3.49

Arthur D Little

Health and Safety Project Plan

for

Remedial Planning Activities at the

Picillo Farm Site

Coventry, Rhode Island

Phase IB/II

Work Assignment No. 01-1L01

Contract No. 68-W8-0120

June 28, 1991

Approvals

Robert N. Lambe Arthur D. Little Project Manager	6-26-91 Date
Corey W. Briggs Arthur D. Little Health & Safety Officer	6-27-91 Date
U.S. Environmental Protection Agency	Date

62352ARC/084

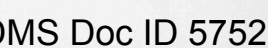


Table of Contents

List of Figures

1.0 Introduction

The following site and task specific Health and Safety Project Plan (HSPjP) has been prepared for the use of Arthur D. Little field personnel during Phase IB/II field investigation at the Picillo Farm site in Coventry, Rhode Island. This HSPjP also provides minimum requirements for subcontractors employed by Arthur D. Little for Phase IB/II tasks and authorized onsite visitors. An authorized visitor shall meet the requirements of Sections 4.1, 4.2, and 4.3 of this HSPjP (the visitor need not be in Arthur D. Little's Medical Surveillance but should be in an established program). All personnel covered by this plan shall comply with all the requirements contained within the plan. Any discrepancies between the requirements of this HSPjP and what occurs onsite or is scheduled to occur should immediately be brought to the attention of the Site Health and Safety Officer (identified in Section 3.1.2).

1.1 Site Location

The Picillo Farm site occupies approximately 100 acres of wooded and cleared land with wetlands and upland areas. The site, Parcel 15 on Plot 51 of the Coventry, Rhode Island Assessor's Map, is located in a rural area of Coventry, Rhode Island approximately one mile southwest of the intersection of State Highway 102 and Perry Hill Road.

Included in the 100 acre site is the Picillo Farm Project (disposal area) -- an 8 acre parcel of land where a variety of hazardous wastes were formerly disposed. All references to "onsite" activities or tasks refers to any work that physically occurs on the 100 acre Picillo Farm site. Figure 1.1 shows the boundaries of the Picillo Farm site and Picillo Farm project.

1.2 Site History and Description

The Picillo Farm Site was discovered in 1977 as a result of a fire and explosion at the site. Since that time a variety of hazardous chemicals have been detected in illegally stored drums, ground water, surface water, subsurface soils, surficial soils, and in the air. Appendix A contains a list of representative toxic contaminants found at the site, and the matrix they were found in (i.e., ground water, surface water, subsurface soil, surficial soils or air). A summary of chemical data collected to date and a more thorough discussion of the hazards associated with this site, including a preliminary risk assessment, is presented in the Final Work Plan: Remedial Investigation and Feasibility Study, issued in January, 1990 by Ebasco Services, Inc. - EPA Work Assignment No. 194-1L01.

Site contaminants that have previously been identified shall be anticipated in the work covered by this plan. In addition this plan should also protect site workers from foreseeable exposures to site contaminants previously unidentified.

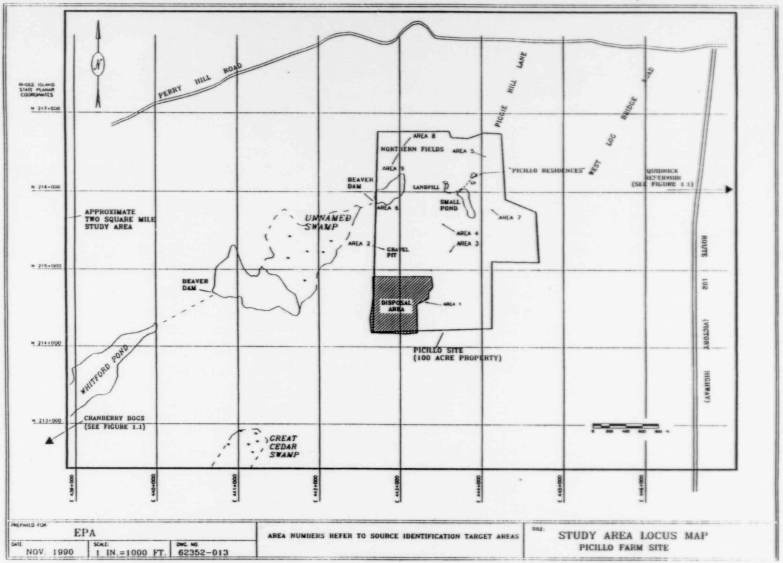


Figure 1.1

1.3 Purpose of Work

The primary objective of the remedial investigation (RI) and feasibility study (FS) is to assess site conditions and evaluate alternatives to the extent necessary to select remedy for the Picillo Farm Site that shall be consistent with the National Contingency Plan. The RI and FS shall be conducted simultaneously as integrated, phased studies leading to the selection of a remedy.

The specific objectives of the RI are to:

- Define the source(s), nature, extent, and distribution of contaminants released;
- Determine and quantify any and all potential exposure pathways;
- Assess the risks to public health and to the environment;
- Determine the impact of any past, current, or potential releases to ground water that may be used as a drinking water source in the future; and
- Provide sufficient information to evaluate remedial alternatives, conceptually design remedial actions, select remedy, and issue a record of decision.

The specific objectives of the FS are to;

- Review the applicability of various remedial technologies;
- Determine the effectiveness, viability, and cost of each alternative;
- Evaluate each alternative or combination of alternatives through a comparative analysis based upon the criteria set forth in the *Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA* (EPA 540/G-89/004 OSWER Dir 9355.3-01, October 1988), and the *National Contingency Plan* (40 CFR Part 300, March 8, 1990).
- Provide direction to the RI to ensure that a sufficient amount of appropriate data are gathered to aid in the selection of a remedy.

Personnel conducting the remedial investigation may encounter various chemical, physical, and environmental hazards. Therefore, this site-specific Health and Safety Project Plan (HSPjP) has been prepared for the purpose of establishing necessary work precautions and procedures designed to minimize the anticipated hazards to which site personnel may be exposed.

The objective of this Health and Safety Project Plan is to provide onsite Arthur D. Little personnel safe working conditions. The safety organization and procedures contained in this plan have been established based on an analysis of potential site hazards; personnel protection measures have been selected in response to these hazards.

All work will be conducted in accordance with applicable federal, state and local regulations, including the U.S. Department of Labor, Occupational Safety and Health Administration (OSHA) requirements of 29 CFR 1910 and 1926. This plan is primarily intended to satisfy the requirements set forth by OSHA in the Hazardous Waste Operations and Emergency Response Standard (29 CFR 1910.120). The most recent copy of the Arthur D. Little Hazardous Waste Site Health and Safety Program Plan should be the reference document for other Arthur D. Little specific policies and procedures regarding work at hazardous waste sites.

1.4 Work Tasks

This section briefly describes the work phase activities that are planned for this project. More detailed descriptions can be found in the June 28, 1991, Arthur D. Little Work Plan for Phase IB/II, Work Assignment No. 01-1L01 and in the Field Sampling and Quality Assurance Plans for this project. Specific hazards which may be encountered during this project are discussed in Section 2.0 of this plan.

1.4.1 Invasive Site Tasks

This section briefly describes field activities that will be performed during Phase IB and II of the RI and will involve penetrating the surface of the site itself or the area around the site. Phase IB activities will include three rounds of quarterly sampling (including ground water, sediment, and residential well sampling), soil boring and monitoring well installation, trenching of test pits, possible deep bedrock well installation, and hydraulic testing (i.e., slug and pump testing). Phase II invasive site activities will include pump testing and any additional activities recommended as a result of Phase IB.

1.4.1.1 Ground Water Monitoring Wells. Ground water monitoring wells (existing and new) and residential wells will be monitored according to a quarterly sampling program. All wells will be purged prior to sampling. An HNu PID-101, a Photovac Microtip, or equivalent will be used to continuously monitor the well head during development and purging. The quarterly ground water sampling schedule is summarized in Table 4-1 of the June 28, 1991 Work Plan for this project.

1.4.1.2 Surface Soil Sampling. Surface soil samples will be collected at 52 locations in and around the disposal area, at the gravel pit, and at the solid waste dump during Phase IB. Samples will be analyzed on site for VOCs, SVOCs,

PCBs, and pesticides. Select samples will also be analyzed off site for additional parameters to be used during the ecological risk assessment.

1.4.1.3 Surface Water and Sediment Sampling. Most surface water and sediment sampling locations will be sampled twice, during the first and second quarterly sampling events. Five surface water locations will be sampled during all three quarterly events. Surface runoff will also be sampled during one quarterly sampling event if it corresponds to a precipitation event.

1.4.1.4 Boring and Monitoring Well Installation. A minimum of 38 borings will be drilled to investigate potential contamination in and near old trenches and piles in the disposal area; to install new monitoring wells; and to investigate anomalies detected during Phase IA. Soil samples will be collected at various depths depending on the investigatory purpose of each borehole.

A total of 32 monitoring wells will be installed in some of the borings described above. Most wells will be installed either around or away from the disposal area. Fifteen of the wells will be screened in shallow bedrock and 17 will be screened across the water table in the overburden. Monitoring wells will be developed at least 24 hours after the well has been constructed.

Two deep bedrock wells may be installed towards the end of Phase IB to characterize ground water quality in high risk fracture zones. Identification of the high risk fracture zones will be based on information gained during the VLF survey.

1.4.1.5 Test Pit Excavation. Seven test pits will be excavated during Phase IB. The test pits, each up to 100 feet long and 5-20 feet deep, will be located in areas where magnetic and/or soil gas anomalies were detected during Phase IA, in the northern fields, and across the solid waste dump. The endpoints of each pit will be marked and staked for the purposes of surveying. Four to six soil samples will be collected from each trench for chemical analysis depending on visual and HNu, or similar, screening of the excavation area. Soil samples will be taken from the backhoe bucket. Excavation activities will cease, and the area will be secured, if potential source materials are discovered. The Health and Safety Officer or a suitably qualified designee from the Arthur D. Little Occupational Health and Safety Unit will be present during all trenching activities.

1.4.1.6 Hydraulic Testing. Hydraulic tests will be performed in 32 of the new overburden and shallow bedrock wells and approximately 10 of the 29 existing wells in order to determine in-situ hydraulic conductivities. Hydraulic testing will consist of slug tests, pump tests, water level measurements, and surface water discharge measurements.

Water level and surface water discharge measurements will be taken prior to each quarterly sampling event. Discharge rates will be measured at a minimum of four locations.

1.4.2 Non-invasive Site Tasks

This section briefly describes non-invasive tasks that will be conducted during Phase IB and II of the project. Completion of these activities will not require disturbance of subsurface soil, ground water, or surface water. The level of protection required for these tasks is based on worst case estimates of surficial contamination and airborne levels of vapors and dusts.

1.4.2.1 Mobilization. Mobilization activities include set-up of site utilities and subcontractor procurements for the geophysical and elevations surveys for site access, drilling, and trenching activities. An on site trailer, equipped with air-conditioning, electricity, telephone, personal computer, and analytical equipment will be set up within the fenced disposal area. In addition, a van will be used as a secondary base for field operations on site. The van will leave the site each day.

1.4.2.2 Location and Elevation Survey. Each new monitoring well, surface water/sediment point, boring location, and seismic line endpoint will be surveyed.

1.4.2.3 Geophysical Investigation. A geophysical survey will be conducted over and around the disposal area. Seismic profiling will be accomplished using four lines of seismic refraction and VLF.

1.4.2.4 Ecological Risk Assessment. The purpose of this survey is to provide a preliminary overview of the terrestrial and wetland biota and ecosystems occurring at the site, to develop site maps of ecological resources, and to compile species lists. (Aquatic biota and ecosystem analyses are addressed under Work Assignment No. 10-1L01.)

2.0 Site Hazard Summary

Hazards which may be encountered at this site can be classified into three general categories: chemical and radioactive, physical, and environmental hazards. Chemical and radioactive hazards are site specific and involve the potential exposure to chemical contaminants in soil and ground water. Physical hazards are generally occupationally-specific and may involve some type of accident, exposure to noise, and electrical hazards, etc. Environmental hazards are created by natural environmental circumstances such as weather, poisonous plants, poisonous animals, insect bites, etc. To minimize the likelihood of an accident, onsite personnel should be familiar with the Accident Prevention Plan in Appendix D.

2.1 Chemical and Radioactive Hazards

Tables presented in Appendix A list the primary contaminants of concern for ground water, surface water, soils, and air. Contaminants of concern were selected based on their toxicity and the concentrations which have previously been detected at the site. Several known carcinogens are included in these tables. Based on a review of the Ebasco Final Work Plan, Volume 1, the concentration of each chemical listed in Appendix A represents the highest known concentrations of that chemical in that medium. The concentrations listed do not necessarily reflect current conditions across the site; however they do indicate that there may be significant levels of contamination almost anywhere onsite. In addition, it is very likely that not all sources of contamination have been identified at this site. The Ebasco Final Work Plan presents some data from limited air monitoring of onsite and offsite locations. The air monitoring program was designed to detect VOCs, pesticides, and metals. However, the pesticide data given in the Ebasco Final Work Plan included sample results from pesticide monitoring that was done inside a temporary building where labpacks (discovered onsite) were being opened and characterized. The levels of endosulfan were particularly high. Airborne pesticides were not detected in any other air samples (per detailed data provided by the EPA RPM). Therefore, high levels of airborne pesticides during the field investigation for this project are not expected. A variety of volatile organic compounds (VOCs) were detected at low levels. No air contaminants were detected in a concentration greater than one percent of their TLV except in confined spaces.

Although the potential for acute symptoms of overexposure to site contaminants is considered low, such an occurrence would likely be the result of exposure to VOCs. Common symptoms of overexposure to VOCs include: headaches, dizziness, nausea, eye irritation, fatigue, loss of coordination, visual disturbances, abdominal pains, and cardiac arrythmia.

2.2 Physical Hazards

It has come to the attention of Arthur D. Little that local residents use the Picillo Farm site for shooting. EPA has talked with the local police about the problem. The police instructed onsite personnel to call the Coventry, Rhode Island Police (401/826-1100) if they hear shooting or see trespassers.

All personnel onsite shall wear a fluorescent red or orange vest and hat. A supply of hats and vests will be kept at the field station.

Other primary physical hazards which may be encountered are slips, falls and trips, improper footing and work surfaces, lifting heavy materials, falling objects, eye injuries, head injuries, working near water, and pinched or crushed hands and feet. Noise (e.g., excavation equipment and drilling rigs) and electrical exposures could be expected to be encountered at the site.

2.3 Environmental Hazards

Environmental hazards such as inclement weather, poisonous plants, animals, and insects cannot always be avoided. Based on available information and current site conditions, the Site Health and Safety Officer and field personnel shall use their best judgement to mitigate these potential hazards. Insect/pest and heat stress hazards are the two primary environmental hazards present at the site and are discussed below.

2.3.1 Insect/Pest Hazards

Insects and pests (e.g., ticks, mosquitos, bees, snakes, rats, etc.) are present onsite. Ticks in particular have been noted as a significant hazard. The following precautionary measures should be taken: liberal use, per container instructions, of an insect repellent containing DEET; high, puncture resistant boots; light-weight overclothing such as Tyvek pants, jackets, and hoods in the most extreme cases; and taping-up of all clothing interfaces. Individuals should also check one another (particularly in hair and around garment interfaces such as wrists, waist, and ankles) for ticks and other insects periodically during the day, and prior to leaving the site.

2.3.2 Heat Stress Hazards

Heat stress of employees can easily occur during these onsite activities. Heat stress indices may be monitored by the Wet Bulb Globe Temperature Index (WBGT) technique. This method will require the use of a heat stress monitoring device, such as the Wibget Heat Stress Monitor (Reuter Stokes).

The WBGT shall be compared to the Threshold Limit Valve (TLV) outlines in the ACGIH TLV Manual, and a work-rest regimen will be established, as necessary, according to the WBGT obtained. Note that 5°C must be subtracted from the listed TLV for heat stress to compensate for the wearing of impermeable protective clothing.

Regardless of onsite monitoring, employees are the most knowledgeable regarding the effects of heat on themselves.

One or more of the following control measures need to be used to help control heat stress:

- Provision of adequate liquids to replace lost body fluids. Employees must replace water and salt lost from sweating. Employees shall be encouraged to drink more than the amount required to satisfy thirst. Thirst satisfaction is not an accurate indicator of adequate salt and fluid replacement.
- Replacement fluids will be commercial electrolyte supplements, such as Gatorade or Quick Kick, in combination with fresh, cool water.

- Establishment of a work regimen that will provide adequate rest periods in shaded areas for cooling down. This may require additional shifts of workers.
- Cooling devices such as vortex tubes or cooling vests can be worn beneath protective garments.
- All breaks are to be taken in a cool rest area (77 degrees Fahrenheit is best).
- Employees shall remove impermeable protective garments during rest periods.
- Employees shall not be assigned other tasks during rest periods.
- All employees shall be informed of the importance of adequate rest, acclimation, and proper diet in the prevention of heat stress.

During periods of high temperature and/or humidity, the Site Health and Safety Officer representative will continually observe the workers for symptoms of heat stress especially in areas where protective clothing is being worn. If the body's physiological processes to maintain a normal body temperature fails, or are overburdened due to excessive heat exposure, a number of physical reactions can occur ranging from mild symptoms such as fatigue, irritability, anxiety, decreases in concentration and movement to death. Additional heat related problems are briefly described below:

- *Heat Rash* - This is caused by continual exposure to heat and humid air, and is aggravated by chafing clothes. Heat rash decreases a person's ability to tolerate heat as well as becoming an irritating nuisance.
- *Heat Cramps* - This is caused by profuse perspiration with inadequate water intake and chemical electrolyte imbalance. Heat cramps result in muscle spasm and pain in the extremities and abdomen.
- *Heat Exhaustion* - Increased stress on various organs to meet increasing demands to cool the body will result in signs and symptoms including shallow breathing; pale, cool, moist skin; profuse sweating; dizziness; and lassitude.
- *Heat Stroke* - This is the most severe form of heat stress which must be treated immediately by cooling the body or death may result. Signs and symptoms include red, hot, dry skin; no perspiration; nausea; dizziness and confusion; strong, rapid pulse; and coma.

In the event of a heat stress related injury or illness, onsite personnel will render the appropriate level of first aid, and, if needed, request assistance from offsite emergency medical personnel.

2.4 Initial and Continued Site Evaluation

A preliminary evaluation will be conducted by the Site Health and Safety Officer to ensure that site activities, personnel protection, and emergency response are consistent with the levels of contaminants expected to be encountered.

Other data obtained during the course of work will be used to update this evaluation.

If other contaminants are encountered on site all personnel will be made fully aware of their hazardous properties and the appropriate procedures which will be utilized to prevent exposure.

3.0 Staff, Organization, and Responsibilities

3.1 Project Staff and Health and Safety Organization

The personnel and their organizations listed below will be performing various onsite and/or offsite activities (see Figure 3-1). The EPA Remedial Project Manager will be notified promptly of any potential onsite health and safety problems and changes in the health and safety organization. Telephone numbers are provided in Section 9.1 of this Plan.

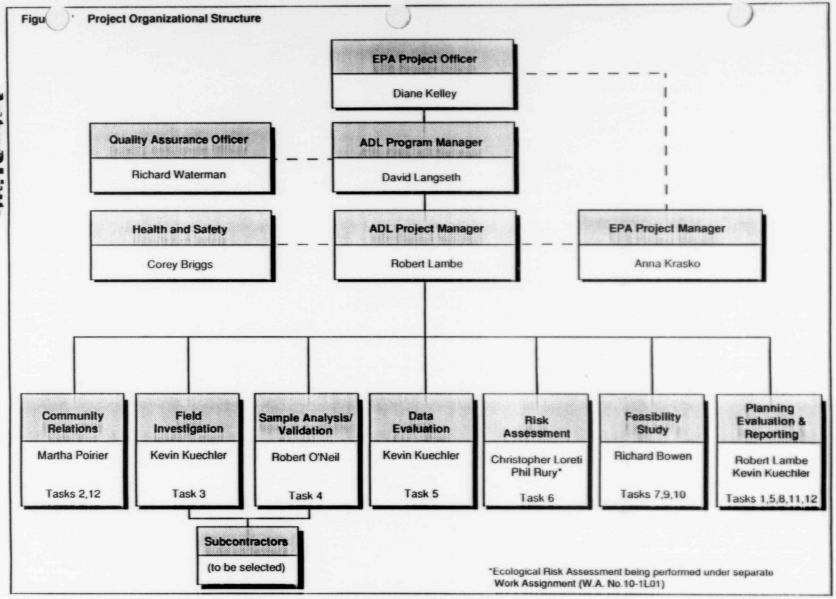
3.1.1 U.S. Environmental Protection Agency

Remedial Project Manager (RPM): Anna Krasko

3.1.2 Arthur D. Little, Inc.

Project Manager (PjM): Robert Lambe
Health and Safety Staff:
Corporate Director of Health and Safety (CDHS): R.S. Stricoff, CIH, CSP
Project Field Supervisor: Kevin Kuechler
Health and Safety Officer (HSO): Corey W. Briggs
Health and Safety Project Manager (HSPM): David Isenberg
Site Health and Safety Officer (SHSO): Kevin Kuechler
Site Health and Safety Officer Alternates: To be determined
Task Health and Safety Officer (THSO): To be determined in the field

Figu Project Organizational Structure



3.2 Responsibilities

3.2.1 Project Manager (PjM)
- Day-to-day liaison with EPA Remedial Project Manager
- Reviews and approves the site-specific Health and Safety Project Plan
- Assures that fieldwork proceeds according to requirements
- Coordinates with the Site Health and Safety Officer
- Responsible for onsite implementation and enforcement of the Health and Safety Project Plan by all project personnel
- Designates field personnel who meet qualification requirements of the site-specific Health and Safety Project Plan

3.2.2 Project Field Supervisor
- Coordinates and supervises all fieldwork

3.2.3 Corporate Director of Health and Safety (CDHS)
- Gives final authority on all health and safety issues, concerns, or conflicts that impact the project
- Exercises supervision and control over company's health and safety program

3.2.4 Health and Safety Staff (HSO & HSPM)
- Prepares the site-specific Health and Safety Project Plan
- Provides ongoing industrial hygiene and safety support to the project
- Acts as the primary health and safety liaison to EPA
- Conducts health and safety site orientations, training, and periodic safety inspections/audits

3.2.5 Site Health and Safety Officer (SHSO)
- Coordinates all onsite health and safety activities
- Monitors the field investigations to ensure compliance with the Health and Safety Project Plan
- Reports deviations from the Health and Safety Project Plan to the Project Manager
- Recommends modifications of the Health and Safety Project Plan to the Project Manager and HSO as soon as practical once it is apparent that the plan should be modified
- Establishes Exclusion Zones
- Coordinates the prohibition of non-essential personnel outside the Exclusion Zone boundaries
- Uses appropriate portable field instruments and personnel as specified in the plan (Section 7.0) to monitor site conditions in the Exclusion Zone
- Maintains a log of field activities, monitoring, and site orientations, and submits appropriate summary reports

3.2.6 Site Health and Safety Officer - Alternates(s)

- Assumes all functions and responsibilities of the SHSO in his/her absence

3.2.7 Task Health and Safety Officer

- Designated by the SHSO, a member of each independent team or group of personnel onsite conducting field work shall be responsible for the health and safety decisions and actions of that team (i.e., air monitoring). Responsibilities include determining if contaminant levels exceed an action level (Section 7.1.3), or assuring that the team maintain communication via predetermined methods - visual, auditory, walkie-talkie, etc.

3.2.8 Field Geologists, Sampling Technicians and Chemists

- Comply with the requirements of the Health and Safety Project Plan
- Immediately notify the SHSO of hazardous or potentially hazardous conditions or environments that are not addressed or are not adequately addressed in the plan
- Immediately notify the SHSO and Project Manager of any onsite accidents or exposures
- Conduct work consistent with normal safe working procedures for a comparable work site
- Attend all Health and Safety Briefings
- Have current training and medical surveillance

4.0 Regulatory Requirements and Personnel Qualifications

In order to be authorized for project fieldwork all Arthur D. Little and subcontractor personnel must be certified as having met the following minimum requirements:

4.1 Medical Surveillance

In compliance with OSHA medical surveillance requirements (29 CFR 1910.120), supervisory personnel and field personnel, including subcontractor personnel, shall have received an examination by a licensed physician. The most recent exam shall have been received within the 12-month period proceeding this work, and each employee shall have been determined by the attending physician to be physically able to perform the work and to use respiratory and other protective equipment as typically required for a field investigation of this nature. A summary of a medical monitoring program which meets OSHA regulations and is acceptable to Arthur D. Little is provided in Appendix B. Arthur D. Little's Hazardous Waste Site Medical Surveillance program is coordinated through the Mt. Auburn Hospital Occupational Health Department in Cambridge, Massachusetts. The physician in charge will be notified of Arthur D. Little's onsite activities.

4.2 Health and Safety Training

All onsite personnel, including subcontractor personnel, shall have received training and/or experience which at a minimum satisfies the OSHA regulations for hazardous waste and emergency response (29 CFR 1910.120). Highlights of a training program that meets OSHA regulations and is acceptable to Arthur D. Little is provided in Appendix C. Once basic training has been received, annual refresher training must also be completed. At least one of the field team members should be first aid and/or CPR trained.

4.3 Respirator Training

All personnel, including subcontractor personnel, who will be within any established Exclusion Zone shall have completed a respiratory protection program which at a minimum satisfies the OSHA regulations (29 CFR 1910.134). This program shall include: 1) instruction in the proper use and limitations of respirators; 2) proper fitting of personnel for a respirator, using either a qualitative or quantitative fit test method; and 3) teaching personnel how to conduct either a positive and/or negative pressure fit test. Personnel shall be fit tested with a respirator model and size that will be available to them for site work.

4.4 Health and Safety Site Orientation Meeting

All site personnel shall be required to read this plan and attend the initial Health and Safety Site Orientation (Section 6.1), and all site Health and Safety Briefings (Section 6.2) relevant to conducting their site work.

All subcontractors shall conduct their work in accordance with the policies and procedures outlined in this Health and Safety Project Plan, or provide to the HSO and health and safety plan that meets or exceeds the requirements of this plan.

5.0 Site Control

The purpose of the site control measures discussed in this section are to maintain order at the site and to minimize chemical and physical hazards to onsite personnel, visitors, and the public.

5.1 Site Access and Parking

The use of personal vehicles to travel to and from the site is discouraged. Dedicated government vehicles are available; their use is coordinated by Howard Pedlikin, the Arthur D. Little Contract Administrator and Property Custodian.

No personal vehicles are to travel beyond the van used as the base of operations (section 1.4.2.1) to help accompiish work tasks. Of the three dedicated government vehicles available, one will be designated for use on the site. Prior to taking this vehicle offsite, the tires, wheel wells, undercarriage, and body panels will be washed (e.g., soft brushes, Hudson Sprayer and a solution of Liquid Tide and water) and rinsed off at the truck wash station. Other vehicles should not be driven on the site unless necessary and approved by the Project Field Supervisor.

To maintain general control over access to the site, gates will be kept closed and/or locked at all times.

5.2 Exclusion and Decontamination Zones

During select onsite operations, the SHSO may determine that it is necessary to establish and maintain Exclusion Zones. The Exclusion Zones may be marked using plastic caution tape supported by metal or wood stanchions, or safety cones and flagging tape, or other equivalent demarcation methods.

The SHSO will be responsible for coordinating the prohibition of non-essential personnel within the Exclusion Zone boundaries. Prior to entering the Exclusion Zone, site personnel shall have donned the proper personal protection equipment (PPE) for expected site conditions and the particular operation, as determined by the SHSO (see Section 7.0).

Contamination Reduction Zones, or decontamination zones, shall be established adjacent to the Exclusion Zones. Personnel exiting the Exclusion Zones shall undergo appropriate decontamination activities as directed by task-specific procedures in Section 7.0.

5.3 Communications

Communication on site, including into or out of the Exclusion Zone, will generally be accomplished by voice; however, at least one pair of walkie-talkie devices will be available during onsite activities. If more than two persons require or request the use of the walkie-talkies for the same day then the site supervisor shall resolve who has priorities, provide additional communication devices, reschedule one or more tasks, or otherwise resolve this situation to the satisfaction of interested parties and the SHSO. Prior to conducting work in a particular area, personnel will locate the nearest telephone.

6.0 General Health and Safety Work Precautions

6.1 Health and Safety Site Orientation

The SHSO, with the assistance of Arthur D. Little's Health and Safety support staff, shall conduct a health and safety site orientation prior to the initiation of field activities. The orientation will cover all aspects of the site-specific Health and Safety Project Plan. Particular emphasis will be placed on a review of site hazards and potential health effects, the Accident Prevention Plan (Appendix D), safe work procedures and precautionary measures, use of personnel protective equipment, and emergency response procedures. All field staff are required to attend these briefings. This orientation, in addition to periodic Health and Safety Briefings, shall act as the informational programs in accordance with OSHA 1910.120. Material Safety Data Sheets (MSDS) for chemicals used onsite shall be maintained by the SHSO and are accessible to personnel upon request.

6.2 Health and Safety Briefings

The SHSO will conduct a periodic Health and Safety Briefing. Topics to be covered, as needed, include personal protection equipment, personnel and equipment decontamination procedures, accident prevention, and any modifications or amendments to the Health and Safety Project Plan. Onsite field staff are required to attend and attendance will be documented.

6.3 Field Station

A base location shall be established at the site near the former truck wash area of the Picillo Farm Project. An office trailer will be used as the primary station, and a van will be used as a mobile field station. The van shall arrive to and depart from the base location daily.

Electrical power will be provided to the field station from an existing power line. A ground fault interrupted circuit (GFI) shall be established for all power used at the field station. All power cords shall be three pronged. All power cords shall be kept out of standing water, off the ground, and in good condition (no cuts in the insulation and no ground prongs missing). Care shall be taken to prevent cords from being run over by any vehicles.

6.4 Accident Prevention Plan

Arthur D. Little's Accident Prevention Plan is provided in Appendix D. This plan addresses several aspects of general site safety, including training, sanitation, fire prevention, housekeeping, protective equipment, equipment maintenance, and site inspections. The provisions of this plan must be adhered to by all onsite personnel and subcontractors.

6.5 Confined Space Entry

While confined space entry will not be permitted during this project, individuals should be aware that the trenches to be excavated during Phase IB are considered confined spaces. Field personnel should inspect the integrity of trench walls prior to conducting work in the vicinity of a trench. Sampling of soils from backhoe buckets should take place at a minimum of ten feet from the edge of the trench during excavation activities. All trenching activities are to be conducted in accordance with applicable OSHA regulations contained in 29 CFR 1926.

6.6 Tanks, Drums, and Barrels

It is possible that field investigations discover or detect unknown tanks, drums, barrels or other containers that are suspected of containing hazardous waste. Should this occur field personnel should mark this location with flagging tape or some similar means and should also mark this location on the site plans. Field personnel should not stay in the immediate area (100 foot radius) any longer than is needed to flag the location of the discovered object. **Tanks, drums and barrels are to be left undisturbed until an action plan and a health and safety plan (an addendum to this Plan) have been approved by the ADL Project Manager, the Health and Safety Officer, and the EPA Project Officer.**

6.7 Respiratory Protective Equipment

The following is a list of general provisions regarding the use of respiratory protective equipment.

- Only properly cleaned, maintained, NIOSH/MSHA approved respirators shall be used on site.
- Selection of respirators as well as any decisions regarding upgrading or downgrading of respiratory protection will be made by the SHSO.
- Air purifying cartridges shall be replaced when loadup or breakthrough occurs, unless otherwise recommended by the SHSO.
- Only employees who have had pre-issue and annual qualitative fit tests thereafter, shall be allowed to work in atmospheres where respirators are required.
- If an employee has demonstrated difficulty in breathing during the fitting test or during use, he or she shall have their physical condition re-evaluated to determine whether the employee can wear a respirator while performing the required duty.

- No employee shall be assigned to tasks requiring the use of respirators if, based upon the most recent examination, a physician determines that the employee will be unable to function normally wearing a respirator or that the safety or health of the employee or other employees will be impaired by use of respirator.
- Contact lenses are not to be worn while using any type of respiratory protection.
- If needed, air supplied respirators shall be assembled per manufacturer's specifications regarding hose length, couplings, valves, regulators, manifolds, etc.
- All air utilized for air supplied respirators will meet the requirements for at least Grade D breathing as specified by the Compressed Gas Association.
- Excessive facial hair (e.g., beards and large moustaches) prohibits proper face fit and effectiveness of air purifying respirators. Persons required to wear respiratory protection must not have any facial hair that interferes with the respirator seal.
- Regular eyeglasses cannot be worn with full face respirators (breaks the facepiece seal). Special eyeglass inserts must be utilized.
- The respiratory protection utilized on site will be in compliance with OSHA, 29 CFR 1910.134 and the Arthur D. Little Respiratory Protection Program.
- Respirators are to be cleaned daily per 1910.134. If respirators are not dedicated to individuals, disinfection is also required.
- Where air-purifying respirators are designated for protection against onsite contaminants, the employee shall be permitted to change canisters or cartridges whenever an increase in breathing resistance is detected.

7.0 Task-Specific Health and Safety Procedures

As stated in Section 1.4.1 and 1.4.2, tasks scheduled for this project include mobilization, residential and monitoring well sampling, soil sampling, site reconnaissance, geophysical survey, hydraulic testing, boring, well installation, excavation of test pits, and an ecological risk assessment. Health and safety procedures for each of these tasks are presented in the following subsections.

7.1 Invasive and Non-invasive Site Tasks

7.1.1 Personnel

Personnel requirements for these procedures typically require a minimum of two persons with each person maintaining visual and/or auditory contact. Any changes to this format shall be agreed upon by the Project Manager and the SHSO.

7.1.2 Site Monitoring

The SHSO shall designate one of the two team members as the Task Health and Safety Officer and this person shall use a properly calibrated HNu PI-101 photoionization detector (PID), or equivalent instrument, with either 10.2 or 11.7 electron volt lamp, as appropriate, to:

A. Monitor organic vapors at several onsite areas at the beginning of each day to establish a background reading.

B. Monitor organic vapors at the worker's breathing zone, hand auger spoils, and above ground water wells.

C. If elevated levels of organic vapors are detected, the worker's breathing zone will be monitored continuously while in the area, or for 15 minute periods every half-hour.

D. Traditional industrial hygiene air monitoring for organic vapors and dusts will also be performed during potential high exposure activities, and at the discretion of the HSO.

The 11.7 electron volt lamp will be required to detect many of the contaminants present onsite (see Table 2B in Appendix A).

In addition, an explosivity meter shall be used when opening well caps to develop, purge, or sample newly installed onsite monitoring wells. The procedure for opening well caps to onsite monitoring wells shall include use of both the HNu (or equivalent) and the explosivity meter. Previously sampled wells will be monitored with the NHu (or equivalent) only. If the Action Level for either instrument is reached then follow the procedure appropriate for the Action Level.

If required by the HSO, radiation monitoring will be performed using a Geiger-Muller pancake probe. General area surveys may be conducted in addition to monitoring the specific sampling sites.

7.1.3 Action Levels

7.1.3.1 Chemical Vapors. All field work covered in Section 7.1 will commence with Modified Level D personal protection (see Section 7.1.4) in force.

Based on positive direct reading instrument levels in the breathing zone or site conditions, the SHSO shall upgrade personal protection equipment requirements as described below.

The following action levels are based on PID *breathing zone readings* and observations of site conditions.

- One to two (1-2) ppm above background sustained for five minutes: *Continue at Modified Level D.*
- Two to ten (2-10) ppm above background sustained for five minutes: *Modified Level D and Continuous Monitoring*
- Greater than ten (> 10) ppm above background sustained for five minutes or a peak reading of 30 ppm or greater: discontinue operations in that immediate vicinity. Under these conditions, the SHSO and the HSO should be contacted to make arrangements to further characterize airborne contaminants. Recommended actions might include personnel and area monitoring.

7.1.3.2 Explosive Limit Detection. Based on a positive reading of the explosivity meter of 10% of the lower explosive limit, all workers in the area should back off immediately and evaluate the situation. Report observations and instrument readings to the SHSO, who will advise workers on safety measures necessary before returning to work in the area. A means of ventilation may be required in order to resume work in this area.

7.1.3.3 Radiation Detection. As of August 1990, no radioactive emitting sources have been detected onsite. No additional radiation surveying will be required for work activities that are limited to areas characterized during the 1990 radiation survey. If, however, work activities are conducted in areas not previously characterized for radiation, the HSO should be contacted and the radiation monitoring plan will be reinstituted. Site personnel must comply with the following action levels when the radiation monitoring program is in effect:

Total External Exposure

x < 100 µR/hr	Level D	Normal monitoring during sampling procedures
100 µR/hr<x<200 µR/hr	Level D	Periodic monitoring (every 30 minutes)
200 µR/hr <x<2 mR/hr	Level D	Continuous monitoring - worker exposures assessed
x > 2 mR/hr		Work site evacuated

7.1.4 Personal Protective Equipment (PPE)

This section contains specific provisions for the use of personal protection equipment (PPE). Based on site conditions and action levels (Sections 7.1.3.1 to 7.1.3.3) the SHSO shall upgrade personal protection requirements as commensurate with site hazards.

Modified Level D protection shall be used at the start of field work. Modified Level D protection shall include use of the following items:

- standard work clothes or coveralls;
- disposable white Tyvek coveralls or equivalent;
- hard hat;
- steel toe/steel shank PVC boots, or similar leather boot with boot cover;
- safety glasses with side shields (all sunglasses and prescription glasses used onsite must also be impact resistant and fitted with side shields);
- chemical protective gloves (e.g., nitrile) and latex surgical undergloves shall be worn when collecting soil gas samples, collecting water or soil samples or when bailing wells; and
- U.S. Coast Guard approved life-jackets will be used when working in and around swampy areas.

Contact lenses may not be worn by workers at this site when Modified D or higher levels of protection are required.

Upgrade to Level C may be required if the level of VOCs detected in the worker's breathing zone exceeds the Action Level of 10 (see Section 7.1.3.1). Level C protection will include all of the PPE required for Modified Level D plus the following:

- replace white Tyvek with Saranex, Tyvek, or equivalent overalls, and
- use disposable outer boots and an appropriate fullface air purifying respirator.

The specific respirator for Level C protection shall be the MSA Ultra Twin full-face respirator (APR) with GMC-H combination cartridges (MSA Part No. 460844), or equivalent. The GMC-H cartridge is approved for organic vapors and acid gases (not more than 1,000 ppm), dusts, fumes and mists having a time weighted average less than 0.05 mg/m^3, radionuclides, and asbestos. Respirator cartridges will be changed at the first sign of breakthrough or loadup, or at the discretion of the SHSO.

Provisions shall be made for backhoe operators to upgrade to Level B protection if conditions warrant during trenching and other potentially high exposure activities. Level B protection will include all of the PPE required for Level C plus the following:

- replace the APR with either a pressure-demand SCBA or a pressure-demand airline respirator with an inline 5-minute escape bottle.

It shall be the responsibility of the SHSO, in coordination with the HSO or HSPM, to make the determination of the level of PPE to be used by personnel within the particular Exclusion Zones. The decision of the SHSO will be based on site monitoring and action levels (see Section 7.1.3) and associated hazards, knowledge of the site, observed site conditions, and applicability of the Arthur D. Little Health and Safety Program for Hazardous Waste Site Activities Program Plan.

7.1.5 Exclusion and Decontamination Zones

In recognition of the increased risk to workers of physical injury and exposure to chemical contaminants, Exclusion Zones may need to be established and maintained. Non-essential personnel shall be prohibited from entering these Exclusion Zones. All personnel entering the Exclusion Zones will be required to wear appropriate personal protective equipment in accordance with Section 7.1.4 and as approved by the SHSO for the particular task.

A Decontamination Zone shall be established adjacent to the Exclusion Zones, and shall consist of wash tubs, a garden-type, pressurized water sprayer, soap and brushes to be used for removing soils and other contamination from gloves and boots.

7.1.6 Decontamination

Upon leaving the Exclusion Zones, all personnel must undergo appropriate decontamination. The nature of the decontamination requirements will depend on whether immediate re-entry into the Exclusion Zone is planned, or if complete egress from the Exclusion Zone is intended. The degree of decontamination will be decided by the SHSO. The decontamination requirements will also depend on the level of protection used within the Exclusion Zone and the degree of contamination. The Decontamination Zone will be located immediately outside the access opening of the Exclusion Zones on its apparent upwind side, and will be delineated using caution tape and/or stakes, metal stanchions, or traffic cones. This zone shall contain the decontamination stations necessary to allow rest and beverage breaks and respirator cartridge changes, as well as complete decontamination as required to exit the work area. Beverages (e.g., bottled water) will be provided to personnel adjacent to this area during rest breaks.

The decontamination area will consist of outer glove and boot wash and rinse stations, and a disposal drum. Decontamination wash will be accomplished by dispensing a detergent and water solution from a garden-type pump-spray can, or similar device. The wash shall be followed by a rinse with clean water. Brushes will be supplied for assisting in the removal of solids.

Partial Decontamination

Workers must observe the following personnel decontamination procedures prior to respirator cartridge changes or rest breaks in the decontamination area:

For Modified Level D and Level C

1. Wash outer gloves.
2. Remove wrist tape (as applicable) and dispose into a plastic-lined disposal drum.
3. Remove outer gloves and dispose into a plastic-lined disposal drum. Continue procedures below, as appropriate.

To change respirator cartridge only

4. Remove respirator, change cartridges, clean respirator with respirator wipe, and put respirator back on.
5. Make sure cartridges are properly seated against the gaskets. Fit check the respirator by holding palms over the cartridges and inhaling. If the respirator is properly seated, air cannot be drawn through the respirator in this fashion.
6. Put on clean outer gloves.
7. Tape wrists with duct tape (as applicable).
8. Re-enter Exclusion Zone.

For rest breaks

1. Wash outer gloves.
2. Remove wrist tape (as applicable) and dispose into a plastic-lined disposal drum.
3. Remove outer gloves and dispose into a plastic-lined disposal drum. Continue procedures below, as appropriate.

4. If respirator is being used, remove respirator and place in a clean area.

5. Remove inner gloves, dispose into disposal drum.

6. Wash hands and face at wash station. Dry hands and face with paper towels.

7. Take rest break, drink cold beverage from disposable paper cups.

8. Put on glove liners.

9. If respirators are being used put on respirator.

10. Don outer gloves.

11. Tape wrists (as applicable).

12. Re-enter Exclusion Zone.

If, in the opinion of the SHSO, Tyvek jumpsuits or outer boots are severely contaminated, then full decontamination must be performed for rest and beverage breaks. The SHSO will determine the necessary decontamination status.

Complete Decontamination

For complete decontamination prior to leaving the site, all personnel must observe the following procedures upon leaving the Exclusion Zone:

1. Get hands and feet screened with a radioactive detector if radiation monitoring program is in effect (see Section 7.1.3.3).

2. Place contaminated sampling and other associated equipment into plastic bag(s) and seal with duct tape.

3. Wash outer boots and outer gloves.

4. Remove ankle and wrist tape (as applicable) and dispose of in a plastic-lined disposal drum.

5. Remove outer boots. Boots used onsite are <u>not</u> to be taken offsite. All footwear will be dedicated to site work only.

6. Remove outer gloves and dispose of in a plastic-lined drum.

7. Remove Tyvek suit and dispose of in a plastic-lined drum (if applicable).

8. If using a respirator, remove respirator, dispose of cartridge, clean, disinfect, dry and place respirator in a plastic bag.

9. Remove and dispose of surgical gloves.

10. Exit Decontamination Zone.

8.0 Data Collection and Onsite Compliance

8.1 Data Collection

Records required by the state and federal government will be kept current. Records of health and safety activity at the site will be maintained, including records of health hazard surveys, evaluation of potential hazards, and control measures taken. These records will document representative exposure levels during waste handling and sampling and the degree of hazard. Site employees will be continually informed of exposure levels and the degree of safety measures required for protection from the hazards present. The documented exposure monitoring will serve as a record of assessment of the respiratory hazards at the particular operation of the project and will include the following:

- Determination of personnel activity in the working area:
  - job routines
  - work locations
  - time spent in work areas
- Determination of any potential respiratory hazards:
  - chemical composition
  - type of air contamination
  - toxicity at various concentrations (acute versus chronic)
  - established concentration limits for inhalation
- Determination of whether to improve the administrative controls.

Applicable data will be available to onsite personnel throughout the project. Records of all sampling methodology, calculations, results, reports, and recommendations will be kept for a period of at least three years after completion of the project.

9.0 Emergency Response

9.1 Onsite Notification and Evacuation

A map showing suggested evacuation routes is included as Figure 9-1. The SHSO may modify these suggested routes in response to work being performed either onsite or in the general area (i.e., the local Public Works Department could be repairing roads in the area). Any changes to suggested evacuation routes will require the SHSO to hold a Health and Safety Briefing to advise all site personnel of the change. An updated evacuation map will be posted at the field station and in other areas as appropriate.

In the event of an emergency that requires workers to evacuate the site or an area of the site, at least one of the following signals will be given - verbal communication, communication via walkie-talkie, or three blasts on an air horn. If there is imminent danger anyone may give the evacuation signal. When a site emergency occurs and the evacuation signal is given, the work will be shut down, and all employees will leave the work area. It is the responsibility of individuals to evacuate in a calm, controlled fashion.

The field staff will not be organized as an Emergency Response Team and will only perform remedial measures that do not pose a threat to their own health and safety. Situations which pose a serious threat to the public health or the environment will be dealt with by notifying EPA Remedial Project Manager, the Arthur D. Little Project Manager, and the appropriate state and local authorities.

Small spill containment and control kits are available in each van to accommodate small incidental spills that may occur. All spills, regardless of size, should be reported to the SHSO.

Use vehicles located outside of the work zone in the evacuation. All personnel will exit the site and be taken to designated nearby rendezvous points or at an alternate site selected by the SHSO depending on wind direction, severity, and type of incident, etc. Use the evacuation route that affords the most direct route away from the site area while avoiding the emergency area.

The Project Field Supervisor's log of onsite personnel will be used to ensure that all individuals are present. If someone is missing, the SHSO will alert the appropriate emergency personnel listed below. Control of personnel at the rendezvous point is the responsibility of the Project Field Supervisor or his designated assistant.

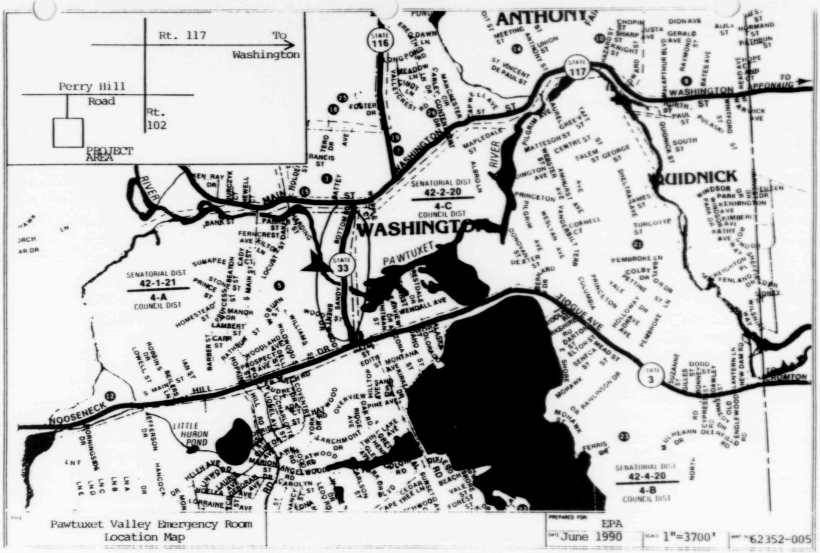


Figure 9-1

Arthur D Little

The names and phone numbers of all personnel and agencies that could be involved in emergency response will be posted by the telephone (on pole at staging area), in the trailer, and in each van. The following phone list contains the agencies and individuals to be notified in an emergency:

• Fire Department	401/821-3456
Police Department	401/826-1100
Ambulance	401/826-1100
• Pawtuxet Valley Emergency Room	401/821-6800
• Anna Krasko, EPA Region 1 Remedial Project Manager	617/573-5749
• Arthur D. Little, Inc.	800/677-3000 or 617/864-5770
Robert Lambe, Project Manager	x 5498
David Isenberg, HSPM	x 3136
Corey Briggs, HSO	x 3018
Chris Martel, Radiation	x 3085
• U.S. EPA, Region I Oil & Hazardous Material Spills	617/223-7265
• Rhode Island Dept of Env. Mgmt.	401/277-3070
• Barry Ricci, Principal Western Coventry School	401/397-3355

The Pawtuxet Valley Emergency Room, in Coventry, Rhode Island is the nearest hospital. A map with a suggested route to the hospital is provided in Figure 9-1.

9.2 General Emergency Procedures

A first aid kit, eye wash bottles, and fire extinguishers rated for class A, B, and C fires will be present at the field station on site. It shall be the responsibility of the SHSO to make a determination as to the proper response to a particular emergency. As soon as practical after an emergency response, the SHSO, shall brief the Project Manager as to the nature of the incident, and response actions taken. The SHSO, with the assistance of health and safety support staff, shall evaluate the site conditions and make a determination regarding any measures that could be taken to prevent incidents of this nature from being repeated. The Project Manager shall promptly notify the EPA Remedial Project Manager.

9.3 Emergency Procedures - Specific Incidents

9.3.1 Chemical Exposures

Inhalation

1. If site personnel experience symptoms suggesting overexposure to toxic chemicals (lightheadedness, dizziness, headache, nausea, shortness of breath, burning sensation in the mouth, throat, or lungs), the person should be escorted from the contaminated environment to fresh air immediately.

2. If unconscious, the victim should be removed from the contaminated area immediately and brought to the nearest hospital. Rescuers shall wear appropriate personal protective equipment during rescue.

3. If the victim is no longer breathing, he or she shall be moved away from the contaminated area. Mouth-to-mouth resuscitation or some alternate form of effective artificial respiration shall begin immediately.

4. If the victim has no pulse he or she shall be moved away from the contaminated area, and cardio-pulmonary resuscitation (CPR) should begin immediately. It may be necessary for the victim to receive artificial resuscitation and CPR simultaneously.

Should any of the above scenarios be encountered, emergency medical attention and advice must be immediately sought by contacting the Fire Department and/or transporting the victim to the hospital.

Skin Exposure

If there is skin contact with toxic or potentially toxic chemicals, the skin should be washed with copious amounts of soap and water for at least 15 minutes. If clothing is contaminated, it should be removed immediately and the skin washed thoroughly with running water.

All contaminated parts of the body, including the hair, should be thoroughly washed. It may be necessary to wash repeatedly. Seek medical attention as appropriate.

Ingestion

If site personnel should ingest toxic or possible toxic chemicals, obtain medical attention immediately.

Eyes

If a toxicant should get into the eyes, they should be washed with generous amounts of water. The eye should be flooded with water so that all surfaces are washed thoroughly. Washing should be continued for at least 15 minutes. Medical attention should be obtained immediately.

9.3.2 Personnel Injury

The SHSO or Project Manager will arrange for administration of appropriate first aid, and arrange transportation for injured personnel to the designated medical facility (if necessary). The SHSO will evaluate the site conditions to determine if the causal hazard still exists. Site personnel shall not re-enter the Exclusion Zone until the cause of the injury is determined and the Exclusion Zone is designated safe to re-enter by the SHSO.

9.3.3 Fire or Explosion

In the event of a fire or explosion, the Fire Department and other applicable offsite contacts shall be alerted, and all personnel shall move to a safe distance regarding the severity of the fire, and whether site personnel shall attempt to extinguish it. Fires shall not be fought by site personnel if an explosion hazard is present. Personnel should *not* attempt to fight large fires on this site. As with all other potentially dangerous activities, the buddy-system should be used during any actual firefighting. The general rule of thumb applies; an individual(s) should expend only one fire extinguisher while attempting to fight a fire. If one extinguisher is ineffective at extinguishing the fire, the regional fire department and the SHSO and/or SHO should be contacted as soon as possible.

Appendix A. Primary Contaminants of Concern

Table 1. Surface Water Contamination (RIDEM, 1984)

Contaminant	Concentration (mg/l)
Acrylonitrile	1.2
Chloroform	4.2
Xylene	56

Appendix A. Primary Contaminants of Concern (continued)

Table 2A. Ground Water Contamination, pre-1990
(MITRE, 1980; Ecology and Environment, 1981; RIDEM, 1984)

Contaminant	Concentration (mg/l)
Organic Compounds	
Acrylonitrile	37.2
Benzene	1.5
Chloroform	34
Isophorone	7.6
Methylene Chloride	30
Phenol	1.8
Tetrahydrofuran	37
1,1,1-Trichloroethane	5
Trichlorofluoromethane	18.5
2,4-Dimethyl Phenol	0.68
Metals (Ecology and Environment, 1981)	
Aluminum	290
Barium	1.5
Magnesium	28
Beryllium	0.014
Chromium	0.070
Nickel	0.080
Vanadium	0.2

Appendix A. Primary Contaminants of Concern (continued)

Table 2B. Ground Water Contamination, August 1990 (Arthur D. Little, 1990)

Compound	Maximum Unremarked[1] Concentration (mg/l)
Chloroform	42
1,1-Dichloroethane	0.2
1,2-Dichloroethane	0.33
1,1,1-Trichloroethane	18
1,1,2-Trichloroethane	0.04
1,2-Dichloroethene	0.07
Trichloroethene	9.3
Tetrachloroethene	0.29
1,2-Dichloropropane	1.4
Chlorobenzene	6.6
Ethylbenzene	0.82
Toluene	2.8
Xylenes (total)	6.7

[1] Unremarked = no remarks or qualifiers on the validated data.

Appendix A. Primary Contaminants of Concern (continued)

Table 3. Soil Contamination

Contaminant	Concentration (mg/kg) pre-1990[1]	1988[2] (mg/kg)
Bis (2-ethylhexyl) phthalate	600	1720
PCBs	110	208
Phenol	420	110
Tetrachloroethene	--[3]	50
Volatile Organic Compounds	25,000[4]	High

[1] These levels were observed at different locations offsite, at a depth of 10-25 feet. (MITRE, 1980)

[2] Measured near the surface at former soil piles in the 8-acre disposal area. (RIDEM, 1988)

[3] Not measured.

[4] Specific compounds were not listed, second highest VOC level was 5,000 mg/kg.

Appendix A. Primary Contaminants of Concern (continued)

Table 4. Airborne Contamination

Contaminant	Concentration (ug/M^3)
Benzene	98
Cellosolve Acetate	130
Chloroform	135
Ethylbenzene	2,000
Tetrachloroethane	150
Tetrahydrofuran	870
Xylene	3,000

Note: Concentrations are maximums observed during removal activities in 1982. (GCA, 1982)

Appendix B. Medical Monitoring Requirements

All personnel engaged in onsite activities are participants in a Medical Monitoring Program which meets the requirements set forth in 29 CFR 1910.120 (OSHA Regulation for Hazardous Waste Operations and Emergency Response). Participants in the medical monitoring program shall have periodic (yearly) physical examinations.

The primary goal of a Medical Monitoring Program is to provide evaluation and ongoing surveillance of the health status of employees potentially exposed to toxic substances as a result of their work-related activities. It is recognized that an active health monitoring program for those employees potentially at risk is an important tool in evaluating the effects of chronic low-level exposures or acute exposures related to operations at hazardous waste sites. The effects of low-level exposures may not become apparent until years after the initial exposure.

A typical Medical Monitoring Program which meets 29 CFR 1910.120 requirements includes laboratory testing, personnel medical history evaluation, physical examination, and specific systemic testing. Each participant undergoes an occupational history evaluation and physical examination, including such parameters as:

- Pulmonary Function Studies
- Complete Blood Count
- SMA 20 (Multiphasic Blood Chemistries)
- Urinalysis
- Chest X-Ray
- Electrocardiogram
- Vision Test
- General Physical Examination

Following the establishment of each participant's baseline values for the above parameters, an annual re-evaluation is conducted to monitor potential changes due to work with hazardous materials.

In addition to this annual re-examination, provisions are made for specific post-exposure examinations in the event of a suspected exposure during a particular field event. The maximum allowable time lapse between the most recent examination and the initiation of field activities at the site for field personnel is one year.

Appendix B. Medical Monitoring Requirements (continued)

After each examination, a determination is made by the attending physician regarding the ability of the employee to carry out his or her work assignments, including the use of respirators and other personal protective equipment. Any restrictions recommended by the physician are communicated to the employer.

Appendix C. Health and Safety Training Requirements

Supervisory and field personnel have had prior training or relevant (documented) health and safety experience which satisfies the training requirements of OSHA's regulation for Hazardous Waste Operations and Emergency Response (29 CFR 1910.120).

For site activities, a minimum of twenty-four (24) hours of training and/or relevant experience, covering, but not limited to, the following topics, has been obtained:

- general site safety
- toxicology
- hazard recognition
- site investigation
- use and limitations of personal protective equipment
- respiratory protection
- hazardous waste management
- use of monitoring instrumentation
- decontamination

The level of training shall be consistent with the employee's job function and responsibilities. Under all site conditions, individuals with only 24 hours of OSHA training shall be under the direct supervision of someone with 40 hours of OSHA training. If site conditions warrant Level C protection, then 40 hours of OSHA training will be required for all workers in the Exclusion and Decontamination Zones.

Onsite management and supervisors directly responsible for, or who supervise, employees working within the Exclusion and Decontamination Zones, shall have received at least eight (8) additional hours of specialized training on managing hazardous waste site operations.

Site personnel who can show, by appropriate documentation from their employer, that their previous work experience and/or training was equivalent to the training requirements for this project, shall be considered as meeting those requirements. Equivalent training includes the training that might have been received from actual onsite training for previous projects. After initial training, personnel are required to have annual refresher training.

Appendix D. Accident Prevention Plan

The purpose of this plan is to assert positive actions to be taken in the recognition, evaluation, and control of safety hazards for the purpose of preventing accidents which may cause personal injury or illness, property damage, or interruption of work.

1.0 Responsibilities

Management - Under the Federal Occupational Safety & Health Act - Title 29 CFR - Arthur D. Little management is responsible for planning deliberate accident prevention measures, providing safe equipment and working conditions, training a competent and safety-minded staff, and maintaining prescribed records of accidents, illnesses, and injuries.

Supervisors - Responsible for observation, evaluation and correction of deficiencies of unsafe conditions, or defective equipment when detected or reported by employees or Government representatives.

Staff - Responsible for use of safety equipment, performing all work in a safe manner, working with deliberate thought of the effects of their actions on others, reporting all unsafe conditions, defective equipment, and injuries immediately to the Supervisor.

Subcontractors - Responsible for full provisions of this Plan.

2.0 Training

Each worker on the site will have been trained in conformance with the provisions of Appendix B. Each employee will also be instructed in the company safety policy, and this Accident Prevention Plan. Additional training will consist of briefings on site-specific toxic or hazardous chemicals, safety hazards, and associated safe work procedures and precautions.

3.0 General Safety Precautions

Buddy System -During site-invasive activities, field personnel shall be in visual or audio contact with at least one other field worker. When respiratory protective equipment is employed within an Exclusion Zone, no fewer than two workers shall be in close proximity within the work area.

Appendix D. Accident Prevention Plan (continued)

An approved first aid kit will be maintained at the site. All injuries, no matter how slight, will be reported to the SHSO for treatment. First aid will be provided at the project site only by those who are qualified through training by the Red Cross. No others will treat any injuries at the project.

No person will be permitted to operate machinery or work in elevated locations while taking antihistamines or other prescription or non-prescription drugs that can adversely affect their mental judgement or physical abilities.

Instruction will be given in identifying, avoiding, and providing first aid for stinging insects, cold or heat exposure, or poison ivy if encountered on the work.

The use of contact lenses is not allowed onsite when required personal protection is Level Modified D, Level C, or Level B. Under these conditions, prescription safety glasses with side shields must be used.

Consumption of alcoholic beverages prior to and during the work shift is strictly prohibited.

Since it has come to the attention of Arthur D. Little that the site is commonly used for shooting, activities should cease if gun shots are heard on site. The Coventry Police (401/826-1100) shall be immediately notified.

4.0 Sanitation

Drinking water will be purchased in one gallon or larger plastic jugs and supplied at the work site as needed. Paper cups will be furnished and a place provided for their disposal.

Eating, drinking, smoking, chewing gum or tobacco, or other similar practices are prohibited within the Exclusion Zone during invasive site activities.

Hands and face must be thoroughly washed before breaks and prior to leaving the work area.

5.0 Fire Prevention

Fire extinguishers (CO_2, ABC or other approved types) will be maintained at the project site, and will be stationed at either the field vehicles or in storage trailers, drill rigs, or back hoes.

Appendix D. Accident Prevention Plan (continued)

No brush or debris will be burned at the project site.

Gasoline will be handled only in OSHA approved safety cans. Engines will be shut off while fueling, with no smoking allowed.

Oily rags and waste will be kept in covered metal containers. All trash and waste will be disposed of daily.

6.0 Housekeeping

Tripping hazards will be eliminated by removal of hoses, cables, and ropes from walkways, by proper storage of materials, and by disposal of waste material.

All debris shall be removed daily.

Drill rods, pipe casing, and other such equipment will be secured such that they do not roll or fall.

7.0 Individual Protective Equipment

Only workers who are trained in the proper use of personal protective equipment will be employed at the work site.

All personnel will wear hard hats and eye protection throughout the project.

Ear protection will be worn by drillers, drillers' helpers, and other field personnel exposed to high-level sound intensity.

Heavy reinforced gloves will be worn when handling wire rope, pipe and rods, and hoist.

Steel toe/steel shank work boots shall be worn by all field personnel.

8.0 Tools

All tools shall be in good condition (without mushroomed heads, split handles or other defects); damaged tools will be repaired promptly or removed from service. This includes privately-owned equipment of the workmen.

Tools shall not be left overhead to fall. Throwing of tools is prohibited.

Appendix D. Accident Prevention Plan (continued)

9.0 Powered Equipment

All machines will be examined daily for safety appliances and condition, and all defects repaired promptly. Periodic maintenance schedules will be followed as recommended by the manufacturer.

All machines will be shut down for adjustment or oiling. During repair of all machines, blocks or stops will be set to prevent falling or moving of parts should any hydraulic line or control device fail.

Workers will climb carefully with handholds and grab irons, not jumping on or off any machine, and in no case while the machine is in motion.

All repairs of hydraulic systems will be with new, manufacturers' parts.

Firm and level standing will be prepared for drills and pumps on land.

10.0 Toxic Materials

Work is to be conducted in accordance with the provisions of the site-specific Health and Safety Project Plan.

Workers are to be prepared for working safely in the event toxic materials are known to be onsite, or are disclosed during the work.

Workers will be protected from possible contamination by toxic materials by wearing appropriate personal protective equipment.

Water, soap and clean towels are to be used instantly in the event splashing, dripping, or settling of dust allows suspected concentrations of toxic materials in contact with the body. Persons developing skin rash, burning, or discoloration of skin, or other indications of chemical exposure, are to receive immediate medical attention. If possible, a sample of the material encountered should accompany the victim to assist in treatment. Full precautions are to be taken in collecting and transporting any sample.

Appendix D. Accident Prevention Plan (continued)

11.0 Emergencies

In the event of warning for severe storm, personnel will be evacuated and equipment secured as directed by the Site Health and Safety Officer to prevent loss or damage.

In the prospect of thunderstorms, all work will be suspended.

For tornado watch, equipment will be removed from exposed positions and personnel will be protected. Crane booms will be laid down.

In the event of fire, explosion, chemical exposure, personnel accident or similar emergency, the provisions of the plan shall be observed.

12.0 Accident Reporting, Analysis and Prevention

Every accident will be reported immediately to the Arthur D. Little Site Health and Safety Officer and subsequently to the Project Manager.

The Project Manager and SHSO will investigate unsafe conditions, defective equipment, failure of maintenance or improper acts, then initiate appropriate corrective actions including comprehensive training to prevent recurrence.

Supervisory personnel at all levels will follow-up by training and observation directed to prevent repetition. Daily Health and Safety/Accident Prevention meetings will review accidents and discuss remedial action by all workers.

13.0 Site Safety Inspections

Site safety inspections shall be conducted as needed by Arthur D. Little's Health and Safety staff to ensure compliance with the plan in the field. A complete record and account of each inspection shall be maintained.