FOM by the end of that work day.

7.10 Site Control Measures

7.10.1 Site Management

The IBM East Fishkill site is currently an active facility including two complexes. All equipment, materials, and supplies used for drilling, and equipment and supplies used for decontamination will be stored at the East Fishkill site. The decontamination pad will also be located at the site. All drums containing decontamination water will be staged within a designated area. The drums will be placed on pallets.

7.10.2 Work Zones

Those tasks discussed previously in Section 7.5 will be subject to zonation. The Restricted Zone (RZ) will be identified by WFC as the area within which all project operations take place. At each sampling site, three work areas shall be established: the Exclusion Zone (EZ), Contaminant Reduction Zone (CRZ), and Support Zone (SZ). Only authorized personnel will be allowed in the RZ. Typically, a five foot wide (or distance determined by the HSO or FOM) strip of land bordering the EZ is considered the CRZ. In addition to this strip of land, a specially demarcated area that connects the decontamination area to the CRZ is treated as an extension of the CRZ. All other areas inside the restricted area that are not an active Exclusion or Contaminant Reduction Zone are treated as a Support Zone.

7.10.2.1 - Exclusion Zone

The Exclusion Zone includes the intrusive activities and isolates the area of contaminant generation and restricts (to the extent possible) the spread of contamination from active areas of the site to support areas and off-site locations. This area will encompass all intrusive work. The Exclusion Zone is demarcated by the Hot Line (i.e.; a tape or rope line or physical barrier). Personnel entering the Exclusion Zone must:

- enter through a controlled access point (the Contaminant Reduction Zone),
- wear the prescribed level of protection (see Section 7.7), and
- be authorized to enter the Exclusion Zone (see Sections 7.4, 7.6 and 7.8).

Any personnel, equipment, or materials exiting the Exclusion Zone will be inspected for contamination. Personnel will be subject to decontamination if deemed necessary by the HSO or FOM; equipment and materials (e.g., drill rods) will be transported to where the decontamination facilities will be set up.

Specific access for emergency services to areas of specific site operations will be established by the HSO prior to commencing any operation. The delineated area of the Exclusion Zone may vary with task. (See Section 7.5 for specific task descriptions and the levels of protection used will range from Level D to Level B.)

7.10.2.2 - Equipment Decontamination

It is not anticipated that the prototypical CRZ will be necessary for this project. Drilling will be performed through concrete or asphalt and soils, and equipment will not be driven over soil. The extent and configuration of the CRZ will be at the discretion of the HSO or FOM. Sampling equipment and drills will be placed in plastic-lined boxes and transported to the decontamination

area where they will be decontaminated. Certain safety equipment (e.g., emergency eye wash, fire extinguisher, and first aid kit) will be located in the van at the sampling location.

The level of protection to be used for decontamination will normally be Level D. However, the HSO shall determine appropriate levels of protection based upon air monitoring readings, and visual inspection of personnel, and equipment operations in the Exclusion Zone. Equipment operators (cranes and trucks) physically performing tasks outside the EZ may be exempt from this requirement as approved by the HSO or FOM.

7.10.2.3 - Support Zone

There will not be a Support Zone, per se, for this project. The WFC van will be used for storage of equipment and materials, paperwork, MSDSs, emergency equipment, communications center and command post. Personal hygiene facilities will be located at the complexes.

A log of all persons entering the site will be maintained by the FOM.

7.10.3 Operations Start-up

No personnel will be positioned downwind of Exclusion Zone during probing and sampling.

Location of staging area for support equipment (i.e., air bottles) will be determined on-site however, it must be upwind and in close proximity to the Exclusion Zone.

7.10.4 Buddy System

All on-site personnel shall utilize a buddy system when any task performed at the site requires:

- Personnel to assist in completing an activity.
- Intrusive work performed in the Exclusion Zone.
- The use of protective clothing.
- Communication between the Exclusion Zone and confined space work and the Command Post (e.g., security, safety).

The HSO shall enforce the buddy system and has the authority to modify the criteria stated above to deal with changing site specific and environmental conditions.

In order to ensure that help will be provided in an emergency, all on-site personnel shall be in line-of-sight contact or in communication with the HSO or FOM when working in the Exclusion Zone.

7.10.5 Site Communications Plan

Internal communications on-site should be instituted prior to initiating any task in the Exclusion Zone. Internal communications will be used by on-site supervisory personnel. The HSO shall ensure all site personnel are trained to use internal communications to:

- alert personnel on-site of emergencies;
- pass along safety information (such as for heat stress, cold stress control, or rest period time, etc.);
- changes in work scope, scheduling or sequencing of operations; and
- maintain site control (such as notification of vandalism, intruders, or violations of SHSP protocol).

Verbal communications and hand signals shall be used for all tasks of the Project. However, for those tasks performed in Level D or Level C, radio communications may be used. Please refer to Exhibit L for a listing of emergency "air horn" and "hand" signals.

Any Exclusion Zone work activity being performed out of the line of sight of the HSO, may require use of radio communications. The HSO may designate a radio operator at the location where the work activity is being performed.

Air horns shall be positioned at any Exclusion Zone work area to be used for emergency response only. The HSO shall designate air horn blast sequences for identification of work location, type of emergency, and need for evacuation of all personnel. Please refer to Exhibit L for a listing of emergency "air horn" and "hand" signals.

Wind direction indicators shall be installed such that a line-of-sight is maintained with all personnel in all work zones. The HSO shall designate specific locations for wind direction indicators.

All moving machinery, bulldozers, cranes, dump trucks, etc. shall have working backup alarms.

External communications shall be maintained at the WFC van and be used to coordinate emergency response, report to management, and maintain contact with essential off-site personnel.

All on-site personnel shall be informed of external communications hardware (such as telephone, etc.) and the necessary telephone numbers to contact in the event of an emergency situation (fire, police, ambulance, etc.).

All emergency numbers shall be available at the site (see Exhibit M for listing of important telephone numbers).

Appropriate action shall be taken should any hazardous environmental condition be observed on site. These conditions and the appropriate action to be taken as follows:

Observation	Potential Hazard	Action
Muddy condition	Personnel/slip, equipment instability	Monitor work until condition improves
Lighting	Electrocution	Stop work until condition subsides
Horn blasts or other notification by site personnel	Site emergency	Stop work - evacuate to trailer - follow emergency notification procedures
Personal injury	Other personnel may be affected	Follow emergency notification procedures
Personal fatigue	Heat stress	Follow heat stress guidelines
Windy condition	Overhead hazards, visual impairment	Stop work until condition subsides

7.10.6 Medical Assistance

(See the following page and Exhibit M for complete listing of emergency contacts..)

The primary source of medical assistance for the site is:

IBM Emergency Control
Telephone 4-3333

Depending on the severity of an injury, emergency first aid may be administered, and then transported to the local hospital by IBM Emergency Control.

EMERGENCY TELEPHONE NUMBERS

Agent/Facility	Telephone	Emergency Number
IBM Emergency Control	4-3333	4-3333
EMS - Sloper Willen Ambulance Service	914-297-3779	914-297-3777/8
East Fishkill Police Department	914-221-2111	--
East Fishkill Fire Department	914-471-2525	--

EMERGENCY TELEPHONE NUMBERS (continued)

Dutchess County Fire Alarm Headquarters	914-471-1414	--
Poison Control Center	--	800-336-6997
On-call physician	718-470-4435	718-470-4435
William F. Cosulich Associates, P.C.	516-364-9880	--
Field Safety Corporation	203-964-9199	--
NYSDEC	--	800/457-7362 (hotline)
IBM (Michele West)	914-894-5536	--
Dutchess County Health Department	914-431-8075	--
NYSDOH	516-458-6305	--
St. Lukes Hospital	914-561-4400	--

ON-SITE FIRST AID EQUIPMENT

A first aid kit will be available at the site.

EMERGENCY MEDICAL INFORMATION FOR SUBSTANCES PRESENT

Substance	Exposure Symptoms	First Aid
VOCs (PCE, TCE, TCA, DCE, etc.)	Dermal: irritation Inhalation: dizziness, nausea	Rinse affected area with water Ventilate, artificial respiration
H_2S (Hydrogen Sulfide)	Inhalation: irritation	Ventilate, artificial respiration
Methane	Inhalation: dizziness, nausea	Ventilate, artificial respiration

GENERAL EMERGENCY PROCEDURES

The following standard emergency procedures will be used by on-site personnel. The HSO shall be notified of any on-site emergencies and shall be responsible for ensuring that the appropriate procedures are followed.

Personnel Injury: Administer first aid and/or CPR, and arrange for medical attention

Fire/Explosion: The fire department shall be alerted by the field engineer. Personnel shall move a safe distance form the involved area.

7.10.7 Safe Work Practices

This section provides practices and procedures for conducting operations safely at drilling sites and hazardous waste operations where heavy equipment's used.

Workers are expected to adhere to established safe work practices for their respective specialties. The need to exercise caution in the performance of specific work tasks is made more acute due to:

- physical, chemical, and toxicological properties of contaminated material present;
- other types of hazards present, such as heavy equipment, falling objects, loss of balance or tripping;
- weather restrictions;
- restricted mobility and reduced peripheral vision caused by the protective gear itself;
- the need to maintain the integrity of the protective gear; and
- the increased difficulty in communicating caused by respirators.

Work at the site will be conducted according to established protocols and guidelines for the safety and health of all involved. Among the most important of these principles are the following:

7.10.7.1 - General

- In any unknown situation, always assume the worst conditions and plan responses accordingly.
- Because no personal protective equipment is 100 percent effective, all personnel must minimize contact with contaminated materials. Plan work areas, decontamination areas, and procedures accordingly.
- Smoking, eating, chewing gum or tobacco, or drinking in the Contaminant Reduction Zone and the Exclusion Zone will not be allowed. Oral ingestion of contaminants is the

second most likely means of introducing toxic substances into the body (inhalation is the first).

- Work breaks should be planned to prevent stress related accidents or fatigue related to wearing protective gear.

- Medicine and alcohol can potentiate the effects from exposure to toxic chemicals and heat stress. Prescribed drugs should not be taken if working in the Contaminant Reduction Zone or Exclusion Zone, unless approval has been given by the physician. Alcoholic beverage consumption shall be prohibited on the site.

- Personnel must be observant of not only one's own immediate surrounding, but also those of others. Everyone will be working under constraints, therefore, a team effort is needed to notice and warn of impending dangerous situations. Extra precautions are necessary when working near heavy equipment and while utilizing personal protective gear because vision, hearing, and communication will be restricted.

- Contact lenses are not allowed to be worn on site; if corrosive or lachrymose substances enter the eyes, proper flushing is impeded.

- All facial hair that interferes with the respirator facepiece fit, must be removed prior to donning a respirator for all tasks requiring **Level B** or **Level C** protection.

- Personnel must be aware that chemical contaminants may mimic or enhance symptoms of other illnesses or intoxication. Avoid excess use of alcohol or working while ill during the duration of task assignment.

- The HSO will maintain records in a bound notebook (e.g., daily activities, meetings, incidents, and data). Notebooks will remain on-site for the duration of the project so that other safety and health personnel may add information, thereby maintaining continuity. These notebooks and daily records will become part of the permanent project file.

7.10.7.2 - Site Personnel

- All personnel at the site shall be identified to the HSO and FOM.

- All personnel operating in respective work zones shall dress according to the protection levels set forth in this SHSP (see Section 7.0).

- Red head wooden matches or lighters of any kind will not be allowed in the Contaminant Reduction Zone or Exclusion Zone.

- All personnel will have their "buddy" with them when the buddy system is in effect.

- All personnel will notify the HSO or FOM of any unusual occurrences that might effect the overall safe operation of the site.
- Any time a fire extinguisher is used, personnel shall notify the HSO or FOM of what took place.
- All injuries and accidents shall be immediately reported to the HSO or FOM and the appropriate reports filed.

7.10.7.3 - Traffic Safety Rules

- Any vehicles that will not be involved in the site operations will be secured and the motor shut down.
- Only personnel assigned to this job will be allowed to enter the site. Any other people, whether from OSHA, EPA, or vendors supplying equipment, etc., will have to be met prior to entering the site.
- At no time will any equipment be allowed to block any access road. If in the moving of said equipment, a temporary blockage will exist, that equipment will have an operator available to move that equipment.
- The locations of all fire fighting equipment, valves, hydrants, hose storage places, and fire extinguishers will be indicated to all personnel so that they will not be inadvertently blocked at any time.

7.10.7.4 - Equipment Safety Rules

- Proper loading and operation of trucks on-site shall be maintained in accordance with DOT requirements covering such items as grounding, placarding, driver qualifications and the use of wheel locks.
- Operation of heavy construction equipment shall be in accordance with OSHA regulations 29 CFR 1910 and 1926.
- All equipment that is brought on-site will be available for inspection by the HSO.
- The HSO, or designee, will assign protective equipment to all site personnel and this equipment will be made available for inspection at anytime.
- All equipment shall be installed with appropriate equipment guards and engineering controls. These include rollover protective structures.

- Safe distances will be maintained when working around heavy equipment.

- All equipment and tools to be operated in potentially explosive environments must be intrinsically safe and not capable of sparking or be pneumatically or hydraulically driven. Portable electric tools and appliances can be used (where there is no potential for flammable or explosive conditions use three-wire grounded extension cords to prevent electric shocks.) Ground fault interrupters shall be used as well.

- With hydraulic power tools, fire-resistant fluid that is capable of retaining its operating characteristics at the most extreme temperatures shall be used.

- Cutting or welding operations shall not be carried out without the approval of the HSO and WFC FOM.

- At the start of each work day and on a weekly basis, inspection of brakes, hydraulic lines, light signals, fire extinguishers, fluid levels, steering, and splash protection shall be made by the equipment operators (see Exhibit N for the Daily Safety Inspection Checklist and Exhibit O for Weekly Safety Inspection Checklist).

- All non-essential people shall be kept out of the work area.

- Loose-fitting clothing or loose long hair around moving machinery shall be prohibited.

- Cabs shall be free of all non-essential items and all loose items shall be secured.

- The rated load capacity of a vehicle shall not be exceeded.

- Dust control measures shall be employed by WFC to prevent the movement of dust from contaminated areas to clean areas. The method employed shall be determined by WFC and reviewed by the HSO and the WFC FOM.

- Equipment operators shall report to their supervisor(s) any abnormalities such as equipment failure, oozing liquids, unusual odors, etc.

- When an equipment operator must negotiate in tight quarters, a second person shall be used to ensure adequate clearance.

- A signalman shall be used to direct backing as necessary.

- Refueling shall be done in safe areas. Engines should not be fueled while vehicle is running. Ignition sources near a fuel area shall be prohibited.

- All blades and buckets shall be lowered to the ground and parking brakes set before shutting off the vehicles.

- An ongoing maintenance program for all tools and equipment shall be implemented by WFC or the responsible subcontractor equipment supervisor. All tools and moving

equipment shall be regularly inspected to ensure that parts are secured and intact with no evidence of cracks or areas of weakness, that the equipment turns smoothly with no evidence of wobble, and that it is operating according to manufacturer's specifications.

- Tools shall be stored in clean, secure areas so that they will not be damaged, lost, or stolen.

- All heavy equipment that is used in the Exclusion Zone shall be kept in that zone until the project is done or the equipment is decontaminated. Completely decontaminate such equipment before moving it into the Support Zone.

7.10.7.5 - Drilling Equipment Safety Rules

Drill rig maintenance and safety is the responsibility of the drill rig operator. The following is provided as a general guideline for safe drilling practices on-site:

Off-Road Movement of Drill Rigs

The following safety guidelines relate to off-road movements:

- Before moving a drill rig, first walk the route of travel, inspecting for depressions, slumps, gullies, ruts and similar obstacles.

- Always check the brakes of a drill rig carrier before traveling, particularly on rough, uneven or hilly ground.

- Discharge all passengers before moving a drill rig on rough or hilly terrain.

- Engage the front axle (for 4X4, 6X6, etc. vehicles or carriers) when traveling off highway on hilly terrain.

- Use caution when traveling side-hill. Conservatively evaluate side-hill capability of drill rigs, because the arbitrary addition of drilling tools may raise the center of mass. When possible, travel directly uphill or downhill.

- Attempt to cross obstacles such as small logs and small erosion channel or ditches squarely, not at an angle.

- Use the assistance of someone on the ground as a guide when lateral or overhead clearance is close.

- After the drilling has been moved to a new drilling site, set all brakes and/or locks. When grades are steep, block the wheels.

- Never travel off-road with the mast (derrick) of the drill rig in the raised or partially raised position.

- Tie down loads on the drill rig/support trucks during transport.

Overhead and Buried Utilities

- The use of a drill rig near electrical power lines and other utilities requires that special precautions be taken by both supervisors and members of the exploration crew. Electricity can shock, it can burn, and it can cause death!

- Overhead/buried utilities should be located, noted and emphasized on all boring location plans and boring assignment sheets.

- **Due to rigorous IBM Health and Safety requirements for on-site utility clearance, each proposed boring location will be hand dug, hand augured or otherwise excavated (by hand or small backhoe) to a depth of at least 6 feet below ground surface prior to commencing any form of mechanical drilling utilizing a drill rig.**

- Before raising the drill rig mast (derrick) on a site in the vicinity of power lines, walk completely around the drill rig. Determine what the minimum distance from any point on the drill rig to the nearest power line will be when the mast is raised and/or being raised. Do not raise the mast or operate the drill rig if this distance is less than 20 feet. In general, the distance between the overhead power line and the boom should be no less than the height of the boom.

- Keep in mind that both hoist and overhead power lines can be moved toward each other by the wind.

- Drilling personnel should double-check any side underground electrical and piping drawings prior to initiating drilling. If an obstruction is encountered during drilling, proceed with extreme caution until the possibility of an exposed electrical line or combustible product pipe line is excluded.

Clearing the Work Area

- Prior to drilling, adequate site cleaning and leveling should be performed to accommodate the drill rig and supplies and provide a safe working area.

- Drilling should not be commenced when tree limbs, protruding objects, unstable ground or site obstructions or debris cause unsafe tool handling conditions and/or limited, awkward work spaces.

- An area clear of obstruction or debris should be maintained 180 degrees around the drilling or sampling activities, where practical.

- **Prior to commencing drilling operations, the driller will either hand auger or excavate (e.g., utilizing a "Bobcat" backhoe) to a depth of at least 6 feet to clear for utilities.**

NOTE: In coordination with the Drilling Crew, the WFC FOM will review the precautions taken to ensure that the drill rig is leveled and stabilized.

Housekeeping On and Around the Drill Rig

- The first requirement for safe field operations is that the drilling crew safety supervisor understands and fulfills the responsibility for maintenance and "housekeeping" on and around the drill rig.

- Suitable storage locations should be provided for all tools, materials, and supplies so that they can be conveniently and safely handled without hitting or falling on a member of the drill crew or a visitor, without creating tripping hazards and without protruding at eye or head level.

- Avoid storing or transporting tools, materials, or supplies within or on the mast (derrick) of the drill rig.

- Pipe, drill rods, bit casings, augers and other drilling tools should be orderly stacked on racks or sills to prevent spreading, rolling, and sliding.

- Penetration of other driving hammers should be placed at a safe location on the ground or be secured to prevent movement when not in use.

- Work areas, platforms, walkways, scaffolding and other access ways should be kept free of materials, obstructions and substances such as ice, excess grease or oil that could cause a surface to become slick or otherwise hazardous.

- Keep all controls, control linkages, warning, and operation lights and lenses free of oil, grease and/or ice.

- Do not store gasoline in any portable container other than a non-sparking, red container with a flame arrester in the fill spout and having the word "gasoline" easily visible.

- Welding gas cylinders should be stored in an upright position to avoid gas leaks.

Safe Use of Hand Tools

There are almost an infinite number of hand tools that can be used on or around a drill rig. "Use the tool for its intended purpose" is the most important rule. The following are a few specific and some general suggestions which apply to the safe use of several hand tools that are often used on and around drill rigs:

- When a tool becomes damaged, either repair it before using it again or dispose of it.
- When using a hammer or a chisel, any kind of hammer or chisel, for any purpose, wear safety glasses and require all others around you to wear safety glasses.
- Keep all tools clean and orderly stored when not in use.
- Replace hook and heel jaws when they become visibly worn.
- When breaking tool joints on the ground or on a drilling platform, position your hands so that your fingers will not be smashed between the wrench handle and the ground or the platform, should the wrench slip or the joint suddenly let go.

Safe Use of Wire Line Hoists, Wire Rope and Hoisting Hardware

- The use of wire line hoists, wire rope and hoisting hardware should be as stipulated by the American Iron and Steel Institute's Wire Rope Users Manual.
- All wire ropes and fittings should be visually inspected during use and thoroughly inspected at least once a week for: abrasion, broken wires, wear, reduction in rope diameter, reduction in wire diameter, fatigue, corrosion, damage from heat, improper weaving, jamming, crushing, bird caging, kinking, core protrusion and damage to lifting hardware and any other feature that would lead to failure. Wire ropes should be replaced when inspection indicates excessive damage according to the wire rope users manual.
- If a ball-bearing type hoisting swivel is used to hoist drill rods, swivel bearings should be inspected and lubricated daily to assure that the swivel freely rotates under load.
- If a rod slipping device is used to hoist drill rods, do not drill through or rotate drill rods through the slipping device, do not hoist more than 1-foot (0.3m) of the drill rod column above the top of the mast (derrick), do not hoist a rod column with loose tool joints and do not make up, tighten or loosen tool joints while the rod column is being supported by

a slipping device. If drill rods should slip back into the borehole, do not attempt to break the fall of the rods with your hands.

- Most sheaves on drill rigs are stationary with a single part line. The number of parts of line should not ever be increased without first consulting with the manufacturer of the drill rig. Wire ropes must be properly matched with each sheave.

- The following procedures and precautions must be understood and implemented for safe use of wire ropes and rigging hardware.

- Use tool handling hoists only for vertical lifting of tools (except when angle hole drilling). Do not use tool handling hoists to pull on objects away from drill rig; however, drills may be moved using the main hoist as the wire rope is pulled through proper sheaves according to the manufacturer's recommendations.

- When stuck tools or similar loads cannot be raised with a hoist, disconnect the hoist line and connect the stuck tools directly to the feed mechanisms of the drill. Do not use hydraulic leveling jacks for added pull to the hoist line or the feed mechanisms of the drill.

- When attempting to pull out a mired down vehicle or drill rig carrier, only use a winch on the front or rear of the vehicle or drill rig carrier and stay as far as possible away from the wire rope. Do not attempt to use tool hoists to pull out a mired down vehicle or drill rig carrier.

- Minimize shock loading of a wire rope - apply loads smoothly and steadily.

- Protect wire rope from sharp corners or edges.

- Replace faulty guides and rollers.

- Replace worn sheaves or worn sheave bearings.

- Replace damaged safety latches on safety hooks before using.

- Know the safe working load of the equipment and tackle being used. Never exceed this limit.

- Clutches and brakes of hoists should be periodically inspected and tested.

- Know and do not exceed the rated capacity of hooks, rings, links, swivels, shackles and other lifting aids.

- Always wear gloves when handling wire ropes.

- Do not guide wire ropes or hoist drums with your hands.

- Follow the installation of a new wire rope, first lift a light load to allow the wire rope to adjust.

- Never carry out any hoisting operations when the weather conditions are such that hazards to personnel, the public, or property are created.

- Never leave a load suspended in the air when the hoist is unattended.

- Keep your hands away from hoists, wire rope, hoisting hooks, sheaves and pinch points as slack is being taken up and when the load is being hoisted.

- Never hoist the load over the head of the clutch, or leave the hydraulic rotation control disengaged, or the transmission in low gear, or the engine running at low RPM.

- The operator and tool handler should establish a system of responsibility for the series of various activities required for auger drilling, such as connecting and disconnecting auger sections, and inserting and removing the auger fork. The operator must insure that the tool handler is well away from the auger column and that the auger fork is removed before starting rotation.

- Only use the manufacturer's recommended method of securing the auger to the power coupling. Do not touch the coupling or the auger with your hands, a wrench or any other tool during rotation.

- Whenever possible, use tool hoists to handle auger sections.

- Never place hands or fingers under the bottom of an auger section when hoisting the auger over the top of the auger section in the ground or other hard surfaces such as the drill rig platform.

- Never allow feet to get under the auger section that is being hoisted.

- When rotating augers, stay clear of the rotating auger and other rotating components of the drill rig. Never reach behind or around a rotating auger for any reason whatsoever.

- Never place your hands between the drill rig and an auger, even when attempting to free a damaged or bound Shelby tube from the auger.

- Never use your hands or feet to move cuttings away from the auger.

- Augers should be cleaned only when the drill rig is in neutral and the augers are stopped from rotating.

Safety During Drilling

Drilling tools should be safety checked prior to drilling:

- Water swivels and hoisting plugs should be lubricated and checked for "frozen" bearings before use.
- Drill rod chuck jaws should be checked periodically and replaced when necessary.
- The capacities of hoists and sheaves should be checked against the anticipated weight of the drill rod string plus other expected hoisting loads. All cables should be inspected daily.
- Special precautions that should be taken for safety rotary or core drilling involve chucking, joint break, hoisting and lowering of drill rods:
- Drill rods should not be braked during lowering into the hole with drill rod chuck jaws.
- Drill rods should not be held or lowered into the hole with pipe wrenches.
- If a string of drill rods are accidentally or inadvertently released into the hole, do not attempt to grab the falling rods with your hands or a wrench.
- In the event of a plugged bit or other circulation blockage, the high pressure in the piping and hose between the pump and the obstruction should be relieved or bled down before breaking the first tool joint.
- When drill rods are hoisted from the hole, they should be cleaned for safe handling with a rubber or other suitable rod wiper. Do not use your hands to clean drilling fluids from drill rods.
- If work must progress over a portable drilling fluid (mud) pit, do not attempt to stand on narrow sides or cross members. The mud pit should be equipped with a rough surface, fitted cover panels of adequate strength to hold drill rig personnel.
- Drill rods should not be lifted and leaned unsecured against the mast. Either provide some method of securing the upper ends of the drill rods sections for safe vertical storage or lay the rods down.
- All hydraulic lines should be periodically inspected for integrity and replaced as needed.

Start Up

- All drill rig personnel and visitors should be instructed to "stand clear" of the drill rig immediately prior to and during starting of an engine.
- Make sure all gear boxes are in neutral, all hoist levers are disengaged, all hydraulic levers are in the correct non-actuating positions and the cathead rope is not on the cathead before starting a drill rig engine.

General Safety During Drilling Operations

- Safety requires the attention and cooperation of every worker and site visitor.
- Do not drive the drill rig from hole to hole with the mast (derrick) in the raised position.
- Before raising the mast (derrick) look up to check for overhead obstructions. (Refer to previous Section on overhead and buried utilities.)
- Before raising the mast (derrick), all drill rig personnel and visitors (with exception of the operator) should be cleared from the areas immediately to the rear and the sides of the mast. All drill rig personnel and visitors should be informed that the mast is being raised prior to raising it.
- Before the mast (derrick) of a drill rig is raised and drilling is commenced, the drill rig must first be leveled and stabilized with leveling jacks and/or solid cribbing. The drill rig should be re-leveled if it settles after initial set up. Lower the mast (derrick) only when leveling jacks are down and do not raise the leveling jack pads until the mast (derrick) is lowered completely.
- Before starting drilling operations, secure and/or lock the mast (derrick), if required, according to the drill manufacturer's recommendations.
- The operator of a drill rig should only operate a drill rig from the position of the controls. The operator should shut down the drill engine before leaving the vicinity of the drill rig.
- Do not consume alcoholic beverages or other depressants or chemical stimulants prior to starting work on a drill rig or while on the job.
- Watch for slippery ground when mounting and dismounting from the platform.
- All unattended boreholes must be adequately covered or otherwise protected to prevent drill rig personnel, site visitors or animals from stepping or falling into the hole. All

open boreholes should be covered, protected or backfilled adequately and according to local or state regulations on completion of the drilling project.

- "Horsing around" within the vicinity of the drill rig and tool and supply storage areas should never be allowed, even when the drill rig is shut down.

- Be careful when lifting heavy objects. Before lifting a relatively heavy object, approach the object by bending at the knees, keeping your back vertical and unarched while obtaining a firm footing. Grasp the object firmly with both hands and stand slowly and squarely while keeping your back vertical and unarched. In other words, perform the lifting with the muscles in your legs, not the muscles in your lower back.

- Drilling operations should be terminated during an electrical storm.

- The minimum number of personnel necessary to achieve the objectives shall be within 25 feet of the drilling or sampling activity. Back-up personnel should remain at least 25 feet from the drilling or sampling activity, where practical.

- Hard hats and steel boots are to be worn by all personnel in the vicinity of the drilling activities. Drilling personnel should not wear loose-fitting or baggy clothing which may be awkward or get caught on equipment. Jewelry, including rings and necklaces, should not be worn around electrical wires or rotating equipment.

7.10.7.6 - Daily Housekeeping

The site and all work zones shall be kept in an orderly fashion and the site is to be left safe and secure upon completion of each day's work.

7.10.7.7 - Site Personnel Conduct

- All site personnel shall conduct themselves properly and in accordance with generally accepted good work practice.

- At all times, the HSO will monitor all safe operations at the site. Any operation not within the scope of the SHSP will be discussed fully before that operation begins.

7.11 Personal Hygiene and Decontamination

7.11.1 General

All personnel performing or supervising remedial work within a hazardous work area, or exposed or subject to exposure to hazardous chemical vapors, liquids, or contaminated solids, will observe and adhere to the personal hygiene-related provisions of this section. Any personnel found to be repeatedly disregarding the personal hygiene-related provisions of the SHSP shall be barred from the site by the HSO. All on-site personnel shall wear personal protective equipment as required at all times whenever entering the Exclusion Zone or the Decontamination Area. Personal hygiene and decontamination facilities, in accordance with OSHA 29 CFR 1910.120 (N), will be provided on-site and include the following:

- Storage and disposal containers for used disposable outerwear.
- Hand washing facilities.
- An uncontaminated lunch area.
- An uncontaminated rest/break area.
- Toilet.

All personnel must enter and leave the work site through the facilities.

- The personal hygiene and decontamination facilities are provided so that any personnel leaving the Exclusion Zone may perform decontamination, safely remove all protective outer clothing, and wash face and hands.
- Decontamination shall be performed prior to taking breaks, eating lunch, or leaving the work site.
- All site personnel will be given orientation training to the use and operation of the personal hygiene and decontamination facilities.

7.11.2 Contamination Prevention

To minimize contact with contaminated substances and lessen the potential for contamination, the following will be adhered to:

- Personnel will make every effort not to walk through any areas of obvious contamination (i.e., liquids, discolored surfaces, smoke/vapor clouds, etc.).
- Personnel will not kneel or sit on the ground in the Exclusion Zone and/or the Decontamination Area.

7.11.3 Personal Hygiene Policy

Smoking and chewing tobacco shall be prohibited except in a designated break area. Eating and drinking shall be prohibited except in the designated lunch or break area. All outer protective clothing (e.g., chemically protective suits, gloves, and boots) shall be removed and personnel shall thoroughly cleanse their hands and other exposed areas before entering the break or lunch area.

Drinking of replacement fluids shall be permitted in a designated area outside the Exclusion Zone. Personnel shall, as a minimum, remove outer and inner gloves, respirator and coverall top, and wash hands prior to drinking replacement fluids.

All personnel should change into fresh clothing after each working period or shift. Showering is mandatory upon return to each individuals' rest place.

7.11.4 Personnel Decontamination Procedures

Decontamination procedures are followed by all personnel leaving the Exclusion Zone. Generalized procedures for decontamination follow. All procedures apply for Level C, however for Level D only steps 2, 3, and 8 apply. The HSO may modify these procedures based on site conditions.

Step 1 Drop tools, monitors, samples, and trash at designated drop stations (i.e.; plastic containers or drop sheets). See Section 9.4 for equipment decontamination specifics.

Step 2 Scrub outer boots and outer gloves with decon solution or detergent and water. Rinse with water.

Step 3 Remove tape from outer boots (if applicable) and remove boots; discard tape in disposal container. Place boots on boot rack.

Step 4 Remove tape from outer gloves (if applicable) and remove only outer gloves; discard in disposal container.

Step 5 This is the last step in the decontamination procedure if the worker has left the Exclusion Zone to exchange the cartridges on his/her air purifying respirator. The cartridges should be exchanged, new outer gloves and boot covers donned, the joints taped, if necessary, and the worker returns to duty.

Step 6 Remove outer garments and discard in disposal container. New outer garments shall be issued at the beginning of each work day or as deemed necessary by the HSO.

Step 7 Remove respirator and place or hang in the designated area.

Step 8 Remove inner gloves and discard in disposal container.

Note: Disposable items (i.e.; coveralls, gloves, and boots) will be changed on a daily basis unless there is reason to change sooner. Dual respirator cartridges will be changed daily, unless more frequent changes are deemed appropriate by site surveillance data or by assessments made by the HSO.

Pressurized sprayers or other designated equipment will be available in the decontamination area for wash down and cleaning of personnel, samples, and equipment.

A waterless hand cleaner and paper towels may be used for hands, arms, and any other skin surfaces potentially in contact with contaminated material.

Respirators (if used) will be decontaminated daily and taken from the drop area. The masks will be disassembled, the cartridges set aside, and all other parts placed in a cleansing solution. After an appropriate time in the solution, the parts will be removed and rinsed with tap water.

Old cartridges will be discarded in the contaminated trash container for disposal. In the morning, the masks will be reassembled and new cartridges installed, if appropriate. Personnel will inspect their own masks and readjust the straps for proper fit.

7.11.5 Emergency Decontamination

Decontamination will be delayed if immediate medical treatment is required to save a life. Decontamination will then be done after the victim is stabilized. When decontamination can be performed without interfering with medical treatment, or a worker has been contaminated with an extremely toxic or corrosive material that could cause additional injury or loss of life, decontamination will be performed immediately.

When decontamination cannot be done, the victim will be wrapped in a chemical protective barrier (clothing or sheeting) to reduce contamination of other personnel. Emergency and off-site medical personnel will be informed of potential contamination and will be instructed about specific decontamination procedures. When the victim is transported off the site, personnel knowledgeable of the incident, the site, and decontamination procedure will accompany the victim.

7.11.6 Equipment Decontamination - General

- All vehicles and equipment used in the Exclusion Zone shall be decontaminated at the decontamination area prior to leaving the site.
- No vehicles shall leave the Decontamination Area until they are properly inspected and approved by the HSO or FOM for general cleanliness of frame and tires.
- No vehicle shall leave the site unless it is in a broom-clean condition; free of loose dirt or material on tailgates, axles, wheels, etc.

- The HSO will monitor all vehicles to confirm proper decontamination prior to exiting. Approval shall be based on visual inspection of all exposed surfaces.

- Equipment decontamination wash water residues shall be collected for disposal.

- Personnel engaged in vehicle decontamination shall wear Level C or Level D equipment with respiratory protection consistent with the air monitoring results collected by the HSO, and perform personal decontamination at the completion of equipment decontamination.

- An equipment decontamination area will be located at the site for removing soil from all equipment leaving the work area. It will include a wash area for equipment and vehicles.

- Only clean water will be used for personnel, equipment, and vehicle decontamination.

7.11.7 Small Equipment Decontamination Procedures

Small equipment should be protected from contamination as much as possible by draping, masking, or otherwise covering the instruments with plastic (to the extent feasible) without hindering operation of the unit. For example, the Photoionization Detector can be placed in a clear plastic bag to allow reading the scale and operation of the controls.

Step 1 Remove coverings from equipment left in the drop area and place the coverings in appropriate waste containers.

Step 2 Any soil or moisture will be brushed or wiped with a disposable paper wipe. Place soiled wipes in appropriate containers.

Step 3 Bare units will then be placed in a clean plastic tub and wiped off with a damp, clean, disposable wipe. Equipment will then be allowed to air dry.

Step 4 Following decontamination, equipment will be checked and recharged, as necessary, for the next day's operations.

Step 5 Prior to entering the Exclusion Zone, all small equipment will be recovered with new, protective coverings, if necessary.

7.11.8 Heavy Equipment Decontamination Procedures

The decontamination area for the drill rig will be set up as described in 7.11.6. A wash/ rinse will be done to all surfaces that came in contact with contaminants (e.g., augers).

Prior to removing any heavy equipment or vehicles from the Exclusion Zone, they must be thoroughly decontaminated. Specific procedures are as follows:

Step 1 Initially, inspect equipment/vehicles to determine if gross decontamination is required first. Particular attention must be paid to tires, under surfaces, points of contact with the ground, and horizontal surfaces where dust or aerosols might settle.

Step 2 If visible contamination is present, the equipment/vehicle must be moved to the decontamination pad where gross contamination will be scraped, brushed, or swept off.

Step 3 Following gross decontamination, or if visible contamination is no longer present, wash the equipment/vehicle with high pressure washer as deemed necessary by the HSO. Efforts should be made to minimize water usage to reduce wastewater quantities.

Step 4 Prior to releasing any heavy equipment or vehicles from the Contaminant Reduction Zone, decontamination personnel will contact the HSO for final approval.

7.12 Emergency Response and Contingency Plan

7.12.1 General

This plan has been prepared in accordance with 29 CFR 1910.120 (l) and will address the following potential emergencies:

- Emergencies outside the Site
- Emergencies within the Site

- Chemical exposures.
- Site Evacuation.

7.12.2 Emergency Equipment

Specially marked and readily accessible emergency equipment will be provided as depicted in Table 7-7.

7.12.3 Special Requirements

The WFC Project Director or FOM will be on-call for any after hour emergencies resulting from adverse weather conditions. Incidents resulting from adverse weather will be reported via the Security Officer to the HSO who will in turn contact the WFC Project Director.

First aid kit locations will be specially marked and have adequate water and other supplies necessary to cleanse and decontaminate burns, wounds, or lesions. First aid stations will also stock buffer solutions for treating acid and caustic burns.

7.12.4 Emergency/Accident Reporting and Investigation

In the event of an emergency associated with the site work, the HSO or FOM will, without delay take: 1) diligent action to remove or otherwise minimize the cause of the emergency, 2) alert the WFC Project Director, and 3) institute whatever measures are necessary to prevent any repetition of any conditions or actions leading to, or resulting in, the emergency. Notification of the WFC Project Director will occur immediately and initially be verbal with written notification occurring within 24 hours of the incident (i.e.; accident, explosion, serious exposure, etc.). The Incident Notification Form and the OSHA 200 Form, provided in Exhibit P and Q, respectively, will be used for written notifications and documentation.

Table 7-7

LOCATION OF EMERGENCY EQUIPMENT

EQUIPMENT	TYPE	LOCATION(S)
Fire Extinguisher	Dry Chemical	WFC VAN
First Aid Kit		WFC VAN
Eye Wash	Portable	WFC VAN
Emergency Sprayer	Portable	WFC VAN
Communication	Air Horns	WFC VAN

7.12.5 Emergency Medical Care

Emergency medical care will be provided to site workers and visitors by IBM Emergency Control by calling 4-3333.

The Hospital will be informed by the HSO or WFC FOM of potential medical emergencies that could result from site operations and have been advised on the types of hazardous materials that are on site. In the event of an incident requiring their assistance, specific details of hazardous materials should be provided to the hospital medical staff, if available.

A list of Emergency Information will be posted at every work site telephone.

7.12.6 Emergencies Outside the East Fishkill Site

All work in East Fishkill site area will stop when advised by any authorized personnel and will remain so until otherwise instructed.

WFC will keep the HSO and FOM fully advised of any work that may affect the safety of on-site employees or property.

Actions to be taken by WFC personnel in the event of an outside emergency will include:

- Cease all operations immediately; shut all equipment down and secure that equipment.
- All personnel will leave vehicles in work zone in a safe manner making sure any remaining vehicles will not hamper any emergency traffic in the area or block any fire hydrants or foam supply systems.
- All personnel will evacuate to a prearranged muster area.
- All personnel will remain in the muster area to await further instructions.

7.12.7 Emergencies Within the East Fishkill Site

The HSO will monitor all operations and assist any emergency personnel responding to an emergency within the work zone.

It will be the HSO's responsibility to maintain communications with IBM personnel.

In the event of an emergency within the work zone at the site, the emergency notification procedures shall be followed as described in Section 7.12.

In all emergency situations, it will be the responsibility of the HSO, to ensure that all site personnel are accounted for.

7.12.8 Personnel Exposures

The emergency procedures to be used in the event of acute exposure (eyes, skin contact, inhalation) are described in Exhibit M.

7.12.9 Site Evacuation

The site area will be evacuated and fire and police departments will be notified in the event of fire, explosion or their potential. See Exhibit M for details.

7.13 Posted Regulations

Regulations will be available on-site. The regulations will cover three specific areas:

- Use of personal protective equipment.
- Personal hygiene.

- Provisions for smoking, eating, chewing, and drinking.

These regulations may be supplemented based on the need to disseminate information or policy. All regulations will be coordinated through International Business Machines Corporation for approval prior to posting. The three specified regulations are presented in Exhibits R, S and T.

7.14 Logs, Reports, and Recordkeeping

As part of the site control process, various logs, reports and records must be completed, coordinated, and maintained. Particular examples to be addressed in this section include:

- Training Logs - Initial, Site Specific, and Refresher.
- Daily Safety Logs.
- Employee and Visitor's Log.
- Weekly Reports.
- Phase-Out Report.

All chemical exposure records and/or medical records will be maintained by the physician for no less than 40 years following completion of the project.

7.14.1 Initial Site-Specific Training Log

The intent of this log is to document that site-specific training was initially provided to workers or visitors prior to their entering regulated areas. Included in the training and on the log is:

- employee/visitor names,
- time allocation in training session,
- topics covered,

- materials used,
- equipment demonstrated,
- equipment practice for each employee,
- prohibitions covered,
- other,
- buddy-system explanation, and
- signature of trainer and date.

Please refer to Exhibits B and D.

7.14.2 Refresher Training Log

Refresher training will be conducted as needed. Minimum elements of refresher training include:

- employee/visitor name,
- time allocation in training session,
- date and place of training,
- topics covered,
- materials used, and
- signature of trainer and date.

Please refer to Exhibit U.

7.14.3 Daily Safety Logs

Each day a new Daily Safety Log will be completed by The HSO, FOM, or designee. One copy will be completed for each of the work areas reviewed. Copies of the daily logs will be

provided to the WFC Project Director for review and comment. These daily logs will be maintained for use during preparation of the Weekly Report. Specific elements of the Daily Safety Log include:

- date prepared;
- area (site specific) checked;
- number of employees in area;
- equipment in use in area;
- protective clothing worn by employees;
- protective devices in use by employees;
- visitors (if any), and State/Federal representatives (if any);
- daily safety briefing and training meetings (attach Daily Toolbox Safety Meeting Record);
- air monitoring data (attach Data Sheets);
- heat/cold stress data (attach Data); and
- HSO or FOM signature and date.

Please refer to Exhibits E, F, N, O and V for the log sheets to be used to document Daily/Weekly Safety Inspections and Reports.

7.14.4 Employee/Visitor Log (Site Entry and Exit Log)

Each time an employee or visitor enters or exits the site, he/she will sign the Employee/Visitor Log. This log not only documents when personnel are present on-site but, also provides a rapid means for accounting personnel whereabouts during emergencies. Specific elements of the Employee/Visitor Log include:

- date of log,
- name of employee/visitor,

- address of employee/visitor,
- agency or company representing,
- time entering site, and
- time exiting site.

Please refer to Exhibit W.

7.14.5 Weekly Safety Reports

Weekly Safety Reports will be prepared by The HSO to summarize weekly safety meetings, inspections, work activities, and incidents where site policies, regulations, or SHSP directives have been violated. Copies of weekly safety meetings, weekly inspections, as well as, Daily Safety Logs, and Daily Toolbox Safety Meeting Records will be attached to The Weekly Safety Report. The Weekly Safety Report will be submitted to WFC no later than close of business The following Monday. Specific elements of The Weekly Safety Report will include:

- Summary sheet covering range of work performed.
- Any incidents of:
  - non-use of protective devices where required;
  - non-use of protective equipment;
  - disregard of buddy system;
  - eating, smoking, or chewing where prohibited;
  - misuse of any of The above;
  - job related injuries and illness; and
  - heat stress or cold stress.
- HSO signature and date.

Please refer to Exhibit V.

EXHIBIT A

HEALTH AND SAFETY OFFICER QUALIFICATIONS

LOREN R. LASKY, P.G.
Senior Geologist

Education

Colorado School of Mines, Golden, Colorado, M.S. (Geology) - 1980
SUNY at Stony Brook, Long Island, NY, B.S. (Earth and Space Sciences) - 1974

Professional Certifications

Professional Geologist - South Carolina
Professional Geologist - North Carolina

Professional Societies

Association of Engineering Geologists

Professional Experience

Ms. Lasky has 13 years experience in managing and conducting hydrogeologic investigations and solving environmental problems. These investigations include numerous hazardous waste projects, site assessments and studies, with emphasis on hydrogeologic investigations and site remediation. Her experience includes working with federal and state agencies, as well as private industries and municipalities. Ms. Lasky has extensive knowledge of a wide variety of hydrogeologic data collection techniques, geologic interpretive skills and investigative methods, with special expertise in aerial photographic interpretation of hazardous waste sites.

As a Senior Hydrogeologist, Ms. Lasky's recent projects include the following:

- Project Manager for first phase of ECRA RI/FS at jet engine repair facility at an active New Jersey airport, responsible for groundwater investigation, development of cleanup plans, and design and implementation of soil remediation program. The project also included a bioremediation pilot study, soil vapor extraction with air sparging, replacement of a municipal supply well, and the design and permitting of an innovative hybrid pump and treat groundwater remediation system combining air stripping with ultraviolet peroxidation.

- Operations Manager for team of 15 geologists on a large, multidisciplinary gas pipeline project with PCB contamination in soil and groundwater at compressor stations throughout the northeast.

- Principal investigator for Edison Electric Institute study on the natural quality of groundwater.

- Lead Hydrogeologist and technical manager of USEPA's DRASTIC project to evaluate the potential for pesticide contamination of shallow aquifers throughout the eastern United States.

- Hydrogeologist on a project to develop closure plans for wastewater ponds, lagoons and land farms at a major New Jersey oil refinery.

LOREN R. LASKY, P.G.

Senior Geologist

- Supervised soil cleanup at a Long Island, New York gas station, securing Suffolk County's approval for sale of the property.

- Hydrogeologist on an investigation of a large industrial landfill complex in Ohio, including geoghysical study to define a leachate plume.

- Hydrogeologic investigation to determine the effect of a slurry wall remedial program on groundwater quality at the Broadhead Creek Coal Tar site, East Stroudsburg, Pennsylvania.

- Lead investigator on Preliminary Assessments and Site Investigations at over 35 uncontrolled hazardous waste sites for the EPA Region III Field Investigation Team. Prepared Hazard Ranking System (HRS) scores for candidate Superfund (CERCLA) sites for the National Priority List.

- Fracture trace analysis for a hydrogeologic investigation of Pease Air Force Base, New Hampshire and for a hardrock uranium exploration project near Spokane, Washington.

- Hydrogeologist on an EPA REM II Remedial Investigation of the Roebling Steel Superfund site in Florence, New Jersey, including interpretation of historic air photos that revealed forgotten waste disposal trenches alongside the Delaware River, upstream of the water intake point for the City of Philadelphia.

- Historic land use analysis utilizing air photos to determine past waste disposal practices at the Royal Lubricants plant in New Jersey and at the Gibson Chemical facility in Hauppauge, New York for the New York State Department of Environmental Conservation (NYSDEC).

- Color infrared photo interpretation to map migration of offshore oil spill, off the coast of North Carolina.

- Established one of the first environmental monitoring positions for NYSDEC at TSD facility on the Nassau/Suffolk County border.

- Technical reviewer and session moderator representing the Association of Engineering Geologist's Hazardous Waste Committee at nationwide HAZMAT RCRA and Superfund conferences.

Publications

Lasky, L.R., "The Natural Quality of Groundwater in the United States Compared with Drinking Water Standards," Edison Electric Institute publication, 1987, presented at the Association of Engineering Geologist's (AEG), Vail, Colorado, 1989.

LOREN R. LASKY, P.G.
Senior Geologist

Lasky, L.R., "ME Conductivity for Leachate Plume Definition," presented at AEG, Winston-Salem, North Caroline, 1985.

Lasky, L.R., "Measurement of Thermal Inertia Variability in Engineering Geologic Units," presented at AEG, Chicago, Illinois, 1979.

Michael H. Ziskin, CHCM, CHMM
President and Director of Technical Programs

WORK HISTORY
& EXPERIENCE

1983 - Present

Field Safety Corporation, Stamford, CT

President/Owner

Founder, President, and Owner of Field Safety Corporation, an environmental health and safety management, compliance and training firm. 18 years experience in planning, conducting, and supervising of major projects in occupational and environmental health and safety, air pollution assessment, hazardous waste site investigations, program development, and compliance training.

Responsible for company policies and implementation of research, education, outfitting, and services to organizations involved with hazardous materials.

- *Perform occupational health and safety management consultations involving program development, compliance audits, and risk assessments.*
- *Develop health and safety programs and standard operating procedures including high hazard investigations, hazardous materials emergency response and confined space operations.*
- *Provide health and safety planning, hazardous waste site supervision, and industrial hygiene monitoring.*
- *Research and develop quantitative test method for vapor flash protection and for assessing physical integrity of chemical protective clothing ensembles.*
- *Create new and innovative methods for educating adults and conducting a wide variety of training programs.*
- *Conduct seminars and hands-on training for OSHA/EPA compliance. Conduct advanced training on chemical protective clothing, confined space entry, chemical identification, hazardous waste operations, emergency response, and respiratory protection.*

Accomplishments

- *Delivered more than 9 thousand hours of training and educational programs to hazardous waste site operators and emergency responders.*
- *Conducted in-depth technical advice to health and safety professionals throughout the U.S.*
- *Professional Development Course Coordinator for 3 years at the Annual American Industrial Hygiene Conference.*
- *Member of the original training staff and program development team for the first 80-hour hazardous waste remediation for construction industry.*
- *Appointed to the NFPA Subcommittee on Chemical Protective Clothing. Committee has since author 3 national documentation standards - 1991, 1992, and 1993.*
- *Appointed to the Education and Training Standards Committee of the Academy of Certified Hazardous Materials Managers (CHMM).*
- *Designated round robin test participant for ASTM F23 Committee on Protective Clothing. Round robin test are being conducted to standardize methodology for encapsulating suit evaluations.*
- *Developed quantitative test method to assess the physical integrity of chemical protective clothing ensembles.*
- *Developed new performance test for vapor flash protection now being presented to ASTM F23 Committee for adoption as a nationally recognized test method.*
- *Created the technical approach and the personal protection strategies for over 500 hazardous site investigations and emergency responses.*
- *Performed over 50 highly hazardous site characterizations involving abandoned factories, hazardous waste sites, and industrial laboratories.*
- *Produced new educational methods and procedures while training health and safety professionals in areas of chemical handling, confined space entry, hazardous waste cleanup, and emergency response operations.*
- *Major contributor in re-design of total encapsulating chemical protective suit which incorporated specific safety and comfort benefits to the emergency responder.*

- *Established first mobile test unit in U.S. to provide quantitative fit testing and hostile atmosphere training while working in encapsulating suits.*

Major Projects

- *Provided health and safety management consulting and training to major Northeastern U.S. utility company. Program included industrial hygiene, safety, environmental, and front line management services.*
- *Established health and safety management structure and program for national environmental testing laboratory and consulting engineering firm.*
- *Managed field operations, directed staff of 8, and assisted in the coordination of excavation and environmental sampling activities during a 3 ½ year cleanup of a Superfund site (first voluntary cleanup under CERCLA in the U.S.).*
- *Provided technical oversight and health and safety management for environmental engineering firm investigating a client's hazardous waste site under a petroleum refinery storage tank farm. 40,000 drums were reported as buried in this site. Services included health and safety planning, site supervision, air monitoring, outfitting personnel, and providing support facilities for site owner.*
- *Conducted an assessment and training program for world-wide pharmaceutical manufacturer at the U.S. based research, development, and production facility. Scope of service included management, industrial hygiene, environmental compliance and emergency response activities.*
- *Customized a 40-hour multi-compliant training program for the U.S. Naval Safety School. Program was attended by civilian and military representatives from 28 Naval installations nationwide.*
- *Managed and directed ambitious customized OSHA 1910. 120 compliant training course for the largest recycler of hazardous waste oil in the world. Scope of service involved site inspection and- training of high level engineers and regulatory compliance staff throughout the U.S.*

1991 - Present

University of New Haven, New Haven, CT

Adjunct Professor

Continue to teach two graduate level Hazardous Materials Management courses (EN 618 and En 670) through the Graduate School of Environmental Sciences and Biology.

1983 - 1984

S & D Engineering Services, Inc., Metuchen, NJ

Senior Staff Consultant

Provided environmental and hazardous material emergency response services to New Jersey Department of Environmental Protection, private, industrial, and municipal fire departments, and other organizations engaged in hazardous material response operations.

- *Managed industrial hygiene and safety programs, hazardous waste site investigations and cleanups, environmental health assessments, air monitoring studies, and health and safety training programs.*
- *Organized and conducted hazardous waste training programs.*
- *Provided remedial investigatory services at more than 5 major superfund sites in Northeast U.S.*

1979 - 1983

Dames & Moore, White Plains, NY

Corporate Industrial Hygiene and Safety Director

Responsible for developing and directing company health and safety programs for 23 waste management service locations nationwide.

- *Provided health and safety project management for more than 80 waste management field investigations and remedial operations.*
- *Developed more than 250 health and safety plans for*

hazardous waste site operations.

- *Trained over 300 personnel in health and safety aspects of site operations.*

Project Manager

- *Managed corporation medical surveillance, respiratory protection, and trained over 450 employees.*
- *Managed environmental health assessment project involving air quality studies, odor measurements, stack emission characterizations, public health surveys, and expert testimony.*
- *Performed chemical and pharmaceutical research and development laboratory site investigations.*

Principal Investigator

- *Participated in over 100 environmental studies at uncontrolled hazardous waste sites and industrial facilities.*
- *Conducted mass balance and pollution control studies at a low-level radioactive waste treatment facility.*
- *Task Group Leader for low level radioactive burial site environmental assessment involving NRC regulation.*

1976 - 1979 York Research Corporation, Stamford, CT

Project Director

Directed numerous air pollution studies at steel, utility, chemical, and research facilities. These studies involved U.S. EPA research, compliance testing, performance evaluations, and point source characterizations.

- *Managed staff up to 10 and budgets of $30,000 - $500,000 for projects of up to 3 months duration.*

1975 - 1976

Westchester County Department of Natural Resources Planning, White Plains, NY

Natural Resources Specialist

Responsible for environmental land use planning studies, natural resources inventories, and environmental impact statements.

- ❖ *Conducted environmental impact analysis for proposed county activities.*
- ❖ *Developed a local citizen advisory council for each municipality in Westchester County.*

EDUCATION

Polytechnic Institute of New York, Brooklyn NY

Master of Science (pending/anticipated 1995); Environmental Health Science

Columbia University, New York, NY

Environmental Systems Analysis

Long Island University, Southampton College
Southampton, NY

Bachelor of Arts; Environmental Land Use Planning

CERTIFICATIONS

Certified Hazardous Materials Manager (# 336) Master Level (IHMM)
Certified Hazardous Control Manager (# 1648) Master Level (BHCM)
Certified Hazardous Materials Technician (IECA)
Certified HazCat Trainer (Haztech, Inc.)

ADDITIONAL TRAINING

Legal Aspects of Industrial Hygiene (American Industrial Hygiene

Operation and Selection of Portable Combustible and Organic Vapor Instruments and Fixed Continuous Monitoring Systems (AIHA)
Application of Tracer Gas Techniques to Industrial Hygiene Investigators (AIHA)
Lead Paint Inspections/Abatement (AIHA)
Chemical Identification System (Haztech, Inc.)
Quantitative Fit Testing, ATI
Emergency Control of Hazardous Materials Incident, I & II (New York State Fire Academy)
Response Safety Decision Making (EPA)
Hazardous Material Incident Response Operations (EPA)
Shipment of Regulated Articles (Federal Express)
Groundwater Investigation at Hazardous Waste Sites (National Water Well Association)
Occupational Respiratory Protection (NIOSH)
Visible Emissions Measurements (CT DEP)

PROFESSIONAL AFFILIATIONS

Member/Co-Chair, AESF OSHA Committee
Member, ASTM F23 Committee on Chemical Protective Clothing Standards
Member, National Environmental Training Association
Member, Air and Waste Management Association
Member, National Association of Environmental Professionals
Member, National Fire Protection Association
Member, NFPA Sub-Committee on Chemical Protective Clothing
Full Member, American Industrial Hygiene Association Committee on Personal Protection
Member, CT Forum for Environmentally Regulated Professionals
Diplomat, Academy of Hazardous Material Management
President, CT Chapter of Certified Hazardous Materials Managers

MICHAEL H. ZISKIN, CHCM,CHMM
DIRECTOR OF TECHNICAL PROGRAMS

Mr. Ziskin has completed undergraduate and graduate studies in Environmental Health Science and Industrial Hygiene. He holds certifications in Hazardous Materials Management (CHMM), Hazard Control Management (CHCM), and Hazardous Materials Technology (CHMT). He has been trained by fifteen governmental and industrial organizations including: the U.S. EPA, and the National Institute for Occupational Health and Safety.

In 1983, Mr. Ziskin founded Field Safety - a firm specializing in occupational and environmental health and safety. In 1985, Mr. Ziskin expanded his capabilities by forming a products division specializing in outfitting Hazardous Emergency Response Teams across the U.S. Prior to 1983, Mr. Ziskin was the Corporate Industrial Hygiene and Safety Director for Dames and Moore - a world wide environmental engineering consulting firm and an Air Pollution Control Engineer for York Research Corporation in 1976.

Mr. Ziskin has 18 years of experience in the environmental and health and safety industries. He has managed and directed over 200 programs including: air pollution assessments, hazardous waste site investigations, remedial actions, emergency responses, and industrial facility compliance audits. Mr. Ziskin has designed and implemented a variety of corporate environmental, industrial hygiene and safety programs for small industrial shops to fortune 100 corporations. He has also conducted environmental and occupational health studies at nuclear facilities, radiological laboratories, low level radioactive waste treatment facilities, and for the NRC and the EPA. Mr. Ziskin has delivered over 9000 hours of training in over 300 programs on more than thirty major subject areas.

Mr. Ziskin is a nationally recognized authority in chemical protection and has been appointed to AIHA, NFPA, AESF and ASTM Committees involved with occupational health and safety issues. He is also a member of other organizations including: the Connecticut Hazardous Materials Awareness Committee, the Air and Waste Management Association, the National Environmental Training Association, and the National Association of Environmental Professionals and the International Society of Fire Service Instructors. He is an instructor and committee member of the Wolcott State Fire School. Mr. Ziskin is a member of the Mid Fairfield County Haz Mat Team and Greens Farms Volunteer Fire Department. He also serves as the Training Committee Chairperson for the HazMat Team.

Mr. Ziskin currently provides training and consulting for industry, state and municipal agencies, the military and for various service contractors and engineering consulting firms. He is also an adjunct Professor at the University of New Haven teaching Hazardous Materials Management courses in the Graduate Environmental Program. Mr. Ziskin also serves on the National Education and Training Committee of the Academy of Certified Hazardous Materials Managers.

Mr. Ziskin's publications include EPA reports, field studies, training manuals, instructional aids and lesson plans. He has presented over twenty-four papers to professional and trade organizations on topics such as health and safety training, emergency response planning, managing hazardous materials, identification of unknown materials, radioactive disposal practices and personal protective equipment selection, uses and limitations.

Mary A. Healy, M.S., CIH
Sr. Industrial Hygienist

WORK HISTORY
& EXPERIENCE

1993 - Present — **Field Safety Corporation, Stamford, CT**

Senior Industrial Hygienist/Instructor

- *Comprehensive industrial hygiene and safety*
- *Site supervision, superfund sites*
- *Compliance risk assessments*
- *Training program development*
- *Process safety management*

1985 - 1991 — **AT&T, Allentown, PA**

Industrial Hygienist/Environmental Engineer

1984 - 1985 — **Pitman-Moore, Inc. (subsidiary of Johnson & Johnson), Washington Crossing, NJ**

Industrial Hygienist

1983 - 1984 — **Phoenix Safety Associates, Phoenixville, PA**

Industrial Hygienist

1980 - 1983 — **Occupational Safety and Health Administration, U. S. Department of Labor, Allentown, PA and Washington, D. C.**

Industrial Hygienist/Compliance Officer

1979 — **Stewart-Todd, Associates, Wayne, PA**

Industrial Hygiene Trainee (student externship)

KEY EXPERIENCE

- *Environmental engineer for large, high technology, semi-conductor facility.*
- *Responsible for industrial hygiene evaluations of wafer fabrication, silicon growing, MOS and BIC assembly and test, epitaxial layer, and thin film operations; made engineering control recommendations for chemical processes.*
- *Knowledge of fixed gas monitoring systems (MDA) and cleanroom ventilation systems.*
- *Physical agents - laser safety, radiation surveys of x-ray equipment, noise surveys, human factors engineering.*
- *Technical advisor for chemical emergency response and hazardous waste disposal.*
- *Indoor air quality studies.*
- *Performed process hazard reviews with engineering teams.*
- *TSCA Coordinator - MSDS evaluation, review and authorization of new chemicals.*
- *Industrial Emergency Response Technician (OSHA HAZWOPER), Industrial Fire Brigade Member, HazMat Team Technical Advisor.*
- *Developed procedures for shutdown and disposal of chemical cleanroom equipment.*
  Skilled in use of state-of-the-art industrial hygiene instrumentation.
- *Evaluated process hazards in veterinary pharmaceutical manufacturing.*
- *Implemented industrial hygiene and medical monitoring protocol for pesticides.*
- *Provided industrial hygiene services and safety and health supervision for Superfund hazardous waste sites.*

TRAINING & PROGRAM DEVELOPMENT

- *Coordinated and delivered periodic safety and health and training for large employee population in hazard communication, asbestos abatement, respiratory protection, confined space entry, TSCA awareness, laser safety, ergonomics.*

- *Implemented and administered asbestos operations and maintenance, respiratory protection, and confined space entry programs which brought large manufacturing facility into compliance with federal OSHA regulations. Author written programs.*
- *Devised hazard communication program for semiconductor manufacturing in group project.*
- *Author employee manual for ergonomics and facilitated formalization of ergonomics program.*
- *Instructor for self-contained breathing apparatus (SCBA) and airline respirator.*

REGULATORY EXPERTISE

Conducted OSHA general industry safety and health inspections for high hazard industries, with emphasis on lead, arsenic, noise, and silica compliance; handled OSHA complaints; wrote inspection reports which required legally supportable documentation.

EDUCATION

Temple University **1979**
M.S. Environmental Health/Industrial Hygiene

Temple University **1975**
B.A. English (pre-med curriculum with credits equivalent to B.S. in Biology)

CERTIFICATIONS

American Board of Industrial Hygiene 1986

Certified Industrial Hygienist

MARY A. HEALY, CIH
SENIOR INDUSTRIAL HYGIENIST

Mary A. Healy, CIH, has 14 years experience in environmental and occupational health and safety, and industrial hygiene, with extensive experience in the evaluation of industrial operations, occupational health program administration, and OSHA compliance including the delivery of over 2,500 hours of training on more than 15 different subject areas. She has earned a Masters of Science in Industrial Hygiene and is certified in the comprehensive practice of Industrial Hygiene (CIH) by the American Board of Industrial Hygiene, and is a member of the American Industrial Hygiene Association.

Other areas of special expertise include indoor air quality, noise and ergonomics studies. Ms. Healy has been a team participant in process hazard analysis of toxic gas operation. She writes numerous safety and health compliance documents and programs for industry.

Since 1992, Ms. Healy has been Manager of our Industrial Hygiene and Safety Services as well as functioning in varying on-site capacities (e.g. technical, supervisory, advisory) for industrial health hazard assessments, hazardous waste site, lead abatement, and asbestos removal operations.

Ms. Healy has also been participating in FSC's environmental, health and safety related training.

As an environmental engineer for AT&T, Microelectronics Division, from 1985 to 1991, she has special expertise in the health hazards of the semiconductor industry, having had industrial hygiene responsibility for several high technology operations at a 3,000 employee manufacturing location.

Ms. Healy planned, implemented, and managed several occupational health programs, including asbestos management, respiratory protection, confined space entry, and ergonomics. She assisted in the management of a Hazard Communication Program, and authored a written program for semiconductor manufacturing. She has developed and facilitated employee training programs in all of these areas.

Other areas of management and technical responsibilities include overseeing TSCA compliance and MSDS evaluation; technical advisor for chemical emergency response and industrial hazardous waste disposal; and Laser Safety Officer.

Ms. Healy was a member of the AT&T Allentown Works Fire Brigade for three years and is a trained Industrial Emergency Response Technician.

Her previous experience in government was as a Compliance Officer with OSHA for three years, performing industrial hygiene inspections in high hazard industries. These included general industry inspections in foundry, steel and glass manufacturing, and involved in the evaluation of industrial programs for lead, silica, arsenic and noise.

Bruce S. Kelly, EMT, CHMT
Technical Specialist/Instructor

WORK HISTORY
& EXPERIENCE

1988-Present

Field Safety Corporation, Stamford, CT

Technical Specialist/Instructor

- *Emergency response planning*
- *Product research to determine application and performance in field.*
- *Instructor for training programs including OSHA 1910.120, SCBA, APR, Fire Extinguishers, Emergency Response, Confined Space Operations, First Aid, Level A Operations, Decontamination and HazCat® Field Screening for Unknown Chemicals.*
- *Multimedian enviornmental sampling*
- *Site supervision*

1987 - Present

Mid-Fairfield County Hazardous Material Response Team, CT

Response Team Member

Active involvement in reorganization and operation of unit.

- *Mutual aid response to hazardous material incidents for 9 municipalities.*
- *Revised standard operating procedures.*
- *Purchased equipment for response operations.*
- *Acquired and rehabilitated the hazardous materials response equipment vehicle.*
- *Trained personnel on use of equipment, how to respond to a hazardous situation, etc.*

1980 to Present

Westport Fire Department, Westport, CT

Firefighter/Hazardous Material Response Team Member

Handle emergencies in the Town of Westport

- *Fire suppression.*
- *Emergency medical response.*
- *Coordinate Fire Department's preparation and response to incidents involving hazardous materials*
- *Train personnel on Hazardous Materials Response.*

EDUCATION

University of New Haven,West Haven, CT
Bachelors of Science - Forensic Science

John Jay College, New York, NY
Arson Investigation
Advanced Arson Investigation

Sacred Heart University, Bridgeport, CT
Chemistry of Hazardous Materials

CERTIFICATIONS

State of Connecticut

Firefighter I
Firefighter II
Emergency Medical Technician
Hazardous Materials Technician
Certified Fire Service Instructor I

Industry

SCBA Field Maintenance 11A, 4.5, 2.5	Scott Aviation, Inc.
SCBA Service and Maintenance	Interspiro, Inc.
HazCat®, Train the Trainer	Haztech, Inc.

ADDITIONAL TRAINING

Basic Hazardous Materials	CT State Fire School
Recognition of Hazardous Materials	CT State Fire School
Hazardous Materials II	CT State Fire School
Recognizing and Identifying Hazardous Materials	Nat'l Fire Academy
Training in the Use of Radiation Monitoring Instruments	CT Civil Defense
Leak, Spill, & Fire Control School, Part III	St. Augustine Technical School
Disaster Control Seminar Part I	Safety Systems Inc.
Command Considerations Part III	Safety Systems Inc.
APR Fit Testing	Field Safety Corp.
OSHA 40 hr Hazardous Waste Operations & Emergency Response Training (HAZWOPER)	Field Safety Corp.
HAZWOPER - 8hr. Supervisor	Field Safety Corp.
Elevator Safety	CT State Fire School
Intro. Vehicular Rescue	CT State Fire School
Basic Vehicular Rescue	CT State Fire School
Intermediate Vehicular Rescue	CT State Fire School
Firefighter II	DE State Fire School
Water Rescue	DE State Fire School
Ropes and Rigging	DE State Fire School
Building Construction I	Nat'l Fire Academy
Chemistry of Haz. Materials I	Nat'l Fire Academy
OSHA Trench Safety "Competent Person"	CT Construct. Ind. Assoc.(CCIA)

BRUCE S. KELLY
TECHNICAL SPECIALIST

Mr. Kelly has over 17 years of industrial and emergency response experience. He has completed undergraduate studies in Forensic Science and is certified as a Hazardous Materials Technician, Emergency Medical Technician, and a Fire Service Instructor all by the Connecticut State Fire Academy. He has also completed specialized training courses in hazardous materials related areas including: Hazardous Materials Transportation Inspection, Disaster Control, Civil Preparedness, Radiological Instruments, Arson Investigation, Vehicular Rescue, Fire Training, and Rescue Operations. He is also certified in the Field Maintenance of SCBA's by two (2) different manufacturers.

Since 1988, Mr. Kelly has been a Technical Specialist for Field Safety Corporation. In this position, Mr. Kelly directs HazCat® Field Chemical Analysis and provides on-site health and safety supervision and multimedia environmental and industrial hygiene sampling. He is also a licensed HazCat instructor and an instructor for many Field Safety Training Programs. He has delivered over 3000 hours of instruction in all Hazardous Waste Operations and Emergency Response related courses.

Additionally, Mr. Kelly is a career Fire Fighter for the town of Westport, Connecticut, and is a member of the Mid-Fairfield Hazardous Materials Response Team for which he is responsible for team organization and equipment maintenance.

Mr. Kelly has worked spill responses and environmental clean-ups at industrial manufacturing facilities as well as state and federal clean-up sites involving low to extremely high hazard conditions for over 6 years.

Mr. Kelly has served in management, support function and entry positions in numerous HazMat incidents and provided third party audit of various environmental contractors during incident clean-up.

Dawn Han
Industrial Hygienist

WORK HISTORY & EXPERIENCE

1995 - Present **Field Safety Corporation**

Industrial Hygienist

- *Comprehensive industrial hygiene and safety*
- *Multimedial environmental sampling*
- *Facility audits*
- *Technical research*
- *Site supervision*

1992 - 1994 **Environmental Laboratories, Inc., New Haven, Connecticut**

Industrial Hygienist

- *Provided health and safety support for company's environmental field work and laboratory needs. Developed health and safety policies and procedures.*
- *Worked as an on-site health and safety coordinator and developed health and safety plans for hazardous waste sites.*
- *Conducted environmental studies including collecting air, water, soil, and asbestos samples, writing reports, and recommending corrective actions.*
- *Coordinated major environmental sampling program at RCRA and CERCLA sites.*

1989 - 1992 **University of Cincinnati**

Industrial Hygienist

- *Conducted investigations on such subjects as industrial hygiene, indoor air quality, pollution control, laboratory safety, building HVAC system, asbestos abatement, and underground storage tanks, etc.*
- *Managed asbestos abatement, underground storage tank annual registration and removal, and waste disposal projects.*
- *Performed construction and renovation project review, employee training, exposure monitoring, environmental sampling, accident investigation, and emergency responses.*

- *Developed and implemented policies and procedures to ensure compliance with environmental health and safety regulations.*

1987 - 1989 **University of Cincinnati**

Teaching and Research Assistant

- *Developed a simplified pressure method for fit-testing respirators*
- *Assisted in teaching courses in Industrial Ventilation, Aerosol Technology, and Air Sampling and Analysis*

TRAINING/ CERTIFICATIONS

- Certified Asbestos Hazard Abatement Specialist
- Certified Asbestos Inspector
- OSHA Hazardous Waste Operations and Emergency Response
- First Aid and CPR, American Red Cross

EDUCATION

M.S., Industrial Hygiene, 1989, University of Cincinnati (GPA 4.0/4.0)
B.S., HVAC Engineering, 1986 Beijing Polytechnic University (GPA 3.7/4.0)

DAWN HAN
INDUSTRIAL HYGIENIST

Dawn Han has 6 years experience in environmental and occupational health and safety, and industrial hygiene, with specialized expertise in pollution control, ventilation system design, and indoor air quality. She has earned a Masters of Science in Industrial Hygiene and a Bachelors of Science in HVAC Engineering.

She has been certified as a Hazardous Waste Site Safety Supervisor, Asbestos Hazard Abatement Specialist, Asbestos Inspector, First Aid and CPR. Ms. Han has been responsible for the development of site specific health and safety plans and performing on site OSHA compliant inspections and audits.

She also participates in the development of corporate environmental health and safety programs, and in the performance of comprehensive industrial hygiene and safety services.

Ms. Han has previously served as an industrial hygienist for an environmental laboratory. In this capacity she had directed the company's health and safety program and provided technical over site for the company's field sampling programs at RCRA and CERCLA sites.

She has also conducted a variety occupational hygiene programs, and has managed asbestos abatement , underground storage tank removals and waste disposal projects for the University of Cincinnati.

EXHIBIT B

FIELD TEAM REVIEW FORM
PROJECT HEALTH AND SAFETY PLAN

EXHIBIT B

FIELD TEAM REVIEW FORM

PROJECT HEALTH AND SAFETY PLAN

INSTRUCTIONS: This form is to be completed by each person working on the subject work-site. Upon completion, this form is to be given to the HSO.

JOB NUMBER: _____

CLIENT/PROJECT: IBM East Fishkill Facility, RCRA Soils RFI Project

DATE: _____

I represent that I have read and understand The contents of The above mentioned Plan and agree to perform my work in accordance with it:

_____
Signature

_____
Name Printed

_____
Company/Office

_____
Date Signed

William F. Cosulich Associates, P.C.

Environmental Engineers & Scientists

Confined Space Entry Program

Prepared By

Field Safety Corporation

January 1996

EXHIBIT C

CONFINED SPACE ENTRY PROCEDURES

TABLE OF CONTENTS

		Page
	CONFINED SPACE ENTRY PROGRAM ACKNOWLEDGMENT	
I	POLICY STATEMENT	1
II	PURPOSE	1
III	SCOPE	1
IV	DEFINITIONS	1
	A. Confined Space	
	B. Permit-Required Confined Space (PRCS)	
	C. Non-Permit Confined Space	
V	RESPONSIBILITIES	2
	A. Management	
	B. Health & Safety Officer and Project Manager	
	C. Entry Supervisors	
	D. Entrants and Attendants	
VI	CONFINED SPACE IDENTIFICATION, CLASSIFICATION AND EVALUATION CRITERIA	4
	A. General Hazards Characterization	
	B. Hazardous Atmospheres - Immediately Dangerous to Life & Health (IDLH)	
	1. Oxygen Deficiency & Oxygen Enrichment	
	2. Flammable Vapors & Gases	
	3. Toxic Vapors	
	4. Changing Conditions	
	C. Mechanical Hazards	
	D. Electrical Hazards	
	E. Engulfment	
	F. Heat Stress	
	G. Other Hazards	
VII	ENTRY PERMIT	6
	A. Requirements	
	B. Permit Information	
VIII	ENTRY PREPARATION AND PROCEDURES	7
	A. Identification and Classification of Spaces	
	B. Atmospheric Testing	
	C. Ventilation	

Page

D. Attendants
E. Isolation of Confined Spaces
F. Lock-out/Tag-out
G. Hot Work Permit
H. Entry Equipment
I. Personal Protective Equipment
J. Traffic Precautions
1. When Approaching the Job Site
2. Cone Placement
3. Flagmen
K. Fall Arrest and Removal System Precautions
1. General Warnings
2. Winch and Tripod
3. Inspection
L. List of ConfinedSpace Entry Equipment

IX ENTRY PROCEDURES 16
A. Entrant & Attendant Duties
B. Communications
C. Continuous Testing

X EMERGENCY PLAN 17
A. Self Rescue
B. Non-Entry Rescue
C. Entry Rescue
D. Outside Emergency Services and Notifications

XI REPORTING 19

XII TRAINING 20
A. Frequency
B. Purpose

APPENDIX A LIST OF QUALIFIED CONFINED SPACE PERSONNEL
APPENDIX B CONFINED SPACE ENTRY PERMIT
APPENDIX C CONFINED SPACE ENTRY CHECK LIST
APPENDIX D VENTILATION WORKSHEET
APPENDIX E INSTRUMENT INHERENT SAFETY
APPENDIX F INSPECTION AND MAINTENANCE LOG
APPENDIX G LIST OF CONFINED SPACE ENTRY EQUIPMENT

ACKNOWLEDGMENT

I have read the Confined Space Entry Program concerning the health and safety procedures for Confined Space Entry. I have discussed any questions which I have regarding these materials with my supervisor or the health and safety officer, and I understand the requirements.

Signed:_____ Date:_____

I POLICY STATEMENT

William F. Cosulich Associates, P.C. and Dvirka and Bartilucci Consulting Engineers (D&B)(a Division of William F. Cosulich Associates, P.C.) is committed to carrying out an effective on-going Confined Space (CS) Entry Program, and will do so by adhering to the procedures in this document. Recognized occupational health and safety practices, standards, regulations, and other corporate Health and Safety Policies and Procedures will be followed in achieving this goal.

Under no circumstances will personnel who have not been trained in CS entry procedures, and who do not have the necessary equipment and an authorized permit, be allowed to access any CS.

II PURPOSE

To protect and safeguard employees from the hazards of confined space entry by establishing responsibilities and procedures for the safe performance of confined space operations.

III SCOPE

This program applies to all employees assigned to confined space entry related duties and operations. This document presents general practices to be followed for confined space entries. The specific conditions, dangers and site layout of a specific project must be evaluated prior to all confined space entries.

IV DEFINITIONS

A. Confined Space

A space large enough and so configured that an employee can bodily enter and perform assigned work; and, has limited or restricted means for entry or exit; and, is not designed for continuous employee occupancy. Examples include: manholes, sewers, boilers, silos, vessels, vats, pipelines, tunnels, storage tanks, vaults, open pits, degreaser tanks, trenches, dry/wet wells.

B. Permit-Required Confined Space (PRCS)

A permit-required confined space, or permit space, has one or more of the following characteristics:

- contains or has the potential to a contain hazardous atmosphere;
- contains a material that has the potential for engulfing an entrant;
- has an internal configuration that could trap or asphyxiate an entrant by inwardly converging walls or by a floor which slopes downward and tapers to a smaller cross-section;
- contains any other recognized serious safety or health hazard.

C. Non-Permit Confined Space

A confined space that does not contain, or with respect to atmospheric hazards, have the potential to contain any hazard capable of causing death or serious physical harm.

V RESPONSIBILITIES

A. Management

Management is responsible for overseeing the program and for ensuring that all procedures are carried out. Management shall ensure that employees are familiar with confined space entry hazards and qualified to perform safe entry, and that the proper training and equipment is provided and used. Appendix A of this plan lists personnel qualified to perform various confined space tasks.

B. Health & Safety Officer & Project Manager

When necessary, Health and Safety Officer will visit during entry into a confined space to ensure enforcement of general procedures and activities. Any decisions requiring use or selection of personal protective equipment or monitoring devices will be approved by a Health and Safety Officer. The Project Manager will ensure that all elements of a site specific plan are implemented (Where applicable) and that all on-site staff have had required confined space training, and are equipped for a CS entry and are working in a safe manner. The Field Operations Manager will be responsible for implementing safety procedures in the field during all work activities.

C. Entry Supervisors

Supervisors shall ensure compliance with the procedures, and shall be responsible for assigning and designating competent and trained personnel to the various confined space entry duties.

Supervisors will issue permits for entry into permit-required spaces. A Supervisor will be available on-site at all times when confined space entry is performed. He will verify that all pre-entry tests have been conducted and that all procedures and equipment are in place before signing and issuing a permit.

D. Entrants and Attendants

Employees who are trained and authorized to perform work activities inside or outside a confined space are responsible for complying with the entry and attendant procedures and practices contained in this document. They must be knowledgeable of the hazards and use the equipment properly.

1. Entrant

   The entrant must remain in communication with the attendant as necessary. He must alert the attendant and evacuate whenever hazards or dangers arise, or evacuate the space when an order is given from an attendant or supervisor, or when an alarm sounds.

2. Attendant

   Attendants must observe and be aware of behavioral changes which may result from overexposure to chemicals or oxygen deficiency. He must remain in continuous contact with entrants, and maintain an accurate account of entrants in the space. Attendants are responsible for remaining at the entrance until relieved by another attendant.

VI CONFINED SPACE IDENTIFICATION, CLASSIFICATION, AND EVALUATION CRITERIA

All confined spaces will be evaluated by a qualified person for the following hazards and conditions:

A. General Hazards Characterization

The primary health concern is potential hazards due to the generation and possible presence of flammable and other toxic gases, and an oxygen deficient environment. In addition to the chemical hazards associated with the location, various biological and physical hazards may also be present for on-site workers. Due to access requirements at several work locations, entry into confined spaces may be required as a part of work activities. Evaluations to determine if these locations can be accessed outside of the confined space shall be made first. Entry into a confined space will only be performed if no other alternative for sample collection can be identified. The confined space entry site will be evaluated for the type and degree of hazards expected for a given job. Decisions concerning how to proceed will be based upon the evaluation of potential hazards.

It may be possible that Occupational Safety and Health Administration (OSHA) Permissible Exposure Limits or the American Conference of Government Industrial Hygienists (ACGIH) Threshold Limit Values are exceeded for volatile organic chemicals or other toxic chemicals which may be present as a result of decomposition of organic matter or other conditions. These compounds are capable of accumulating in confined spaces and specific protection will be required for entry into spaces.

B. Hazardous Atmosphere - Immediately Dangerous to Life & Health (IDLH)

A hazardous atmosphere, or IDLH atmosphere, is one which may expose employees to the risk of death, incapacitation, impairment of ability to self-rescue, injury, or acute illness. The following criteria define IDLH conditions and acceptable levels for entry:

1. Oxygen Deficiency and Oxygen Enrichment

   Oxygen concentration below 19.5% is oxygen deficient and the minimum permissible level for entry into a space.

Oxygen concentrations above 23.5% create a potentially explosive or flammable atmosphere.

Acceptable oxygen range for entry: 19.5% to 23.5%
Entry shall be prohibited when levels of oxygen are not within the acceptable range.

2. Flammable Vapors and Gases

Airborne concentrations of flammable gases or vapors in excess of 10% of the Lower Flammable Limit (LFL) or Lower Explosive Limit (LEL) is considered IDLH.

Entry shall be prohibited when LEL readings equal or exceed 10%.

3. Toxic Vapors

Entry shall be prohibited when levels exceed the predetermined action levels specific to the nature of the work.

4. Changing Conditions

Activities performed in the space can change atmospheric conditions by introducing air contaminants:

a. cleaning materials
b. welding, brazing, cutting
c. operating internal combustion engine-powered equipment
d. chemical removal of wall coatings and paints, sanding, scraping

C. Mechanical Hazards

All mechanical apparatus, such as pumps, which if activated could injure the worker shall be identified and locked out prior to entry.

D. Electrical Hazards

Any electrical equipment which can cause shock or electrocution shall be identified, deenergized and locked out prior to entry.

E. Engulfment

Any liquid or solid material which can enter the space and surround and capture a person shall be identified and controlled by isolation of the space by blanking, blinding, or line breaking.

F. Heat Stress

Heat stress may occur even in moderate temperatures when work is strenuous. Heat stress symptoms and illnesses include heat rash, heat cramps, heat exhaustion, and heat stroke. Work activities will be monitored and schedules adjusted to allow for intake of fluids as well as resting and "cooling off" periods.

G. Other Hazards

Spaces shall be evaluated for any additional hazards including: high pressure lines; steam lines; slip, trip and fall hazards; and space configurations which could cause entrapment or crushing. Entry into sewer systems, wet wells, etc. presents special hazards, such as biological hazards from waste materials, extremely slippery conditions, and drowning hazard.

VII ENTRY PERMIT

A. Requirements

Before entering a permit-required confined space, the entrant must be issued a permit signed by the supervisor. The permit must be completed in its entirety, assuring that all of the actions have been taken and conditions met which are in Section VIII, Entry Preparation.

A copy of the permit is located in Appendix B.

B. Permit Information

The following information must be included in the permit:

- identification of space;

- purpose of entry;
- date and duration of permit;
- names of authorized entrants;
- name of entry supervisor;
- names of authorized attendants;
- identification of hazards;
- actions taken to isolate space, and eliminate/control hazards;
- acceptable entry conditions;
- test results;
- rescue and emergency means;
- communication procedures;
- and required equipment.

A confined space entry checklist is available in Appendix C. It should be used together with the permit.

VIII ENTRY PREPARATION

A. Identification and Classification of Spaces

- Inspect the exterior of the space and determine if the cover can be safely removed by testing the air around the cover, and if possible, insert the probe by slightly prying open the cover.
- Inspect the interior of the space from outside and perform atmospheric testing around and at the opening to the space.
- Guard the opening with a railing or barrier to prevent an accidental fall.
- Determine means of escape and estimated time needed to escape.
- Determine hazards present or potential for hazards to develop (for conditions to change) based on hazards described in Section VI of this plan.

B. Atmospheric Testing

- **The internal atmosphere must be tested before anyone enters the space.** The space will be tested for:
  - % oxygen;
  - % lower explosive limit (LEL); and
  - toxic vapors.

- Tests will be performed with a Bacharach Sentinel 4 (or equivalent) - A four (4) gas atmosphere testing device for oxygen, combustible gas, carbon monoxide, and hydrogen sulfide.
- Tests will be performed with low detection level atmospheric testing equipment (colorimetric tubes or organic vapor analyzers) should toxic concentrations be suspected or known to be present.
- Test the atmosphere at a distance of every 4 feet in the direction of travel and to each side. Test progression must be slow to allow for instrument response time.
- Order of testing:
  - Test for oxygen first. If the atmosphere is oxygen deficient, combustible gas reading will not be reliable.
  - Test for combustible gas second.
  - Test for toxic vapors last.
- **Do not enter confined space if oxygen is less than 19.5%.**
- **Do not enter a confined space if the LEL is greater than or equal to 10%.**
- **Exit a confined space if the meter indicates an alarm condition.**
- **If other toxic materials are suspected, contact your supervisor.**
- Toxic air symptoms - if you are exposed to toxic gas and have symptoms such as nausea, dizziness, blurred vision, irregular heartbeat, or breathing difficulty, signal for help. Attendant call for medical attention immediately if you observe signs of distress.

C. Ventilation

- In a confined space where the natural ventilation is poor, areas will be ventilated with an explosion proof fan and ducts.
- The O_2 meter will remain running with the probe inside the confined space the entire duration that personnel are inside, and will be monitored by the attendant.
- In confined areas where it is extremely hot, the explosion proof fan will be used to lower the temperature.
- The ventilation shall be maintained and fresh air shall continue to be introduced during occupancy of the space.
- Several air exchanges shall be used to purge the space. (A ventilation worksheet can be found in Appendix D).

D. Attendants

No work shall be performed in any confined space without an attendant. The attendant shall remain outside the space and observe and/or communicate with the entrant until the operation is complete and the entrant has exited the space. This person shall be properly instructed in emergency and rescue procedures. The supervisor and the attendant must assure the following:

- That a precise record be maintained of all personnel entering the confined space.
- That all emergency services and necessary equipment are available, and personnel in the vicinity advised of the hazard.
- The equipment which allows proper mechanical advantages for removing immobile personnel is in place so that attendants can perform non-entry rescue.
- The attendant shall not leave the opening until relieved by another attendant.
- The attendant will have an on-site means of summoning help, such as an airhorn, or a portable telephone, in the event of an emergency.

E. Isolation of Confined Spaces

- The confined space must be isolated from all other systems.
- Electrical equipment must be locked out and tagged by the person(s) entering the confined space.
- Line disconnect switches supplying power to all mechanical equipment such as pumps, must be locked and tagged in the off position by the person(s) entering the confined space.
- All mechanical equipment must be blocked, chocked, and disengaged.
- Piping containing pressure must be bled and the line left separated exterior to the confined space so that no vapors can enter the confined space. If it is not possible to leave the line separated, a blank, which stops any possible flow, must be installed in the line to the confined space.
- Blanking flanges (skillet blanks) - Such flanges, pre-cut and designed for specific locations, are used in addition to lock-out of valves to block material flow through the piping system. Blanking flanges must be sufficiently strong to withstand anticipated line pressures. Gaskets

should be provided on the incoming side of the blanks.

- All movable equipment within the confined area must be made immobile to prevent accidental movement.

F. Lock-out/Tag-out (LO/TO)

The purpose of locking and tagging is to prevent inadvertent actuation of electrical circuits, mechanical apparatus, or where there are any other operations or processes associated with the space whose operation may expose employees working within to hazardous energy conditions.

The conditions include but are not limited to those created by the following equipment or systems:

- vapor, liquid, or gas lines used to fill the vessel or space with fuel;
- mechanical pumps, electrical circuits, and auxiliary systems (including climate control, lighting, and power transmission apparatus);
- mechanical cleaning or discharging systems used to empty the vessel or space of processed materials.

The following types of LO/TO devices may be used by personnel depending on the specific needs of the site, equipment, or operation:

- Lock - standard, key-opened padlocks are the only type which shall be used.
- Lock-out boxes - For multiple lock-out, a lockable container for holding a number of keys shall be used. The supervisor must retain a master key to open the lock-out box.
- Multiple lock hasps - a locking device enabling padlocks to be installed for simultaneous use when several employees are required to lock-out the same device.
- Chains - chains can be used to lock cut-off points of piping systems where valves are not provided with other equally effective types of locking devices. These chains must be pre-cut for specific valve lock-outs and must be provided with padlocks.
- Tags - any lock-out system must be accompanied by an informational tag indicating that the system has been deactivated and that use is prohibited.

Proper employee protection can be insured only if all power sources and potential exposures from any hazardous materials or systems are positively

eliminated.

All systems or equipment which could create a hazardous condition must be identified and positively eliminated through locking and isolation. All electrical apparatus must be shut off and locked in the off position. Mechanical power transmission apparatus must be mechanically disabled or locked to prevent operation. Valves must be locked in the closed position. Additionally, the piping should be disconnected from the vessel and further disabled by installation of blanking or flanges or skillet blanks, especially in cases where misalignment is impractical.

The use of signs or tags confirming the deactivation of the device or system and warning against further use shall be used only when a checklist and supervisory approval system (with a signed verification form) can be constructed from an inventory of all tagged points as insurance that all systems have been locked-out and isolated.

Before any employees enter a space or vessel, the start buttons, valves, and other actuating devices shall be tried to insure that they are disabled and the proper systems have been disabled.

Prior to removing any locks, tags, and isolation devices, employees and supervision must verify that the equipment or system locked-out is safe to operate. The Supervisor shall utilize a checklist to assure the following conditions are met:

- all personnel are clear of hazardous equipment and spaces;
- all guards are installed;
- all previously exposed electrical wiring and equipment are properly covered;
- all piping systems and open pipes are closed and properly connected;
- all mechanical devices are free of loose, unsecured objects,

G. Hot Work Permit

Any work to be done in the space which includes riveting, welding, cutting, burning and heating that is capable of providing an ignition source, requires a hot work permit.

Hot work permits must be obtained from the appropriate authority having jurisdiction or the corporate entry supervisor.

- When performing Hot Work in confined spaces employees shall

  - identify any chemical involved;
  - check appropriate required personal protective equipment and ensure that a dry chemical fire extinguisher is on hand for all Hot Work;
  - check appropriate safety requirements.

- When Hot Work ceases employees shall:

  - leave all gas cylinders and welding machines outside of the confined space;
  - positively isolate the gas supply outside the confined space when torches are not in use for substantial periods of time (such as during lunch break), and where practical, remove torches and hoses from the confined space;
  - de-energize electrode holders by electrically disconnecting the power supply when welding is to be suspended for an appreciable amount of time or the welder has occasion to leave work;
  - ensure that mechanical ventilation in the confined space is continuous and is arranged to pull fumes away from employees who may be performing Hot Work;
  - properly file documentation of entry activities.

H. Entry Equipment

All equipment introduced into confined space or used in the immediate vicinity of confined spaces shall meet the specific performance requirements for the hazardous atmospheres, i.e. intrinsic safety and explosion proof conditions as specified in the National Electrical codes. (See Appendix E).

The following tools and equipment should be available for entry and set up during pre-entry preparation:

- escape respirators or emergency breathing systems;
- lighting equipment (flashlights, lanterns, or AC or DC electric powered lighting) approved for Class I, Division I, Group C or D atmospheres (explosion proof);
- hand tools constructed of non-sparking metal alloys;
- ladders;
- lifeline and harnesses;

- tripod with lifting device;
- explosion proof fan and ductwork;
- venturi horn;
- oxygen/combustible gas meter with alarm set at 19.5% O_2 and 10% LEL;
- two-way radio;
- emergency equipment - first aid kit.

I. Personal Protective Equipment

Workers are provided and required to use protective equipment as follows:

- For worker entering permit-required confined space:
  - gloves;
  - safety glasses or goggles;
  - boots and safety shoes;
  - impermeable coveralls;
  - safety harness with attached lifeline;
  - respiratory protection as deemed necessary by results of atmospheric testing.
- For attendant:
  - safety glasses or goggles;
  - gloves;
  - boots and safety shoes;
  - impermeable coveralls;
  - immediate access to safety harness and lifeline;
  - two-way radio for summoning assistance and emergency communication;
  - respiratory protection as deemed necessary by results of atmospheric testing.

J. Traffic Precautions

Traffic control may be necessary while confined space entry is taking place.

1. When Approaching the Job Site

a. Activate 4-way flashers upon approach to the confined area to be entered.
b. Park the vehicle in such a way that traffic will flow in the most unobstructed manner and, where possible, the vehicle should provide protection for the entry crew.
c. Park the vehicle in such a manner that exhaust fumes are not drawn down into the manhole.

2. Cone Placement

Prior to opening the cover, place traffic safety cones around the space and the vehicle. These cones are to be visible to traffic in all directions. Cones are to be used to protect the crew and channel traffic. Place the cones at sufficient distances and intervals to adequately warn oncoming traffic.

3. Flagmen

a. If only one lane of traffic is open in a congested area, use a flagman to direct traffic flow.
b. Use of safety vests and flags is required.
c. When a flagman is necessary, he cannot act as an attendant. An employee must be present as an attendant to the entrant.

K. Fall Arrest and Removal System Precautions

1. General Warnings

a. Do not install fall arrest and removal equipment where there exists the possibility of coming into contact with power lines, live cables, etc.
b. Do not leave equipment for long periods in environments where corrosion of the main components could take place as a result of vapors rising into the atmosphere from organic materials. Sewage and fertilizer plants, for example, should be avoided for they have high concentrations of ammonia present.
c. Always erect equipment directly overhead of intended working area. Do not work at more than a 10° angle from vertical below tripod or davit arm suspension point. Working outside of this range could cause the tripod to tip or create a "swing fall" situation (swing fall occurs when a worker swings and strikes an

immovable object).

2. Winch and Tripod

The tripod is generally stored with all legs set at full retraction and a winch may or may not be mounted on one leg. Erect as follows:

- Lay the tripod on the working surface and attach the winch if not already in position.
- Adjust legs to required working length.
- Tilt tripod into an upright position.
- Spread legs out. Make sure legs are against bearing surface on head (legs fully spread).
- Position tripod over opening so winch cable is located approximately in the center of the opening. Make sure footing is solid under each leg and capable of supporting intended loading (a suitable safety factor must be applied). Level the tripod by adjusting the leg height.
- Adjust the leg chain by removing excessive slack. WARNING: Tripod must never be used without leg chains in place.
- The winch may be adjusted up or down along the main leg of the tripod. Loosen the clamp plate and slide the winch to the desired level and retighten. Do not over-tighten the clamp plate.
- For personnel use, attach the fall protection system to the fall arrest anchorage.
- Inspect system before use (see Section VIII. K. 4 below).

3. Inspection

A visual inspection of the operating condition of the system is required before each use. Detailed inspections shall be conducted at a minimum of two (2) times per year. Detailed inspections must be recorded on the inspection log provided in Appendix F.

L. List of Confined Space Entry Equipment

A list of confined space entry equipment (instruments, personal protective equipment, and fall arrest equipment, etc.) can be found in Appendix G.

IX ENTRY PROCEDURES

A. Entrant and Attendant Duties

All confined space entries will be performed by a team of no less than two (2) persons with specific duties as follows:

1. Entrant

   Secure a lifeline to winch or stationary object and enter into confined space to perform necessary operation(s). Maintain communication with the attendant.

2. Attendant

   Remain outside the confined space and observe and/or communicate with entrant until the operation is complete and entrant has exited the confined space. During the entire period in which the confined space operation is being performed, the attendant will tend to the entrant's lifeline.

B. Communications

Entrants and attendants shall communicate with each other during the entire operation if visual contact cannot be maintained. Radio communication may be used if designed for atmospheric conditions (i.e. hazardous atmospheres requiring intrinsically safe devices.) Lifeline may also be used. The following code shall be used when utilizing the lifeline:

Attendant to Entrant	Entrant to Attendant
1 pull - Are you okay?	1 pull - I am okay
2 pulls - Advance	2 pulls - I'm going ahead
3 pulls - Back out	3 pulls - Keep slack out of line
4 pulls - Come out	4 pulls - Send help immediately

If Entrant does not respond to the pull code, assume that there is trouble and begin effecting emergency procedures.

C. Continuous Testing

- The atmosphere within the space must be tested continuously to ensure that the forced air ventilation is preventing the accumulation of a hazardous atmosphere.

- If a hazardous atmosphere develops:

  - the entrant must leave the space immediately;
  - the space will be evaluated from the **outside** to determine how the conditions changed, if possible;
  - the hazardous atmosphere will be eliminated before subsequent entry takes place.

X EMERGENCY PLAN

A. Self Rescue

Self Rescue implies that the entrant(s) will be removed by themselves. This may be done with or without the aid of an approved escape respirator or emergency breathing system.

B. Non-entry Rescue

If it becomes necessary to effect rescue efforts to remove a worker from a confined space, the following procedures will be followed:

- Attendant will communicate via two-way radio or air horn to request assistance. The following information will be given:

  - location of worker;
  - description of problem;
  - call for emergency medical assistance.

  If the entrant's lifeline is secured to a winch, begin hauling entrant out of the confined space. This procedure must be performed at a speed that will not injure the entrant.

C. Entry Rescue

If the lifeline is not secured to a winch, the attendant will secure a lifeline and enter the confined space only under the following conditions:

- there is no hazardous atmosphere as determined by air testing instruments;
- there are no other physical hazards that would injure the rescuer;
- another attendant has arrived on the scene;
- outside emergency assistance has been summoned.

ALWAYS SUMMON ASSISTANCE BEFORE BEGINNING A RESCUE ATTEMPT!

The Attendant will:

- sound the alarm and begin to donn any appropriate equipment;
- **WAIT FOR SOMEONE TO RESPOND** to the scene of the entry before he/she enters the confined space (responder becomes Attendant);
- enter the confined space;
- locate the downed person;
- secure the rescue line to the disabled persons harnes or belt;
- signal the Attendant to pull the person out of the space.

D. Outside Emergency Services and Notifications

- The **local fire department** will be summoned for rescue assistance when rescue cannot be performed by corporate personnel:

  Telephone No. **911**

- Rescue operations shall cease if removal would cause:

  - further injury to the victim;
  - injury to the rescuer.

  NO RESCUE WILL BE ATTEMPTED BY EMPLOYEES WHEN A HAZARDOUS ATMOSPHERE OR ANY OTHER HAZARDOUS CONDITION EXISTS IN THE SPACE!

The emergency procedures will include notifying emergency and other affected

personnel, and keeping the locations of the nearest emergency medical facility and emergency telephone numbers in a convenient and readily accessible area at the project site. In addition, a map showing the route from the project site to the medical facility will be shown on a map attached to the permit. Emergency services include:

Nearest Emergency Medical Facility
[To be inserted]

Ambulance, Emergency and Rescue Service
Call Emergency 911

Fire Department
Call Emergency 911

Police Department
_____County Police Department
Call 911 for emergencies

Poison Control Center
[To be inserted]

Designated on-call Physician
Dr. Ronald Rosen, M.D.
Center for Occupational and Preventative Health Care
(718) 470-8900

All emergency services must be contacted prior to initiation of field work to explain the effort involved, site location and work schedule.

XI REPORTING

Upon completion of the confined space entry operation, the permit will be completed indicating the amount of time the entrants were inside the space. The permit will be submitted to the supervisor/foreman:

XII TRAINING

A. Frequency

Training shall be provided to employees:

- Before the employee is first assigned confined space entry duties;
- before there is a change in assigned duties;
- whenever there is a change in confined space operations that presents a new hazard;
- whenever there are inadequacies in the employee's knowledge or use of these procedures.

B. Purpose

- The training shall establish employee proficiency in confined space entry duties, and shall introduce new or revised procedures, as necessary.
- The corporation shall certify that the training has been accomplished. The certification shall contain each employee's name, the signatures or initials of the trainers, and the dates of training. The certification shall be available for inspection by employees and their authorized representatives.

Appendix A

APPENDIX A

LIST OF QUALIFIED CONFINED SPACE PERSONNEL

Entry Supervisor:

Entrants:

Attendants:

Rescuer:

Appendix B

APPENDIX B

CONFINED SPACE ENTRY PERMIT

BACHARACH 625 ALPHA DRIVE • PITTSBURGH, PA 15238 • **(800)736-4666** • FAX (412)963-2091

☐ CONFINED SPACE ENTRY PERMIT ☐ HAZARDOUS AREA ENTRY PERMIT ALL COPIES OF PERMIT WILL REMAIN AT JOB SITE UNTIL JOB IS COMPLETED

1

LOCATION AND DESCRIPTION OF CONFINED SPACE	DATE
PURPOSE OF ENTRY	TIME ' _.m.
DEPARTMENT	EXPIRATION _.m.
PERSON IN CHARGE OF WORK	

2

CREW SUPERVISOR(S)	TYPE OF CREW	PHONE

3

SPECIAL REQUIREMENTS	YES	NO		YES	NO
Lock Out – De-Energize			Escape Harness		
Lines Broken – Capped or Blanked			Tripod Emergency Escape Unit		
Purge – Flush and Vent			Lifelines		
Ventilation			Fire Extinguishers		
Secure Area			Lighting		
Breathing Apparatus			Protective Clothing		
Resuscitator – Inhalator			Respirator		

4

TEST(S) TO BE TAKEN (Valid for one 8-hour turn only.)	P.E.L.*	YES	NO	DATE _ m	DATE _ m	DATE _ m	DATE m	DATE _ m	DATE _ m	DATE _ m	DATE _ m
% of Oxygen	19.5% 21%										
% of L.E.L.**	Any % over 10										
Carbon Monoxide	35 ppm										
Hydrogen Sulfide	10 ppm										

GAS TESTER NAME _____

Note: Continuous/periodic tests shall be established before beginning job. Any questions pertaining to test requirements, contact certified division gas tester.
Plant Gas Coordinator (name) _____ or the Industrial Hygienist (name) _____

5

INSTRUMENTS USED NAME	TYPE	IDENT. NO.

SAFETY STANDBY PERSON(S) NAME		CHECK NO.
YES ☐		
NO ☐		

AMBULANCE _____

FIRE _____

SUPERVISOR AUTHORIZING ALL ABOVE CONDITIONS SATISFIED _____

ORIGINAL TO DEPARTMENT
COPY TO SAFETY

* P.E.L. Permissible Entry Level ** L.E.L. Lower Explosion Level

Appendix C

APPENDIX C

CONFINED SPACE ENTRY CHECK LIST

CONFINED SPACE IDENTIFICATION

Confined Space Location: _____
Purpose of Entry: _____
Previous materials in space: _____

Potential Hazards of the Confined Space

Atmospheric Hazards:

Yes NA Flammable gas vapor or mist <10% LFL): _____

Yes NA Airborne combustible dust >LFL: _____

Yes NA Atmospheric oxygen <19.5% or >23.5% _____

Yes NA Atmospheric condition over PEL: _____

Yes NA Other condition IDLH

Yes NA Poor ventilation

Yes NA Migrating vapors/gases

Chemical Hazards:

Yes NA Unknown contents

Yes NA Corrosive materials: _____

Yes NA Chemical reactivity: _____

Yes NA Sludge/residue

Yes NA Chemical contact

Engulfment Hazards:

Yes NA Materials that fill or plug respiratory tract: _____

Yes NA Materials that exert pressure to strangle, constrict or crush: _____

Configuration Hazards:

Yes NA Inadequate light

Yes NA Difficult to exit

Yes NA Heat/cold

Yes NA Falling objects: _____

Yes NA Poor communications

Yes NA Equipment startup: _____

Yes NA Electrical shock: _____

Yes NA Poor visibility

Yes NA Hot/cold contact

Yes NA Pressure/vacuum

Yes NA Sharp objects

Yes NA Sloping surfaces

Yes NA Taper to smaller cross section

External Hazards:

Yes NA Weather

Yes NA Slip/trip surfaces

Yes NA _____

Yes NA _____

Hazards Being Introduced to Space:

Yes NA Toxic chemical: _____

Yes NA Atmospheric contaminant: _____

Yes NA Radiation hazard: _____

Yes NA Electrical hazard: _____

Yes NA Mechanical hazard: _____

Yes NA _____

CONTROL OF THE POTENTIAL HAZARDS

Required Before Entry:

Yes NA Isolate chemical, utility and outlet lines

Yes NA Purge the space with:
- ☐ water/steam
- ☐ air
- ☐ inert

Yes NA Lockout, tagout and tryout:
- ☐ physical/mechanical
- ☐ electrical
- ☐ radiation

Yes NA Minimize slipping hazards

Yes NA Conduct atmospheric tests:
- ☐ O_2
- ☐ LEL
- ☐ toxic
- ☐ continuous monitoring required
- ☐ periodic monitoring required

Yes NA Guard sharp edges and moving parts

Yes NA Ventilation:
- ☐ mechanical
- ☐ natural ventilation only

Yes NA Review the MSDS for _____

Yes NA Non-sparking tools

Yes NA Explosion proof lighting

Yes NA Gloves for hazards

Yes NA Boots for hazards

Yes NA Additional PPE: _____

Yes NA Emergency eye wash

Yes NA First aid kit

Yes NA Safety harness:
- ☐ chest
- ☐ full body

Yes NA Wristlets

Yes NA Lifeline

Required During Entry:

Protective Equipment -

Yes NA Hearing protection

Yes NA Special clothing: _____

Yes NA Splash goggles

Yes NA Splash shield

Yes NA Respirator:
- ☐ SCBA
- ☐ Air-line with egress bottle
- ☐ PAPR/air purifying: cartridge _____

Yes NA Head protection

Yes NA Fire extinguisher

Communications -

Yes NA Portable radio

Yes NA Mobil phone

Yes NA Unaided voice

Ventilation -

Yes NA Conduct atmospheric tests: ☐ O_2 ☐LEL ☐toxic
- ☐ continuous monitoring required
- ☐ periodic monitoring required

Required for Rescue/First Aid:

Yes NA Vertical retrieval device/winch

Yes NA Respiratory protection: ☐ SCBA ☐Air-line with egress bottle

Yes NA Battery Lighting

Yes NA Alarm/powered communication device

Yes NA Antidote for _____

Yes NA _____

Yes NA _____

SPECIAL ENTRY INSTRUCTIONS

_____

_____

_____

Anticipated Signs and Symptoms

Yes	NA	Irritation of eyes, nose and throat	Yes	NA	Heat rash
Yes	NA	Tearing	Yes	NA	Fatigue and/or weakness
Yes	NA	Changes in complexion or skin color	Yes	NA	Sneezing
			Yes	NA	Tightness in the chest
Yes	NA	Breathing difficulties	Yes	NA	Drooling
Yes	NA	Coughing	Yes	NA	Diarrhea
Yes	NA	Coordination difficulties	Yes	NA	Slurred speech
Yes	NA	Confusion	Yes	NA	Irritability
Yes	NA	Incoherent speech	Yes	NA	Headaches
Yes	NA	Dizziness, nausea, light-headed	Yes	NA	Profuse sweating
Yes	NA	Clammy skin	Yes	NA	Fainting
Yes	NA	Weak or strong rapid pulse	Yes	NA	Convulsions
			Yes	NA	Unconsciousness, coma

Rescue Information

Important Numbers:

Rescue: _____

Plant: _____

Other: _____

Special Rescue Instructions

_____

_____

_____

Based upon the above evaluation, it is anticipated that this space will be classified as:

☐ Multiple hazards permit-required space: requires full compliance with Permit Space Program including the completion of a permit and the presence of an attendant.

☐ Atmospheric hazard permit-required space that can be controlled by ventilation alone: no permit or attendant required. Note: This classification allows alternate entry procedures.

☐ Non-permit required space: no potential or actual atmospheric hazards or all hazards within the space have been eliminated - no permit or attendant required. Note: this classification requires special certification.

Evaluation performed by: _____

(Print name)

_____

(Print title)

_____

(Sign name)

Appendix D

APPENDIX D

VENTILATION WORK SHEET

e this Work Sheet to calculate the approximate volume of the Confined Space and the number of minutes needed to change the in the confined space. IF Ventilation is used to modify the atmosphere of the confined space then a MINIMUM of two (2) air anges MUST occur before retesting PRIOR to any entry into the confined space. Entry is made ONLY after it is authorized a PERMIT is signed and issued.

Ventilation Requirements

A. Height of Confined Space (H) = _____ feet

B. Length of Confined Space (L) = _____ feet

C. Width of Confined Space (W) = _____ feet

D. Diameter of Confined Space (D) = _____ feet

ESTIMATE IF DIMENSIONS ARE UNKNOWN

Volume of the Confined Space

For Rectangular or Cubic spaces:

E. Volume (V) = L x W x H = _____ cubic feet

For Circular or Columnar spaces:

F. Volume (V) = π x (D/2)^2 x H = _____ cubic feet

NOTE: π = 3.14

Ventilation Times

Minimum Ventilation Time = 2 x [CS Volume (V)/Ventilation Rate (VR)]

Blower Model No. _____

G. Ventilation Rate of the Blower (VR) = _____ cubic feet per minute

Found on Blower or in Manual. Call Manufacturer if YOU unsure of Blower output.

Time of ventilation required prior to retesting prior to Authorized Entry:

H. Time (in minutes) = 2 x (V/VR) = _____ minutes

NOTE: Ventilation MUST continue for the entire duration of the CS Entry.

Appendix E

APPENDIX E

INSTRUMENT INHERENT SAFETY

Instrument Inherent Safety

The portable instrumentation used to evaluate hazardous material spills or waste sites must be demonstrated as being safe to use in those hostile environments. Electrical devices, such as the monitoring instruments, must be constructed in such a fashion as to eliminate the possibility of igniting a combustible atmosphere. The sources of his igniting could be: an arc generated by the power source itself or the associated electronics, and/or a flame or heat source inherent in the instrument and necessary for its proper functioning.

Several engineering, insurance, and safety industries have standardized test methods, established inclusive definitions; and developed codes for testing electrical devices used in hazardous locations. The National Fire Protection Association (NFPA), a forerunner in this endeavor, created minimum standards in its National Electrical Code (NEC), published every 3 years. This code spells out among other things:

- Types of controls acceptable for use in hazardous atmospheres.
- Types of areas in which hazardous atmospheres can be generated and the types of materials that generate these atmospheres.

1. Hazardous Atmospheres

   Depending upon the response worker's background, the term *hazardous atmosphere* conjures up situations ranging from toxic air contaminants to flammable atmospheres. For our purposes, an atmosphere is hazardous if it meets the following criteria:

- It is a mixture of any flammable material in air (see *Class* and *Group* below) whose composition is within this material's flammable range (LEL-LFL).

- A critical volume of the mixture is sufficiently heated by an outside ignition source.

- The resulting exothermic reaction propagates the flame beyond where it started.

Hazardous atmospheres can be produced by one of three general types of materials:

- Flammable gases/vapors

- Combustible dusts

- Ignitable fibers

Whereas the flammable material may define the hazard associated with a given product, the occurrence of release (how often the material generates a hazardous atmosphere), dictates the risk. Two types of releases are associated with hazardous atmospheres:

- CONTINUOUS: Those existing continuously in an open unconfined area during normal operating conditions.

- CONFINED: Those existing in closed containers, systems or piping, where only ruptures, leaks, or other failures result in a hazardous atmosphere outside the closed system.

There are six possible environments in which a hazardous atmosphere can be generated. However, not every type of control will prevent an ignition in every environment. To adequately describe the characteristics of those environments and what controls can be used, the National Electrical Code defines each characteristic:

- *Class* is a category describing the type of flammable material that produces the hazardous atmosphere:

  - *Class I* is flammable vapors and gases, such as gasoline, hydrogen. Class I is further divided into groups A, B, C, and D on the basis of similar flammability characteristics (*Table 1-1*).

  - *Class II* consists of combustible dusts like coal or grain and is divided into groups E, F, and G.

TABLE 1-1

CLASS I CHEMICALS BY GROUPS

GROUP A ATMOSPHERES

Acetylene

GROUP B ATMOSPHERES

Butadiene
Ethylene Oxide
Hydrogen
Manufactured gases containing more than 30% hydrogen (by volume)
Propylene Oxide

GROUP C ATMOSPHERES

Acetaldehyde
Crotonaldehyde
Cyclopropane
Diethyl Ether
Ethylene
Unsymmetrical Dimethyl Hydrazine (UDMH, 1-, 1-Dimethyl Hydrazine)

GROUP D ATMOSPHERES

Acetone
Acrylonitrile
Ammonia
Benzene
Butane
1-Butanol (Butyl Alcohol)
2-Butanol (Secondary Butyl Alcohol)
2-Butyl Acetate
n-Butyl Acetate
Isobutyl Acetate
Ethane
Ethanol (Ethyl Alcohol)
Ethyl Acetate
Ethylene Dichloride
Gasoline
Heptanes
Hexanes
Isoprene
Methane (Natural Gas)
Methanol (Methyl Alcohol)
3-Methyl-1-Butanol (Isoamyl Alcohol)
Methyl Ethyl Ketone
Methyl Isobutyl Ketone
2-Methyl-1-Propanol (Isobutyl Alcohol)
2-Methyl-1-Propanol (Tertiary Butyl Alcohol)
Octanes
Petroleum Naphtha[1]
Pentanes
1-Pentanol (Amyl Alcohol)
Propane
1-Propanol (Propyl Alcohol)
2-Propanol (Isopropyl Alcohol)
Propylene
Styrene
Toluene
Vinyl Acetate
Vinyl Chloride
Xylenes

Source: *National Electrical Code*
National Fire Protection Association, 470 Atlantic Avenue, Boston, MA 02210 (1977).

[1] A saturated hydrocarbon mixture boiling in the range 20°- 135°C (68°-275°F). Also known by the synonyms benzine, ligroin, petroleum ether, or naphtha.

- *Class III* is ignitable fibers such as produced by cotton milling.

- *Division* is the term describing the "location" of generation and release of the flammable material.

  - *Division 1* is a location where the generation and release are continuous, intermittent, or periodic into an open, unconfined area under normal conditions.

  - *Division 2* is a location where the generation and release are in closed systems or containers and only form ruptures, leaks or other failures.

Using this system, a hazardous atmosphere can be routinely an adequately defined. As an example, a spray-painting operation using acetone carrier would be classified as a Class I, Division 1, Group D environment. Additionally, an abandoned waste site containing intact closed drums of methyl ethyl ketone, toluene, and xylene would be considered a Class I, Division 2, Group D environment. Once the containers begin to leak and produce a hazardous atmosphere, the environment changes to Class I, Division 1, Group D.

2. Controls

Three methods exist to prevent a potential ignition source from igniting a flammable atmosphere:

- EXPLOSION-PROOF: Encase the ignition source in a rigidly built container. "Explosion-proof" instruments allow the flammable atmosphere to enter. If and when an arc is generated, the ensuing explosion is contained within the specially designed and built enclosure. Within it, any flames or hot gases are cooled prior to exiting into the ambient flammable atmosphere so that the explosion does not spread into the environment.

- INTRINSICALLY SAFE: Reduce the potential for arcing among components by encasing them in a solid insulating material. Also, reducing the instrument's operational current and voltage below the energy level necessary for ignition of the flammable atmosphere provides equal protection. An "intrinsically safe" device, as defined by the National Electrical Code, is incapable "of releasing sufficient electrical or thermal energy under normal or abnormal conditions to cause ignition of a specific hazardous atmospheric mixture in its most easily ignited concentration. Abnormal conditions shall include accidental damage to any...wiring, failure of electrical components,

application of over-voltage, adjustment and maintenance operations and other similar conditions."

- PURGED: Buffer the arcing or flame-producing device from the flammable atmosphere with an inert gas. In a pressurized or "purged" system, a steady stream of, for example, nitrogen or helium is passed by the potential arcing device, keeping the flammable atmosphere from the ignition source. This type of control, however, does not satisfactorily control analytical devices that use a flame or heat for analysis such as a combustible has indicator (CGI) or has chromatograph (GC).

National groups, such as Underwriters Laboratories (UL), Factory Mutual (FM), and the American National Standards Institute (ANSI), together with NFPA, developed test protocols for certifying explosion-proof, intrinsically safe, or purged devices to meet minimum standards of acceptance.

An electrical device certified under one of these test methods carries a permanently affixed plate showing the logo of the laboratory granting certification and the Class(es), Division(s), and Group(s) it was tested against. See *Figure 1-1*.

Certification means that if a device is certified as explosion-proof, intrinsically safe, or purged for a given Class, Division, and Group, and is used, maintained, and serviced according to the manufacturer's instructions, it will not contribute to ignition. The device is not, however, certified for use in atmospheres other than those indicated.

Any manufacturer wishing to have an electronic device certified by FM or UL must submit a prototype for testing. If the unit passes, it is certified as submitted. However the manufacturer agrees to allow the testing laboratory to randomly check the manufacturing plant at any time, as well as any marketed units. Furthermore, any change in the unit requires the manufacturer to notify the test laboratory, which can continue the certification or withdraw it until the modified unit can be retested.

A unit may be certified either by UI, FM or both. Both laboratories follow test protocols established by NFPA and ANSI. Therefore once certification is no better or worse than the other. The important consideration is that the device is approved for the Class(es), Division(s), and Group(s) it will be used in.

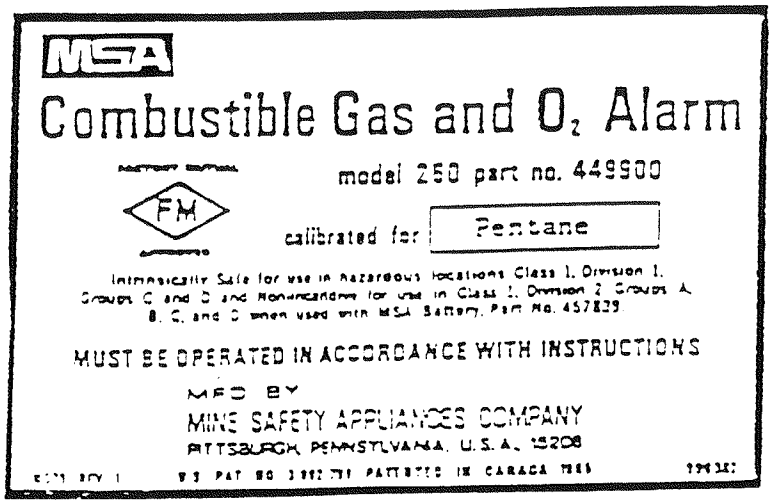


FIGURE 1-1

The mention of FM or UL in the manufacturer's equipment literature does not guarantee certification. All certified devices that are used in hazardous (flammable) locations must be marked to show Class, Division, and Group, per NEC Table 500-2(b).

Other organizations such as the Mine Safety and Health Administration (MSHA), Canadian Standards Association (CSA), National Electrical Manufacturers Association (NEMA), and the U.S. Coast Guard (USCG) have developed their own testing and certification schemes for electrical devices in hazardous locations common to their jurisdiction.

MSHA tests and certifies electrical equipment to be used in hazardous atmospheres associated with underground mining. These atmospheres usually contain methane gas and coal dust; hence the tests and certification are specific to those two contaminants.

Often the same monitoring equipment is used in mines as well as above ground and therefore carry more than one certification, such as FM and MSHA.

To ensure personnel safety, it is recommended that only approved (FM or UL) instruments be used on-site and only in atmospheres for which they have been certified. When investigating incidents involving unknown hazards, the monitoring instruments should be rated for use in the most hazardous locations. The following points will assist in selection of equipment that will not contribute to ignition of a hazardous atmosphere:

- In an area designated Division 1, there is a greater probability of generating a hazardous atmosphere than in Division 2. Therefore, the test protocols for Division 1 certification are more stringent than those for Division 2. Thus a device approved for Division 1 is also permitted for use in Division 2, but not vice versa. For most response work this means that devices approved for Class I (vapors, gases), Division 1 (areas of ignitable concentrations), Groups A, B, C, D should be chosen whenever possible. At a minimum, an instrument should be approved for use in Division 2 locations.

- An additional consideration is that all instruments used in a methane environment should be approved by the Mine Safety and Health Administration (MSHA) as being safe in such atmospheres.

- There are so many Groups, Classes, and Divisions that it is impossible to certify an all-inclusive instrument. Therefore, select a certified device based on the chemicals and conditions most likely to be encountered. For example, a device certified for a Class II, Division 1, Group E (combustible metal dust) would offer little protection around a flammable vapor or gas.

Appendix F

APPENDIX F

INSPECTION AND MAINTENANCE LOG

INSPECTION AND MAINTENANCE LOG

SERIAL NUMBER _____

MODEL NUMBER _____

DATE _____

INSPECTION ITEMS NOTED	CORRECTIVE ACTION TAKEN	MAINTENANCE PERFORMED

APPROVED BY:_____

Appendix G

APPENDIX G

LIST OF CONFINED SPACE ENTRY EQUIPMENT

TO BE PROVIDED ON A
PROJECT-SPECIFIC BASIS

EXHIBIT D

SITE WORKER TRAINING AND MEDICAL EXAMINATION RECORD

EXHIBIT D

SITE WORKER TRAINING AND MEDICAL EXAMINATION RECORD

IBM East Fishkill Facility, Hopewell Junction, New York

Name	Date Training Completed Initial	Refresher*	Date of Last Physical Examination
Ed Aldrich		3/95	Spring 94
Fred Brown		3/95	no record
Gerald Gould		7/94	10/92
Tom Maher		3/94	5/87
David Obradovich		3/95	4/94
Robbin Petrella		3/95	9/92
David Glass	7/95		
Keith Robins		3/95	9/93
Mark Rauber		3/95	12/91
Bill Roesch		3/95	5/92
Rich Russell		3/95	6/94
Ed Santoro		4/91	10/92
Randy Suba		3/95	7/93
Bob Tschiember		3/95	> 3 years ago
Brian Veith		3/95	
Mike Volz		3/95	5/94
Chuck Wachsmuth		3/95	7/93
Rich Walka		3/94	1/89
Maria Wright		3/95	9/93
Caroline Yates		3/95	8/92
Lauren Lasky		9/95	

EXHIBIT E

WEEKLY SAFETY MEETING

EXHIBIT E

WEEKLY SAFETY MEETING

DATE HELD _____ Time _____

1. The weekly safety meeting was held this date for The following personnel:

   (CONTRACTOR) _____

   (SUB-CONTRACTOR) _____

   (HSO) _____

   (OTHER) _____

2. Subjects discussed (note, delete, or add):

   Accident trends/new hazards -
   Individual protective equipment -
   Back injury, safe lifting techniques -
   Fire prevention -
   Sanitation, first aid, waste disposal -
   Tripping hazards -
   Staging -
   Equipment inspection & maintenance (zero defects) -
   Hoisting equipment -
   Ropes, hooks, chains, and slings -
   Trucks, tractors, front-end loaders, scrapers, graders, gradall -
   Electrical grounding, temporary wiring, GFCI -
   Lockouts for safe clearance procedures: electrical, pressure moving parts -
   Steep slopes -
   Toxic materials: hazards, MSDS, respiratory, ventilation -
   Other -

3. Forwarded _____

   Prepared by _____

   Signature _____

EXHIBIT F

DAILY TOOL BOX SAFETY MEETING RECORD

EXHIBIT F

DAILY TOOL BOX SAFETY MEETING RECORD

Date: _____ Work Period Covered: _____

Weather Conditions: _____

Employee in Attendance

Name Company **Name Company**

_____ _____ _____ _____

_____ _____ _____ _____

_____ _____ _____ _____

_____ _____ _____ _____

Summary of Day's Work Activity:

_____

_____

Monitoring/Sampling Equipment Utilized by HSO/Air Sampling Technician:

_____

_____

Protective Clothing and Equipment Being Used by Personnel:

_____

_____

Physical Condition of Workers (any heat or cold stress or other medical problems):

_____

_____

EXHIBIT F (continued)

DAILY TOOL BOX SAFETY MEETING RECORD

Accidents or Breach of Procedures:

_____

_____

Description of Monitoring and Air Samples to be Taken:

_____

_____

Description of Training Activity/Topics Covered:

_____

_____

_____

Equipment Demonstrated (if applicable):

_____

_____

Special Training and Other Comments:

_____

_____

_____ _____

Name of Person Conducting Training Title

_____ _____

Signature Date

EXHIBIT G

RESPIRATORY CERTIFICATION RECORDS

EXHIBIT G

RESPIRATORY CERTIFICATION RECORDS

RESPIRATORY PROTECTION PROGRAM
RECORD OF RESPIRATOR USE

Name _____ Date _____

Social Security Number _____ Age _____

Location _____

Department _____ Supervisor _____

Area to be used in _____

Type of Respirator _____ Fitted By _____

Medical Approval Date _____

Medical Facility/Physician _____

Specific contaminants for which respiratory protection is necessary:

EMPLOYEE STATEMENT

I, an employee of _____ have received The above referenced respirator. I have been fitted and properly instructed on its uses and limitations. I, also, understand that it is my responsibility to properly clean, maintain and store my respirator in a clean area unless other arrangements have been made to assure maintenance and care of The respiratory protection.

Signature _____

Date _____

EXHIBIT H

CARE AND CLEANING OF RESPIRATORS

EXHIBIT H

CARE AND CLEANING OF RESPIRATORS

General Requirements

Any organization using respirators on a routine basis should have a program for their care and cleaning. The purpose of a program is to assure that all respirators are maintained at their original effectiveness. If they are modified in any way, their Protection Factors may be voided. Usually one person in an organization is trained to inspect, clean, repair, and store respirators.

The program should be based on The number and types of respirators, working conditions, and hazards involved. In general, The program should include:

- Inspection (including a leak check)
- Cleaning and Disinfection
- Repair
- Storage

Inspection

Inspect respirators after each use. Inspect a respirator that is kept ready for emergency use monthly to assure it will perform satisfactorily.

On air-purifying respirators, thoroughly check all connections for gaskets and "O" rings and for proper tightness. Check The condition of The facepiece and all its parts, connecting air tubes, and headbands. Inspect rubber or elastomer parts for pliability and signs of deterioration.

Maintain a record for each respirator inspection, including date, inspector, and any unusual conditions for findings.

Cleaning and Disinfection

Collect respirators at a central location. Brief employees required to wear respirators on The respirator program and assure them that they will always receive a clean and sanitized respirator. Such assurances will boost morale. Clean and disinfect respirators as follows:

- Remove all cartridges, canisters, and filters, plus gaskets or seals not affixed to their seats.
- Remove elastic headbands.
- Remove exhalation cover.
- Remove speaking diaphragm.
- Remove inhalation valves.
- Wash facepiece and breathing tube in cleaner/sanitizer powder mixed with warm water, preferably at 120% to 140% F.
- Wash components separately from The facemask, as necessary. Remove heavy soil from surfaces with a hand brush.

- Remove all parts from The wash water and rinse twice in clean, warm water.
- Air dry parts in a designated clean area.
- Wipe facepieces, valves, and seats with a damp lint-free cloth to remove any remaining soap or other foreign material.

NOTE: Most respirator manufacturers market their own cleaners/sanitizers as dry mixtures of a bactericidal agent and a mild detergent. One-ounce packets for individual use and bulk packages for quantity use are usually available.

Repairs

Only a trained person with proper tools and replacement parts should work on respirators. No one should ever attempt to replace components or to make adjustments or repairs beyond The manufacturers' recommendations. It may be necessary to send high pressure side components of SCBA's to an authorized facility for repairs.

Make repairs as follows:

- Disassemble and hand clean The pressure-demand and exhalation valve assembly (SCBA's only). Exercise care to avoid damage to The rubber diaphragm.
- Replace all faulty or questionable parts or assemblies. Use parts only specifically designed for The particular respirator.
- Reassemble The entire respirator and visually inspect The completed assembly.
- Insert new filters, cartridges, or canisters, as required. Make sure that gaskets or seals are in place and tightly sealed.

Storage

Follow manufacturers' storage instructions, which are always furnished with new respirators or affixed to The lid of The carrying case. In addition, these general instructions may be helpful:

- After respirators have been inspected, cleaned, and repaired, store them so to protect against dust, excessive moisture, damaging chemicals, extreme temperatures, and direct sunlight.
- Do not store respirators in clothes lockers, bench drawers, or tool boxes. Place them in wall compartments at work stations or in a work area designated for emergency equipment. Store them in The original carton or carrying case.
- Draw clean respirators from storage for each use. Each unit can be sealed in a plastic bag, placed in a separate box, and tagged for immediate use.

EXHIBIT I

MEDICAL DATA SHEET

EXHIBIT I

MEDICAL DATA SHEET

This Medical Data Sheet will be completed by all on-site personnel and will be kept in The Support Zone during site operations.

Project: _____

Name: _____

Address: _____

Home Telephone: Area Code ( ) _____

Date of Birth: _____ Height: _____ Weight: _____

In case of Emergency, contact: _____
(name and relationship)

Address: _____

Telephone: Area Code ( ) _____

Do you wear contact lenses? ( ) Yes ( ) No

Allergies: _____

List medication taken regularly: _____

Particular sensitivities: _____

Previous/recent illnesses or exposures to hazardous chemicals: _____

_____

Name of Personal Physician: _____

Telephone: Area Code ( ) _____

EXHIBIT J

AIR MONITORING RESULTS REPORT

EXHIBIT J

AIR MONITORING RESULTS REPORT

Date: _____

Duration of Monitoring: _____

Work Location and Task: _____

_____

Instrument Reading _____ (Time)	Instrument Reading _____ (Time)	Instrument Reading _____ (Time)
_____	_____	_____
_____	_____	_____
_____	_____	_____

(Note: If instruments have recorders, just attach tape to report. Also note any action levels when exceeded.)

Instrument Calibration: _____

Perimeter Samples Collected: _____

_____

Personnel Samples Collected: _____

_____

Perimeter and Personnel Sample Results From Previous Day (attach data once received):

_____

Comments: _____

_____

_____ _____

Name Title (Site Safety Officer)

Signature _____

EXHIBIT K

HEAT STRESS/COLD STRESS

G. Eating facilities will allow for meal periods to be taken in the designated lunch area. On days of extreme temperatures, the use of air conditioning will be limited so as not to have personnel exposed to temperature extremes.

1.2 Causes of Heat Stress

Wearing the expected levels of protection on-site can put personnel at risk of developing heat stress. This section will discuss heat stress and what steps will be taken to monitor personnel for the signs of it.

The body's chemical activities take place in a limited temperature range. Heat is generated by these processes. Any heat not needed to sustain the activities must be lost from the body to maintain a balance. HYPERTHERMIA is an abnormally high body temperature. The three main avenues for the release of body heat are:

A. Respiration is our breathing pattern. Care should be taken that the body is not fooled into believing it is cool based on skin temperature.

B. Radiation is how heat is released from the skin. Blood will pool on the surface of the skin as body temperatures increase. The protective ensemble specified for this site will not allow for this type of heat release.

C. Evaporative Heat Loss normally allows for a body to cool itself by the evaporation of perspiration. Because the protective ensemble stops any contact with moving air the sweat coming off of the body will not evaporate.

If any of these release mechanisms is out of balance, the following conditions can occur and may be considered emergencies needing care:

A. **HEAT RASH** is a common occurrence in areas where body parts rub causing friction. The level of protection will heighten its effects. Proper treatment would be personal washing of the affected areas and administering powder to help healing.

B. **HEAT CRAMPS** occur when people are exposed to heat for extended periods of time. Due to the wearing of the required protective ensemble, this will be expected. The person will sweat heavily and drink large quantities of water. The more the person sweats, the more electrolytes are lost.

If enough body salts are lost, the individual will begin to experience body cramps and pain in the extremities.

Proper treatment includes slow replenishment of body fluids augmented by a proper salt solution along with cooling the individual down, taking care not to expose the person to extreme cooling measures. The worker will not be allowed to return to work until the SSO has monitored and approved re-entry.

C. **HEAT EXHAUSTION** occurs as the blood pools at the skin surface in an attempt to cool the body. Sweating is profuse, skin is moist and cool, and the patient will experience dizziness, nausea, or fainting. This condition is an indicator of overwork in the environmental conditions. Treatment includes all for heat cramps with an extended rest period before re-entry. Depending on the worker's physical condition, rest periods may be from 30-60 minutes. After experiencing heat exhaustion, the worker should be closely monitored for symptoms reoccurring.

D. **HEAT STROKE** can occur if heat exhaustion is not cared for. This occurs when the body loses its ability to regulate its temperature. Sweating stops and, if not treated, can lead to death. Signs and symptoms include dry red skin with no perspiration along with nausea, dizziness and confusion. A strong, rapid pulse should be carefully monitored as this condition can lead to coma. Proper treatment begins by understanding that this is a true medical emergency and requires activating the emergency medical system as covered in other sections. When notifying the Emergency Medical Response organization, emphasis should be placed on the words HEAT STROKE and the need for rapid transportation to the medical facility. (See Appendix A of the SHSP). Emergency medical treatment in the field includes immediate cooling of the body with total body immersion preferable. Water temperature should be cool enough to absorb the high body heat but not cold. Ice packs can be applied to the person's head area and under the arms. Due to the personnel needed to treat the patient while awaiting emergency medical care, all work will stop and all attention will be devoted to the person in stress.

The First Aid Technician will evaluate all personnel after the patient is transported to determine if they also are showing signs of heat stroke.

To facilitate treatment of all of the above, air conditioning, fresh water supply, and shower, will be used if necessary. In all cases requiring treatment, emergency decontamination procedures

based on the individual's degree of contamination will be done before entry into the treatment area. Remember: *You* are your own best indicator of signs of heat stress.

2.0 COLD STRESS

The purpose of this section is to make all workers on-site aware of The problems associated with cold weather operations. As with heat related emergencies, cold weather injuries are progressive. That means that if The worker is aware of The problems beforehand he may prevent further damage and remain working.

Cold related injuries may be divided into two types:

LOCAL COOLING affects The particular part of The body coming in direct contact with The cold air. This is commonly known as FROSTBITE.

GENERAL COOLING affects The entire body and is known as HYPOTHERMIA. Hypothermia is a true medical emergency and should be recognized as such and treated immediately by trained medical personnel.

As stated, cold related injuries are progressive. The body loses heat either by CONDUCTION or direct transfer of body heat into The cold environment. An example would be an unprotected head allowing The surface area of The head to come in direct contact with The colder air. The other means by which The body loses heat is by CONVECTION. This occurs when colder air is allowed to pass over The body surface. When that air is also moist or The garments work become wet, a WATER CHILL or more commonly recognized WIND CHILL occurs. An example of wind chill would be a 20 mph wind during a 10 degree day would produce The same effect as -25 degree temperature. Both of these conditions may be easily prevented by proper work attire and safe work practices. Hardhat liners prevent The wind from blowing under The brim but will also affect your hearing ability. Lose layers of work clothes rather than bulky garments will allow The wearer to adapt to changing conditions. Use of rubber overboots will prevent leather workboots from getting wet and are excellent for stationary work to stop cold penetration.

SIGNS TO LOOK FOR:

FROSTNIP, The first stage of frostbite occurs when a body part comes in direct contact to a cold object or cold air. This condition is not serious and can be remedied by warming of The region. The real problem is that a numbing effect can occur and keep The worker from realizing that he is going into The next stage SUPERFICIAL FROSTBITE.

The skin and under layers become effected. If not treated this can become a FREEZING condition in which The deeper structures of The body become effected.

CONDITION	SKIN SURFACE	TISSUE UNDER SKIN	SKIN COLOR
frostnip	soft	soft	red-white
frostbite	hard	soft	white/waxy
freezing	hard	hard	white/gray

HYPOTHERMIA occurs when The body is unable to maintain its proper temperature of 98.6 degrees. It is important for The worker to realize that this can occur in temperatures of 50 degrees and below. Submersion of a body part in cold water will also cause hypothermia very quickly. Some early signs are:

1. Shivering
2. Numbness in extremities
3. Drowsiness
4. Slow breathing and pulse rates
5. Failing eyesight
6. Loss of coordination, inability to do easy tasks
7. Freezing of body parts

Proper treatment begins by activation of emergency medical service procedure. Hypothermia required prompt qualified medical treatment. Initial site action would revolve around getting The affected worker out of The weather and begin The warming process. The most important thing to realize is that Hypothermia is a MEDICAL EMERGENCY.

Workers exposed to cool temperatures for extended period of time can experience lesions in The form of red swollen areas that seem hot and itchy. These chronic lingering lesions are known as CHILBLAINS. Although not an emergency, The Chilblains indicate that The worker in not adequately protecting The affected area.

A common problem in wet work areas is TRENCH FOOT. The worker whose feet remain unprotected by leather footwear in water close to freezing will have swollen limbs that appear waxy and mottled in color. The affected limb will appear cold to The touch. Basic treatment revolves around getting The worker to a warm place and slowly removing The wet footwear. The obvious way to prevent TRENCH FOOT is to wear rubber protective footwear.

Some suggestions to prevent cold weather operation problems:

1. Plan ahead as to The proper work clothes to be worn.
2. Avoid early overheating which dampens clothes and hastens The release of body heat by evaporation.
3. Use of windbreaks in The work zone.
4. Elimination of standing water or avoid prolonged immersion in that water.
5. Provision of heated rest area i.e. trailer or vehicle.
6. Avoid overheating of The rest area. Extreme temperature differentials between The work area and The rest area will lead to chilling upon return to work.
7. Proper diet and eating habits.
8. Avoid or cut down smoking which constricts The blood vessels.

REMEMBER, YOU ARE THE BEST PROVIDER OF INFORMATION ABOUT HOW YOU FEEL. THE BEST WAY TO PREVENT INJURIES FROM COLD WEATHER OPERATIONS IS TO RECOGNIZE THE EARLY SIGNS AND PREVENT SERIOUS INJURY

EXHIBIT L

EMERGENCY SIGNALS

EXHIBIT L

EMERGENCY SIGNALS

In most cases, field personnel will carry portable radios for communications. If this is the case, a transmission that indicates an emergency will take priority over all other transmissions. All other site radios will yield the frequency to the emergency transmissions.

Where radio communication is not available, The following air-horn and/or hand signals will be used:

EMERGENCY AIR-HORN SIGNALS

HELP!	Three short blasts	. . .
EVACUATION!	Three long blasts	_ _ _
ALL CLEAR!	Alternating long and short blasts	_ . _ .

EMERGENCY HAND SIGNALS

OUT OF AIR, CAN'T BREATH	Hand gripping throat
LEAVE AREA IMMEDIATELY, NO DEBATE!	Grip partner's wrist or place both hands around waist
NEED ASSISTANCE	Hands on top of head
OKAY! - I'M ALL RIGHT! - I UNDERSTAND!	Thumbs up
NO! - NEGATIVE!	Thumbs down

EXHIBIT M

EMERGENCY INFORMATION

EXHIBIT M

EMERGENCY INFORMATION

M-1 EMERGENCY TELEPHONE NUMBERS

Agent/Facility	Telephone	Emergency Number
IBM Emergency Control	4-3333	4-3333
EMS - Ambulance		911
East Fishkill Fire District	914/471-2525 914/471-1414	
Sloper-Willow Ambulance Service	914/297-3779	914/297-3777/8
Police Department		911
East Fishkill Police Department	914/221-2111	
Dutchess County Sheriff's Dept.	914/452-0400	
New York State Police	914/896-6242	
Fishkill Police Department	914/831-1110	
Fire Department		911
East Fishkill Fire Department	914/471-2523	
Dutchess County Fire Alarm Hqtrs.	914/471-1414	
Hospitals		
St. Lukes Hospital	914/561-4400	
Vassar Hospital	914/454-8500	914/431-5680
St. Francis Hospital	914/471-2000	914/431-8220
Poison Control Center		800-336-6997
On-call Physician	718-470-4435	718-470-4435
William F. Cosulich	516-364-9880	
Field Safety Corp.	203-964-9199	
NYSDEC		800/457-7362 (hotline)
IBM (Michele West)	914-894-5536	
Dutchess County Health Dept.	914-431-8075	
NYSDOH	516-458-6305	

M-2 EMERGENCIES WITHIN THE SITE

- Contact The HSO On-Site
- Contact The WFC FOM
- Contact IBM
- Report The following:
  - Location of emergency in relation to a specific recognizable landmark.
  - Nature of emergency:
    - » **FIRE**, if so of what kind and what equipment is involved.
    - » **EMERGENCY MEDICAL INCIDENT, ALL INJURIES, ACCIDENTS) OR FIRES.**

    Communication will include:
    - Number of injured people.
    - Nature of injuries.
    - If Project Field Team Members can't handle injuries with its resources, what emergency medical services will be needed.

    - » If any outside personnel must enter the site, any hazards will be communicated and those people will be supervised by The HSO.
    - » In The event that any site personnel wearing protective equipment in The Exclusion Zone becomes injured, The HSO or designated individual will do whatever decontamination is necessary to remove that equipment.
    - » Any emergency treatment information dealing with The injury will accompany The injured party so that those treating that person will have any and all information.
    - » **REQUEST FOR POLICE.** If any person entering the site who does not belong there becomes a problem, Police will be notified. If that person either endangers The safe operation of Project Field Team members or himself, The HSO will suspend all work until that person can be removed.

    - » If site personnel will be evacuating the site due to emergency.

M-3 PERSONNEL EXPOSURES WITHIN THE SITE

- Contact The HSO On-Site
- Contact The WFC FOM
- Provide Treatment as follows:

  - Eye Exposure - treat by immediate flushing with distilled water (portable eyewash). Transport for examination and treatment.
  - Skin Exposure - remove contaminated clothing and treat by washing with soap and water.

- Inhalation - if a person inhales a large amount of organic vapor, The person will be removed from The work area to fresh air and artificial respiration will be administered if breathing has ceased. The affected person will be transported to local hospital by ambulance or emergency vehicle if overexposure to lungs has occurred.
- Personal Injuries - in case of severe injury, The victim will receive emergency first aid at the site, as appropriate, and will be transported by ambulance or emergency vehicle to local hospital. An accident form must be completed for any accident or occupational exposure and forwarded to The WFC Project Manager.

M-4 EVACUATING THE SITE

- Contact The HSO On-Site
- Contact The WFC FOM
- Follow The directions below:

  - Upwind withdrawal - withdraw to a safe upwind location if:

    » Air quality concentration contain excessive concentrations of volatile organics, combustible gases, particulates, or oxygen percentage above or below safe levels for The level of protection being worn. The field team will withdraw to a safe upwind location determined by The HSO.
    » A minor accident occurs. The victim will undergo decontamination procedures and be transported to a safe upwind location. Field operations will resume after first aid and/or decontamination procedures have been administered to The affected individual.
    » Protective clothing and/or respirator malfunctions.

  - Withdrawal from site - evacuate the site if:

    » Explosive levels of combustible gases, toxic gases, or volatile organics are recorded.
    » A major accident or injury occurs.
    » Fire and/or explosion occurs.
    » Shock-sensitive, unstable, or explosive materials are discovered.
    » High levels of radioactive materials are discovered.

  - Evacuation of nearby facilities - a continuous release of toxic, flammable, or explosive vapors from the site could affect people off-site. Air quality should be monitored downwind to assess The situation. The WFC FOM, or his on-site designee, is responsible for determining if circumstances exist for any level of off-site contamination warranting concern for people off-site. He/she should always assume worst case conditions until proven otherwise. If

conditions are marginal, evacuation should be conducted until acceptable conditions resume. Key personnel identified in The SHSP should be contacted when evacuation of nearby facilities becomes necessary.

EXHIBIT N

DAILY SAFETY INSPECTION CHECKLIST

EXHIBIT N

DAILY SAFETY INSPECTION CHECKLIST

EQUIPMENT #: _____ DATE: _____

TYPE: _____

LOCATION: _____ OPERATOR: _____

CHECK (X) FOR UNSATISFACTORY CONDITIONS AND/OR LEAKING

CLUTCH	☐	CABLE	☐
TRANSMISSION	☐	CHASSIS	☐
BRAKES	☐	TIRES, WHEELS, RIMS	☐
STEERING	☐	TRACKS	☐
LINING	☐	FANBELTS	☐
CONTROLS	☐	LEAKS - AIR	☐
OIL PRESSURE LEAKS	☐	LIGHTS & REFLECTORS	☐
WATER TEMP	☐	HORN	☐
LOW ENGINE RPM	☐	WINDSHIELD WIPERS	☐
GENERATOR	☐	MIRRORS	☐
EXCESSIVE EXHAUST SMOKING	☐	COUPLING DEVICES	☐
STARTER	☐	ENGINE OIL	☐
FUEL PRESSURE	☐	HYDRAULIC OIL/HOSES	☐
EMERGENCY EQUIPMENT	☐	MISCELLANEOUS	☐

REMARKS/CORRECTIVE ACTION TAKEN: _____

_____

EXHIBIT O

WEEKLY SAFETY INSPECTION CHECKLIST

EXHIBIT O

WEEKLY SAFETY INSPECTION LIST

Project Name/Number: _____ Date: _____

Superintendent's Name: _____ Title: _____

This safety inspection list is to be completed by the HSO on a weekly basis and turned into the WFC Project Director with the week's paperwork. Any deficiencies found are to be corrected immediately.

1. Is the OSHA Safety and Health protection poster on the job? _____

2. Are emergency telephone numbers conspicuously posted? _____

3. Are first-aid kits and supplies on the job? _____

4. Are there first-aid trained personnel on the job? _____

5. Are warning signs and posters adequate? _____

6. Is there an adequate supply of personal protective gear available?

    a. Hard Hats _____

    b. Hearing Protection _____

    c. Eye and Face Protection _____

    d. Respiratory Protection _____

7. Are all personnel wearing the appropriate personal protective gear? _____

8. Is there an adequate slope or support provided for all trenches and excavations? _____

9. Is temporary electrical service grounded and is all other electrical equipment grounded? _____

10. Is the housekeeping adequate-are all aisles, passageways, and stairways clear of obstructions? _____

11. Are there any fire hazards on the job that could be eliminated? _____

12. Have heavy equipment been thoroughly inspected and is there a record of the inspections on file? _____

13. Is the job site fire protection adequate?

    a. Fire Extinguishers - have they been checked? _____

    b. Available Water Hoses? _____

    c. Barrels of Water with Buckets? _____

14. Is there adequate clearance between equipment or machinery and energized power lines? _____

15. Is the record of injuries and illnesses properly maintained and on file? _____

16. Are there job-site safety meetings held at least once a week? _____

17. Are all new employees indoctrinated with respect to their individual safety responsibilities? _____

18. Do my personal safety practices set a good example for all employees? _____

19. Misc.: _____

_____

_____

_____

_____ _____

Signature Date

EXHIBIT P

INCIDENT NOTIFICATION FORM

EXHIBIT P

INCIDENT NOTIFICATION FORM

TO: William F. Cosulich Associates, PC Project Manager

Date: _____

FROM: HSO and/or _____
(someone who has direct knowledge of the incident)

1. Contractor's Name: _____

2. Organization: _____

3. Telephone Number: _____

4. Location: _____

5. Reporter Name: _____

6. Name of Injured: _____ Birthdate _____

7. Company Employing Injured: _____

8. Date of Incident: _____

9. Company Employing Injured: _____

10. Location of Incident: _____

11. Brief Summary of Incident (provide pertinent details including type of operation at time of incident):

_____

_____

_____

12. Cause, if known: _____

13. Casualties, if any: _____

14. Details of Any Existing Chemical Hazards or Contamination:

15. Estimated Property Damage: _____

16. Affect on Contract Schedule: _____

17. Actions Taken by Contractor: _____

18. What Medical Help was Given: _____

19. Doctor and/or Hospital (if known): _____

20. When did Employee Return to Work: _____

21. Other Damages/Injuries Sustained (public or private):

22. Additional Information:

EXHIBIT Q

OSHA FORM 200

Bureau of Labor Statistics
Log and Summary of Occupational Injuries and Illnesses

U.S. Department of Labor

For Calendar Year 19 ____ Page ____ of ____

Form Approved
O.M.B. No. 1220-0029
See OMB Disclosure Statement on reverse.

NOTE: **This form is required by Public Law 91-596 and must be kept in the establishment for *5 years*. Failure to maintain and post can result in the issuance of citations and assessment of penalties.** ***(See posting requirements on the other side of form.)***

RECORDABLE CASES: You are required to record information about every occupational **death**; every nonfatal occupational **illness**; and those nonfatal occupational **injuries** which involve one or more of the following: loss of consciousness, restriction of work or motion, transfer to another job, or medical treatment (other than first aid). ***(See definitions on the other side of form.)***

Company Name

Establishment Name

Establishment Address

Case or File Number	Date of Injury or Onset of Illness	Employee's Name	Occupation	Department	Description of Injury or Illness	Extent of and Outcome of INJURY: Fatalities — Injury Related	Extent of and Outcome of INJURY: Nonfatal Injuries — Injuries With Lost Workdays				Extent of and Outcome of INJURY: Nonfatal Injuries — Injuries Without Lost Workdays	Type, Extent of, and Outcome of ILLNESS: Type of Illness							Type, Extent of, and Outcome of ILLNESS: Fatalities — Illness Related	Type, Extent of, and Outcome of ILLNESS: Nonfatal Illnesses — Illnesses With Lost Workdays				Type, Extent of, and Outcome of ILLNESS: Nonfatal Illnesses — Illnesses Without Lost Workdays
Enter a nonduplicating number which will facilitate comparisons with supplementary records.	Enter Mo./day.	Enter first name or initial, middle initial, last name.	Enter regular job title, not activity employee was performing when injured or at onset of illness. In the absence of a formal title, enter a brief description of the employee's duties.	Enter department in which the employee is regularly employed or a description of normal workplace to which employee is assigned, even though temporarily working in another department at the time of injury or illness.	Enter a brief description of the injury or illness and indicate the part or parts of body affected. Typical entries for this column might be Amputation of 1st joint right forefinger; Strain of lower back; Contact dermatitis on both hands; Electrocution—body	Enter **DATE** of death. Mo./day/yr.	Enter a **CHECK** if injury involves days away from work, or days of restricted work activity, or both.	Enter a **CHECK** if injury involves days away from work.	Enter number of **DAYS** *away from work.*	Enter number of **DAYS** of *restricted work activity.*	Enter a **CHECK** if no entry was made in columns 1 or 2 but the injury is recordable as defined above.*	**CHECK** Only One Column for Each Illness *(See other side of form for terminations or permanent transfers.)* Occupational skin diseases or disorders	Dust diseases of the lungs	Respiratory conditions due to toxic agents	Poisoning (systemic effects of toxic materials)	Disorders due to physical agents	Disorders associated with repeated trauma	All other occupational illnesses	Enter **DATE** of death. Mo./day/yr.	Enter a **CHECK** if illness involves days away from work, or days of restricted work activity, or both.	Enter a **CHECK** if illness involves days away from work.	Enter number of **DAYS** *away from work.*	Enter number of **DAYS** of *restricted work activity.*	Enter a **CHECK** if no entry was made in columns 8 or 9.
(A)	(B)	(C)	(D)	(E)	(F)	(1)	(2)	(3)	(4)	(5)	(6)	(7) (a)	(b)	(c)	(d)	(e)	(f)	(g)	(8)	(9)	(10)	(11)	(12)	(13)
					PREVIOUS PAGE TOTALS →																			

OMB DISCLOSURE STATEMENT

We estimate that it will take from 4 minutes to 30 minutes to complete a line entry on this form, including time for reviewing instructions; searching, gathering and maintaining the data needed; and completing and reviewing the entry. If you have any comments regarding this estimate or any other aspect of this recordkeeping system, send them to the Bureau of Labor Statistics, Division of Management Systems (1220-0029), Washington, D.C. 20212 and to the Office of Management and Budget, Paperwork Reduction Project (1220-0029), Washington, D.C. 20503.

Instructions for OSHA No. 200

I. Log and Summary of Occupational Injuries and Illnesses

Each employer who is subject to the recordkeeping requirements of the Occupational Safety and Health Act of 1970 must maintain for each establishment a log of all recordable occupational injuries and illnesses. This form (OSHA No. 200) may be used for that purpose. A substitute for the OSHA No. 200 is acceptable if it is as detailed, easily readable, and understandable as the OSHA No. 200.

Enter each recordable case on the log within six (6) workdays after learning of its occurrence. Although other records must be maintained at the establishment to which they refer, it is possible to prepare and maintain the log at another location, using data processing equipment if desired. If the log is prepared elsewhere, a copy updated to within 45 calendar days must be present at all times in the establishment.

Logs must be maintained and retained for five (5) years following the end of the calendar year to which they relate. Logs must be available (normally at the establishment) for inspection and copying by representatives of the Department of Labor, or the Department of Health and Human Services, or States accorded jurisdiction under the Act. Access to the log is also provided to employees, former employees and their representatives.

II. Changes in Extent of or Outcome of Injury or Illness

If, during the 5-year period the log must be retained, there is a change in an extent and outcome of an injury or illness which affects entries in columns 1, 2, 6, 8, 9, or 13, the first entry should be lined out and a new entry made. For example, if an injured employee at first required only medical treatment but later lost workdays away from work, the check in column 6 should be lined out, and checks entered in columns 2 and 3 and the number of lost workdays entered in column 4.

Another example: if an employee with an occupational illness lost workdays, returned to work, and then died of the illness, any entries in columns 5 through 12 should be lined out and the date of death entered in column 8.

The entire entry for an injury or illness should be lined out if later found to be nonrecordable. For example: an injury which is later determined not to be work related, or which was initially thought to involve medical treatment but later was determined to have involved only first aid.

III. Posting Requirements

A copy of the totals and information following the fold line of the last page for the year must be posted at each establishment in the place or places where notices to employees are customarily posted. This copy must be posted no later than ***February 1 and must remain in place until March 1.***

Even though there were no injuries or illnesses during the year, zeros must be entered on the totals line, and the form posted.

The person responsible for the ***annual summary totals*** shall certify that the totals are true and complete by signing at the bottom of the form.

IV. Instructions for Completing Log and Summary of Occupational Injuries and Illnesses

Column A – **CASE OR FILE NUMBER.** Self-explanatory.

Column B – **DATE OF INJURY OR ONSET OF ILLNESS.**
For occupational injuries, enter the date of the work accident which resulted in injury. For occupational illnesses, enter the date of initial diagnosis of illness, or, if absence from work occurred before diagnosis, enter the first day of the absence attributable to the illness which was later diagnosed or recognized.

Columns C through F – Self-explanatory.

Columns 1 and 8 – **INJURY OR ILLNESS-RELATED DEATHS.** Self-explanatory.

Columns 2 and 9 – **INJURIES OR ILLNESSES WITH LOST WORKDAYS.** Self-explanatory.

Any injury which involves days away from work, or days of restricted work activity, or both must be recorded since it always involves one or more of the criteria for recordability.

Columns 3 and 10 – **INJURIES OR ILLNESSES INVOLVING DAYS AWAY FROM WORK.** Self-explanatory.

Columns 4 and 11 – **LOST WORKDAYS––DAYS AWAY FROM WORK.**
Enter the number of workdays (consecutive or not) on which the employee would have worked but could not because of occupational injury or illness. The number of lost workdays should not include the day of injury or onset of illness or any days on which the employee would not have worked even though able to work.
NOTE: For employees not having a regularly scheduled shift, such as certain truck drivers, construction workers, farm labor, casual labor, part-time employees, etc., it may be necessary to estimate the number of lost workdays. Estimates of lost workdays shall be based on prior work history of the employee AND days worked by employees, not ill or injured, working in the department and/or occupation of the ill or injured employee.

Columns 5 and 12 – **LOST WORKDAYS––DAYS OF RESTRICTED WORK ACTIVITY.**
Enter the number of workdays (consecutive or not) on which because of injury or illness:
(1) the employee was assigned to another job on a temporary basis, or
(2) the employee worked at a permanent job less than full time, or
(3) the employee worked at a permanently assigned job but could not perform all duties normally connected with it.

The number of lost workdays should not include the day of injury or onset of illness or any days on which the employee would not have worked even though able to work.

Columns 6 and 13 – **INJURIES OR ILLNESSES WITHOUT LOST WORKDAYS.** Self-explanatory.

Columns 7a through 7g – **TYPE OF ILLNESS.**
Enter a check in only ***one*** column for each illness.

TERMINATION OR PERMANENT TRANSFER––Place an asterisk to the right of the entry in columns 7a through 7g (type of illness) which represented a termination of employment or permanent transfer.

V. Totals

Add number of entries in columns 1 and 8.
Add number of checks in columns 2, 3, 6, 7, 9, 10, and 13.
Add number of days in columns 4, 5, 11, and 12.
Yearly totals for each column (1-13) are required for posting. Running or page totals may be generated at the discretion of the employer.

If an employee's loss of workdays is continuing at the time the totals are summarized, estimate the number of future workdays the employee will lose and add that estimate to the workdays already lost and include this figure in the annual totals. No further entries are to be made with respect to such cases in the next year's log.

VI. Definitions

OCCUPATIONAL INJURY is any injury such as a cut, fracture, sprain, amputation, etc., which results from a work accident or from an exposure involving a single incident in the work environment.
NOTE: Conditions resulting from animal bites, such as insect or snake bites or from one time exposure to chemicals, are considered to be injuries.

OCCUPATIONAL ILLNESS of an employee is any abnormal condition or disorder, other than one resulting from an occupational injury, caused by exposure to environmental factors associated with employment. It includes acute and chronic illnesses or diseases which may be caused by inhalation, absorption, ingestion, or direct contact.

The following listing gives the categories of occupational illnesses and disorders that will be utilized for the purpose of classifying recordable illnesses. For purposes of information, examples of each category are given. These are typical examples, however, and are not to be considered the complete listing of the types of illnesses and disorders that are to be counted under each category.

7a. **Occupational Skin Diseases or Disorders**
Examples: Contact dermatitis, eczema, or rash caused by primary irritants and sensitizers or poisonous plants; oil acne; chrome ulcers; chemical burns or inflammations; etc.

7b. **Dust Diseases of the Lungs (Pneumoconioses)**
Examples: Silicosis, asbestosis and other asbestos-related diseases, coal worker's pneumoconiosis, byssinosis, siderosis, and other pneumoconioses.

7c. **Respiratory Conditions Due to Toxic Agents**
Examples: Pneumonitis, pharyngitis, rhinitis or acute congestion due to chemicals, dusts, gases, or fumes; farmer's lung; etc.

7d. **Poisoning (Systemic Effect of Toxic Materials)**
Examples: Poisoning by lead, mercury, cadmium, arsenic or other metals; poisoning by carbon monoxide, hydrogen sulfide or other gases; poisoning by benzol, carbon tetrachloride, other organic solvents; poisoning by insecticide sprays such as parathion, lead arsenate; poisoning by other chemicals such as formaldehyde, plastics, and resins, etc.

7e. **Disorders Due to Physical Agents (Other than Toxic Materials)**
Examples: Heatstroke, sunstroke, heat exhaustion, and other effects of environmental heat; freezing, frostbite, and effects of exposure to low temperatures, caisson disease; effects of ionizing radiation (isotopes, X-rays, radium); effects of nonionizing radiation (welding flash, ultraviolet rays, microwaves, sunburn), etc.

7f. **Disorders Associated With Repeated Trauma**
Examples: Noise-induced hearing loss; synovitis, tenosynovitis and bursitis; Raynaud's phenomena, and other conditions due to repeated motion, vibration, or pressure.

7g. **All Other Occupational Illnesses**
Examples: Anthrax, brucellosis, infectious hepatitis, malignant and benign tumors, food poisoning, histoplasmosis, coccidioidomycosis, etc.

MEDICAL TREATMENT includes treatment (other than first aid) administered by a physician or by registered professional personnel under standing orders of a physician. Medical treatment does NOT include first aid treatment (one-time treatment and subsequent observation of minor scratches, cuts, burns, splinters, and so forth, which do not ordinarily require medical care) even though provided by a physician or registered professional personnel.

ESTABLISHMENT: A single physical location where business is conducted or where services or industrial operations are performed (for example: a factory, mill, store, hotel, restaurant, movie theater, farm, ranch, bank, sales office, warehouse, or central administrative office). Where distinctly separate activities are performed at a single physical location, such as construction activities operated from the same physical location as a lumberyard, each activity shall be treated as a separate establishment.

For firms engaged in activities which may be physically dispersed, such as agriculture, construction, transportation, communications, and electric, gas, and sanitary services, records may be maintained at a place to which employees report each day.

Records for personnel who do not primarily report or work at a single establishment, such as traveling salesmen, technicians, engineers, etc., shall be maintained at the location from which they are paid or the base from which personnel operate to carry out their activities.

WORK ENVIRONMENT is comprised of the physical location, equipment, materials processed or used, and the kinds of operations performed in the course of an employee's work, whether on or off the employer's premises.

EXHIBIT R

REGULATION 1 - USE OF PERSONAL PROTECTIVE EQUIPMENT

EXHIBIT R

REGULATION 1 - USE OF PERSONAL PROTECTIVE EQUIPMENT

WHO This regulation applies to all site workers, supervisors, and visitors, *without exception.*

WHEN Prior to entering the Contaminant Reduction Zone (CRZ) or Exclusion Zone (EZ) provisions of this regulation will be followed.

WHAT This regulation outlines the initial forms of PPE required to be worn while working in the CRZ and EZ. Particular types or forms of PPE may be altered based on the authority of the HSO. Specific guidelines are provided in Section 7.7 of this SHSP. Disposable PPE will not be worn more than one work shift of workday. In some instances disposable PPE may have to be replaced more than once during a workday. The HSO shall determine the frequency of replacing disposable PPE. Reusable PPE will be properly decontaminated, cleaned, sterilized (if appropriate), and stored. Doubts regarding what to wear shall be directed to the HSO for resolution.

WHY The levels of protection specified in the SHSP were chosen to protect individuals from potentially harmful exposures to chemicals or physical hazards. No changes to PPE specifications are authorized without the permission of the HSO.

EXHIBIT S

REGULATION 2 - PERSONAL HYGIENE

EXHIBIT S

REGULATION 2 - PERSONAL HYGIENE

WHO This regulation applies to all site workers, supervisors, and visitors, but is intended primarily for site workers.

WHEN Before beginning work, during scheduled breaks, and at the end of a workday.

WHAT This regulation summarizes the policy on personal hygiene that applies to all site personnel. Personal hygiene includes those activities such as washing hands, showering, shaving, etc., that are conducive to keeping one's body clean and mind refreshed. For the individual's sake, and his/her coworkers, each worker will be responsible for maintaining a high level of personal hygiene. This is especially critical prior to breaks where food, beverages, or smoking will occur. If proper personal hygiene is not followed, potential ingestion, absorption, or inhalation of toxic materials may occur. Particular attention must be paid to close shaving whenever respirators are worn. Facial hair and long hair will interfere with respirator fit and will allow excessive contaminant penetration.

WHY To avoid accidental ingestion, absorption, or inhalation of hazardous materials. To maintain an elevated state of awareness, thus reducing potential mental errors and accidents.

EXHIBIT T

REGULATION 3 - PROVISIONS FOR SMOKING, EATING, CHEWING, AND DRINKING

EXHIBIT T

REGULATION 3 - PROVISIONS FOR SMOKING, EATING, CHEWING, AND DRINKING

WHO This regulation applies to all site workers, supervisors, and visitors, *without exception.*

WHEN At all times personnel are on-site. This regulation will specifically apply during breaks and rest periods.

WHAT Site personnel are forbidden to smoke, eat, chew, or drink in the Exclusion Zone or Contaminant Reduction Zone. Only those areas specified as break areas or common areas in the Support Zone may be used for smoking, eating, chewing, or drinking. Individuals found to be repeatedly disregarding these provisions will be released.

The only exception to this regulation involves access to electrolytic fluids in the Contaminant Reduction Zone when the HSO has determined heat stress warrants regular replenishing of lost body fluids.

WHY To protect personnel from accidental exposures to hazardous materials, smoking, eating, chewing, and drinking is prohibited everywhere except designated break areas. To avoid potential fires and explosions, smoking is prohibited everywhere except designated break areas.

EXHIBIT U

REFRESHER TRAINING DOCUMENTATION

EXHIBIT U

REFRESHER TRAINING DOCUMENTATION

EMPLOYEE/VISITOR NAME	REPRESENTING
1. _____	_____
2. _____	_____
3. _____	_____
4. _____	_____
5. _____	_____
6. _____	_____

TOTAL TIME ALLOCATED TO REFRESHER TRAINING: _____

DATE OF TRAINING: _____

LOCATION: _____

TOPICS COVERED (describe clearly):

_____

_____

_____

MATERIALS USED (if any):

_____

_____

_____	_____	_____
Trainer Signature	Trainer Name Printed	Date

EXHIBIT V

WEEKLY SAFETY REPORT

EXHIBIT V

WEEKLY SAFETY REPORT

Week Ending: _____

Summary of Any Violations of Procedures Occurring That Week:

_____

_____

_____

Summary of Any Job Related Injuries or Illnesses That Week:

_____

_____

_____

Summary of Air Monitoring Data That Week (Include any sample analyses, action levels exceeded, and actions taken):

_____

_____

_____

Comments:

_____

_____

Attach Meteorological Station Data.

_____ _____

Name Title

Signature _____

EXHIBIT W

SITE ENTRY AND EXIT LOG

EXHIBIT W

SITE ENTRY AND EXIT LOG

SITE: IBM EAST FISHKILL FACILITY

Date	Name	Representing	Date/Time In	Date/Time Out

Section 8

8.0 COMMUNITY RELATIONS PLAN

8.1 Introduction

The Community Relations Plan, as one of the required elements of a RCRA Facility Investigation (RFI) Work Plan, outlines the methods to be utilized to provide information to the affected community regarding the status of investigation activities and results. The IBM East Fishkill Facility is committed to a Community Relations Plan as part of its responsibilities in undertaking the RCRA Facility Investigation and fulfilling the requirements of its Part 373 Permit. Community Relations promotes public understanding of the planned investigatory activities at the IBM East Fishkill Facility. In addition, it provides an opportunity for the NYSDEC and IBM Corporation to obtain comments from the public that will enable the development of a comprehensive corrective action program which is not only protective of both public health and the environment but responsive to any public concerns.

8.2 Identification of Affected and/or Interested Public

A mailing list will be used to inform and involve the interested public. Public interest in the site, issues arising during various stages of the investigation and other factors will determine if additional residents and organizations are added. It should be noted that as the RFI progresses, the list of interested citizens may increase and, if so, will be periodically updated. During the public notification process associated with the Part 373 permit, other than technical comments prepared and submitted by the IBM East Fishkill facility, comments were not received from the general public or any interested organizations. However, the current facility mailing list, which is provided below, identifies only regulatory agency contacts.

Any person interested in adding his/her name to the mailing list may contact the New York State Department of Environmental Conservation (NYSDEC) and/or International Business Machines (IBM) Corporation. Contacts at the NYSDEC and IBM East Fishkill Facility are listed in the following Section.

8.3 Identification of IBM, NYSDEC and USEPA Contacts

This section of the Community Relations plan provides the names, addresses and telephone numbers of contacts at IBM Corporation East Fishkill Facility and the New York State Department of Environmental Conservation (NYSDEC).

International Business Machines Corporation - East Fishkill Facility

- IBM Community Relations - Z41X
  International Business Machines Corporation
  East Fishkill Facility
  1580 Route 52
  Hopewell Junction, NY 12533-0999
  1-914-894-3534

New York State Department of Environmental Conservation - Albany Office

- Division of Hazardous Waste Remediation
  Bureau of Eastern Remedial Action
  50 Wolf Road, Room 208
  Albany, NY 12233
  1-518-457-1641

New York State Department of Environmental Conservation - Regional Office

- Margaret Duke
  Regional Permit Administrator
  NYSDEC Region 3
  21 South Putt Corners Road
  New Paltz, NY 12561-1696
  1-914-256-3059

United States Environmental Protection Agency - Regional Office

- Andrew Bellina, Chief
  Hazardous Waste Facilities Branch
  U.S. EPA
  290 Broadway
  22nd Floor AWM-HWF
  New York, NY 10007
  1-212-637-4109

8.4 Identification of Document Repositories

Fact sheets related to RCRA Facility Investigation activities at the IBM Corporation East Fishkill Facility will be made available, as appropriate, for public review at the following locations:

- New York State Department of Environmental Conservation - Region 3 Office
  21 Putt Corners Road
  New Paltz, NY 12561-1696

- United States Environmental Protection Agency - Region II
  Hazardous Waste Facility Branch - 22nd Floor - AWM-HWF
  290 Broadway
  New York, NY 10007

- East Fishkill Community Library
  P.O. Box 308
  (Located between Rte 52 and Rte 82 on Rte 376)
  Hopewell Junction, NY 12533

- East Fishkill Town Hall
  370 Route 376
  Hopewell Junction, NY 12533

Fact sheets which may be placed in the document repository include, but are not limited to:

- International Business Machines Corporation 6 NYCRR Part 373 Permit Document
- Final Approved RCRA Facility Investigation Work Plan:
- Final Approved RCRA Facility Investigation Report
- Final Approved Corrective Measures Study

8.5 Description of Community Relations Activities

This section of the Community Relations plan describes the specific activities planned to be undertaken during the overall RCRA Corrective Action program to enhance public understanding

of the project. These activities will be developed in phases as the program progresses and may be modified as additional insight into the local issues and level of interest generated by the local citizens is determined.

At this stage in the development of the RCRA Corrective Action Program at the facility, IBM has utilized the Part 373 Permit public notification process as the principal vehicle for achieving community involvement with respect to corrective action. At the time of the preparation of this RFI/RFA work plan, the New York State Department of Environmental Conservation has completed the public notification of the International Business Machines Corporation East Fishkill Facility Part 373 Permit. The permit document, including a section entitled, "Module III - Corrective Action Program" which outlines this RFI/RFA program, has been the subject of the following public notification procedures and activities:

- Notification in the Environmental Notice Bulletin
- The use of local radio announcements
- Notification in local newspaper
- Opportunity for public hearing

In addition, all documents relevant to the permit application (including the corrective action program) were available for public inspection at a local library, as well as various federal, state and local repositories as described in Section 8.4. It is worthy to note that on September 29, 1995, the New York State Department of Environmental Conservation issued a final Part 373 Permit to the International Business Machines Corporation East Fishkill facility.

After submittal of a final RFI Report, the NYSDEC will determine the need for any additional work that would be required as part of a Corrective Measure Study to protect human health and the environment. At that time, the Community Relations Plan will be updated to address the specific activities to be initiated during the Corrective Measure Study, as appropriate.

Section 9

9.0 REFERENCES

1. Cambridge Analytical Associates, Area A Boring Analysis, Vol. I and Vol II.

2. Cambridge Analytical Associates, Miscellaneous Borings, Vol. I and Vol. II.

3. Chazen Environmental Services, Building 322 Soil Borings and Utilities Search, July 21, 1989.

4. Converse Engineering Consultants, P.C., Report of Preliminary Geotechnical Investigation Proposed Renovation of Building 322, January 10, 1991.

5. Corddry Carpenter Dietz and Zack, International Business Machines Corporation, East Fishkill Facility, Dutchess County, New York, Solid Waste Management Unit Questionnaire Addendum (Volume 1-4) and Subsequent Addenda, September 1989.

6. Dames & Moore, Addendum No. 2 to Proposal, April 15, 1986.

7. Dames & Moore, Boring Logs [B-901, B-902, B-903, B-904, B-905, B-906, B-907, B-908, B-909, B-910, B-911, B-912, B-913, B-914, B-915, B-916].

8. Dames & Moore, Final Report - Geotechnical Investigation of Fluoride/Heavy Metals Treatment Facility Expansion - Building 386, July 17, 1986.

9. Dames & Moore, Phase I Hydrogeologic Survey Groundwater Protection Plan for the IBM Corporation Facilities at East Fishkill, New York (Section 3), May 1979.

10. Dames & Moore, Trestle Borings for B/322, 1985.

11. Dunn Geoscience, Geologic Mapping of Bedrock, East Fishkill Site, August 23, 1982.

12. EnviroTest Labs, Appendix 33 Analysis of B/322 Wells, July 1994.

13. Geraghty & Miller, Inc., Assessment of Geologic Conditions at IBM's West Complex, East Fishkill, New York, July 1984.

14. Groundwater Sciences Corporation, Attachment 2 - Utilities Investigation - B/322 PPL, B/315 Site Piping, B/340 Site Piping, B/322 Piping, Site Piping, B/340 Site Piping, Site Piping, B/323 - Device Manufacturing, B/322 Utility Expansion, Site Plan Subsurface B/320B and B/322, B/300 Trestle and Utility Expansion.

15. Groundwater Sciences Corporation, Geological, Hydrogeological and Hydrogeochemical Evaluation of the Southeast Quadrant, IBM, October 1987.

16. Groundwater Sciences Corporation, Soil Gas Sampling Results In and Around Building 322 and Indoor Air, May 16, 1991.

17. Groundwater Sciences Corporation, B/322 In Situ Permeability Tests, December 10, 1991.

18. Handex Environmental Management, Inc., Soil Sampling Completion Report Phase I IBM Building 322 Upgrade, March 1991.

19. International Business Machines Corporation, Soil Core Data for Area D and B/308, April 1, 1982.

20. International Business Machines Corporation, B/330D Groundwater Contamination Meeting Minutes, December 1982.

21. International Business Machines Corporation, Analysis of Core Samples from Area C-C', June 1983.

22. International Business Machines Corporation, Soil Core Data for Building 303, September 14, 1983.

23. International Business Machines Corporation, B/334 Soil Boring Data, October 1983.

24. International Business Machines Corporation, Soil Sampling/Analysis Procedures, October 1983.

25. International Business Machines Corporation, Caster Annex Soil Data, December 1983.

26. International Business Machines Corporation, Data for Preliminary Soil Testing for Trestle Project, May 29, 1984.

27. International Business Machines Corporation, Soil Analysis on Samples from B/303 Trestle Project-III, July 17, 1984.

28. International Business Machines Corporation, Data for Freeze Core Borings, July 30, 1984.

29. International Business Machines Corporation, Data for Soil Profiling Project; CS 2000, B Series: B/308 Gas Tank Area, July 30, 1984.

30. International Business Machines Corporation, Furnace Building Soil Data, September 1984.

31. International Business Machines Corporation, B/330 Soil Data for Wells, April 1985.

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