



REPLY TO  
ATTENTION OF

DEPARTMENT OF THE ARMY  
NEW ENGLAND DIVISION, CORPS OF ENGINEERS  
424 TRAPELO ROAD  
WALTHAM, MASSACHUSETTS 02254-9149

SCANNED

CENED-RE-AM (200-1a)

23 March 1992

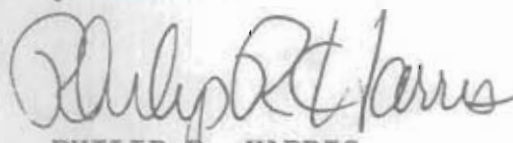
MEMORANDUM FOR

HQ, USACE, ATTN: CEMP-R  
COMMANDER, MRD-MD-HA  
COMMANDER, HND-PM-EA

SUBJECT: DERP-FUDS Inventory Project Report (INPR) for Site No. D01MA0489, Property of Susquehanna Corporation (Former National Fireworks Site), Hanover, Massachusetts

1. Forwarded for appropriate action is the INPR for the former National Fireworks Site in Hanover, Massachusetts.
2. The Navy owned an undetermined number of buildings at the site, but never owned the land. The buildings would be eligible for DERP-FUDS; however, they no longer exist. The land may be eligible for DERP-FUDS if a records search establishes that the Government used the site to such an extent that it was an "operator" of the site.
3. Recommend that CEMP-R forward the INPR to CEMRD so that an archival records search may be conducted to determine whether the land is eligible for DERP-FUDS. If the land is eligible for DERP-FUDS, recommend that CEMRD take further action regarding HTW hazards at the site.
4. If the land is eligible for DERP-FUDS, recommend that the INPR be forwarded to CEHND-PM-OT for further action regarding potential OEW hazards at the site.

Encl

  
PHILIP R. HARRIS  
COL, EN  
Commanding

SITE SURVEY SUMMARY SHEET  
FOR  
DERP-FUDS SITE NO. D01MA0489  
PROPERTY OF SUSQUEHANNA CORPORATION  
(NATIONAL FIREWORKS SITE)  
HANOVER, MASSACHUSETTS  
12 MARCH 1992

**SITE NAME(S):** National Fireworks Site.

**LOCATION:** Hanover, Massachusetts; site map attached.

**SITE HISTORY:** The Department of Defense never owned any acreage at the site, but did own structures on private land at the site. In 1942 the Navy contracted with National Fireworks, Inc. to build facilities on property of National Fireworks (which comprised approximately 200 acres of land). The facilities were owned by the United States but used by National Fireworks in connection with the manufacture and production of ordnance. CENED does not know the number and type of facilities built on the property. In 1946, the Navy conveyed the buildings to National Fireworks, Inc.

The following information is according to affidavits of two former employees at the site taken on behalf of Susquehanna Corporation. This information has not been independently verified by CENED. The Army, Navy, Air Force, and Chemical Corps all contracted with National Fireworks, Inc. and/or its successors or assigns for the manufacture and production of explosives. Explosives were produced at the site between 1942 and the late 1960s. The munitions included 20mm shells, 20mm tracer ammunition, 60 mm illuminating rounds (M-112), various types of detonators, bouchon fuses for hand grenades, incendiary grenades, primers, igniters, rocket igniters, M1-A1 squibs, pop-up explosive charges for anti-personnel mines, "Gravel" non-metallic land mines, dispenser cannisters for C-S gas, tetryl explosive pellets, MOX explosives, flame thrower cartridges, and illuminating flares. The Government supplied many of the explosives and other raw materials to be made into munitions. The Government had on-site military and civilian inspectors who ordered and oversaw the disposal of wastes and rejects. In 1970, an Army demolition team from Fort Devens carried out the final disposal of waste chemicals, parts, materials, and rejected munitions.

The current owners of the land are the Town of Hanover, Massachusetts (approximately 130 acres controlled by the Conservation Commission) and Drinkwater Investment Corporation (approximately 70 acres). Only one building remains on the site. The building is used by Drinkwater and

its affiliate company, P.A. Landers, as offices and a repair shop. The Town uses its portion of the property as conservation land (people hunt, canoe, walk, and occasionally fire guns). The groundwater, surface water, and soil around the property is known to contain hazardous substances, including trichlorethylene, benzene, and toluene.

**SITE VISIT:** A site visit was conducted by Robert Batt and Maureen McCabe of CENED-RE on 8 August 1989. They were accompanied by Mr. Gil Amado of P.A. Landers/Drinkwater; Mr. Gary Siegal of Goldman Environmental Consultants (617-848-5012); and Attorney Richard Hoffman of Hale & Dorr, representing Susquehanna Corporation (617-742-9100).

**CATEGORY OF HAZARD:** HTW, OEW.

**HAZARD DESCRIPTION:**

a. HTW. In March 1988, the Environmental Protection Agency (EPA) found trichlorethylene, benzene, toluene, and other hazardous substances at the site. In May 1988, EPA notified the current owners (the Town of Hanover and Drinkwater), one former owner (Susquehanna Corporation), and one entity that sent waste to the site (Massachusetts Institute of Technology) that they were considered Potentially Responsible Parties in connection with hazardous waste contamination at the site. In December 1988, EPA ordered Susquehanna to undertake a removal action of drums at six areas. Susquehanna anticipates that a future remedial action will be needed at the site. Susquehanna has told the Army and Navy that it considers the United States to be an "operator" of the site and responsible under CERCLA (42 U.S.C. 9601, et. seq.) for at least a portion of the costs for drum removal and future site remediation. The Assistant United States Attorney handling the matter is George (Bunker) Henderson, 617-223-9407.

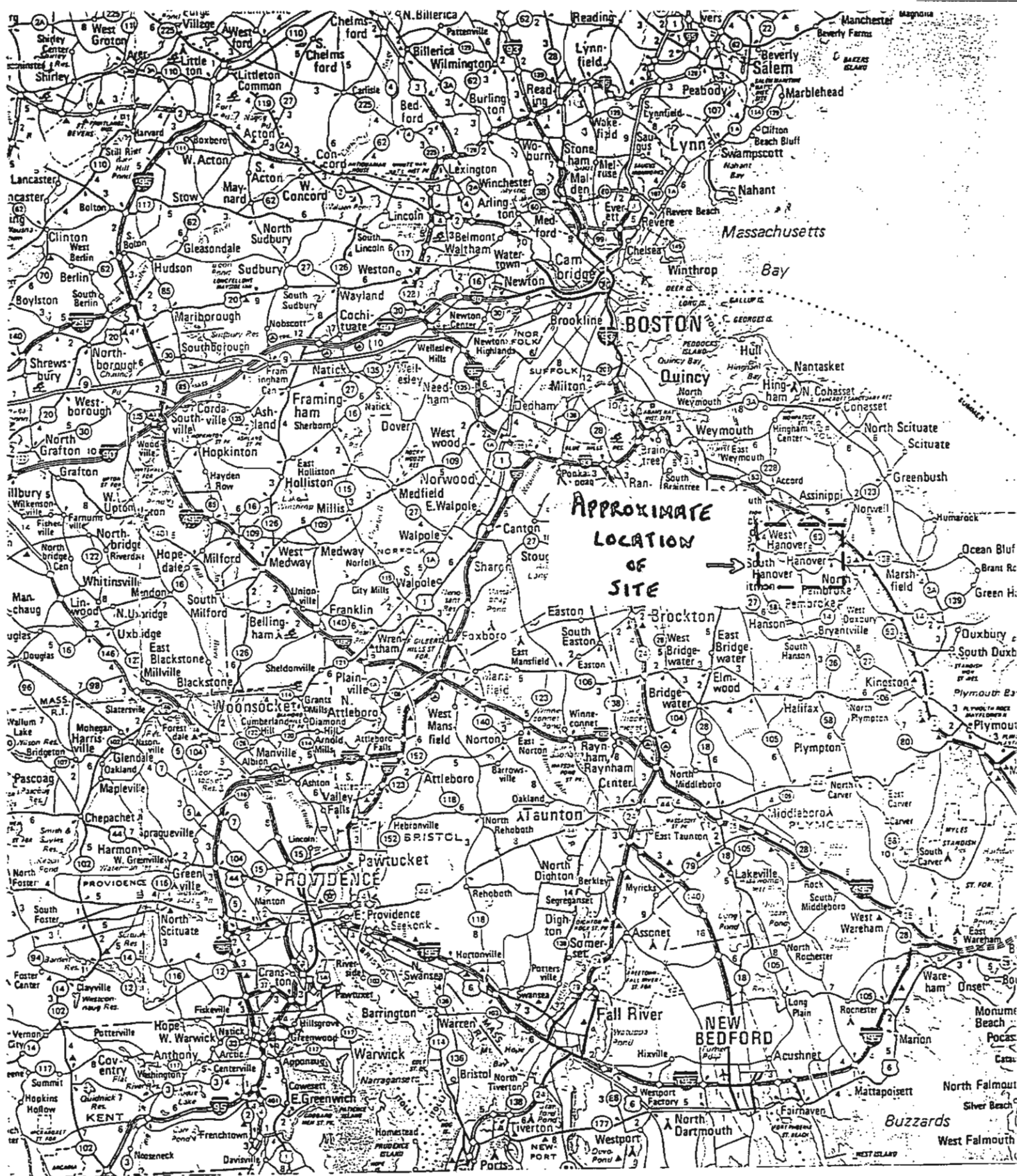
b. OEW. Explosives were produced at the site by a Government contractor between 1942 and the late 1960s. The munitions reportedly included 20mm shells, 20mm tracer ammunition, 60 mm illuminating rounds (M-112), various types of detonators, bouchon fuses for hand grenades, incendiary grenades, primers, igniters, rocket igniters, M1-A1 squibs, pop-up explosive charges for anti-personnel mines, "Gravel" non-metallic land mines, tetryl explosive pellets, MOX explosives, flame thrower cartridges, and illuminating

SITE NO. D01MA0489

flares. There is the potential that ordnance or explosive waste remains at the site. Also, dispenser cannisters for C-S gas reportedly were manufactured at the site. There is the potential that chemical surety material may be on the site.

**AVAILABLE STUDIES AND REPORTS:** Reports of EPA testing may be available from EPA; reports of Goldman Environmental Consultants, Inc. regarding the removal of drums and testing of soil and groundwater may be available from GEC or from Attorney Richard Hoffman.

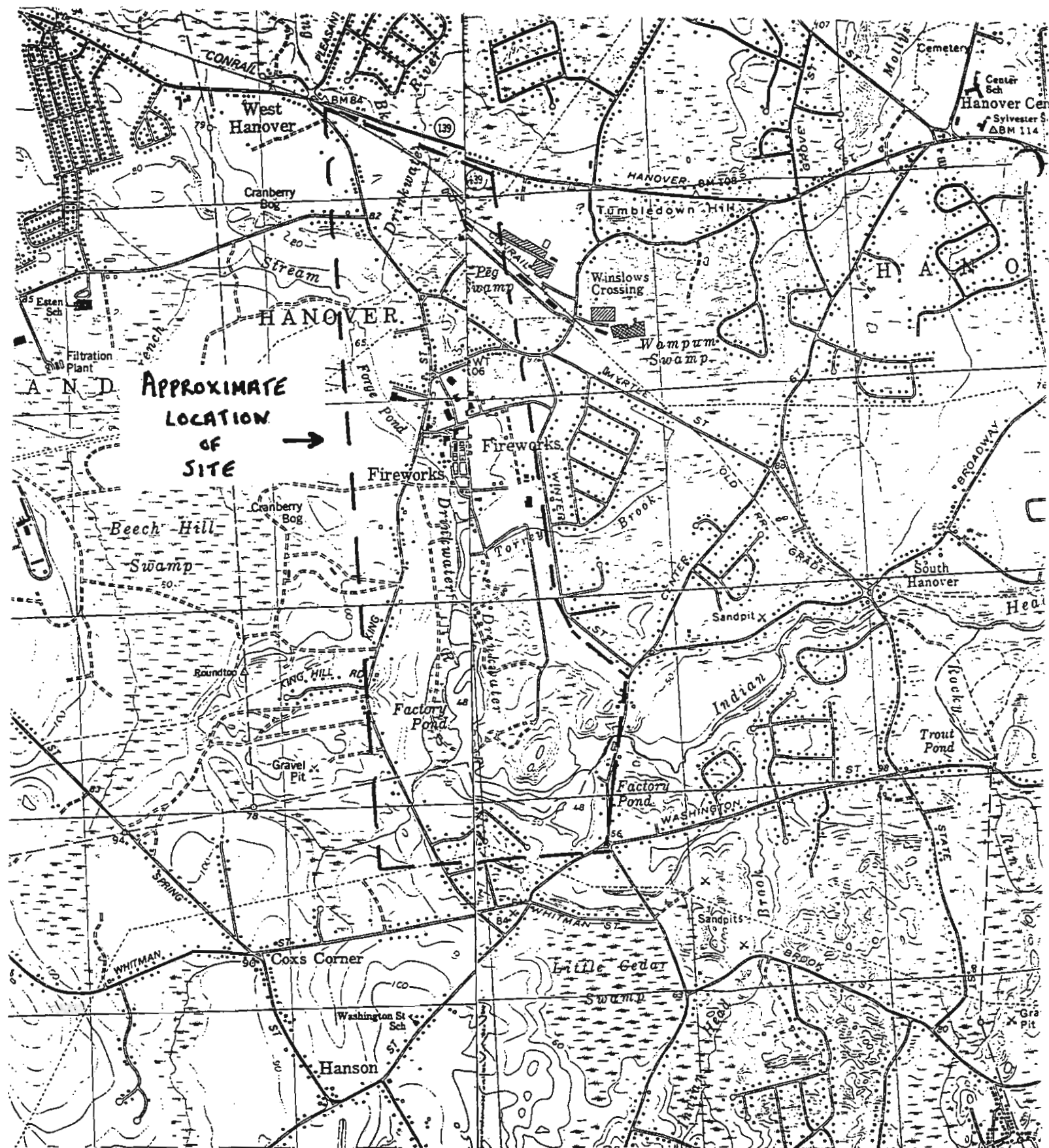
**DIVISION POC:** Maureen McCabe, CENED-RE-AM, 617-647-8269.



DEPARTMENT OF THE ARMY  
 New England Division  
 Corps of Engineers  
 Waltham, Massachusetts

DEFENSE ENVIRONMENTAL REGISTRATION PROGRAM  
 NATIONAL FIREWORKS SITE  
 HANOVER, MASSACHUSETTS  
 PAGE 1





SCALE: 1" = 25000 FT.

DEPARTMENT OF THE ARMY  
New England Division  
Corps of Engineers  
Waltham, Massachusetts

DEFENSE ENVIRONMENTAL RESTORATION PROGRAM  
NATIONAL FIREWORKS SITE  
HANOVER, MASSACHUSETTS

PAGE 2

DEFENSE ENVIRONMENTAL RESTORATION PROGRAM  
FORMERLY USED DEFENSE SITES  
FINDINGS AND DETERMINATION OF ELIGIBILITY  
DERP-FUDS SITE NO. D01MA0489  
PROPERTY OF SUSQUEHANNA CORPORATION  
(NATIONAL FIREWORKS SITE)  
HANOVER, MASSACHUSETTS  
12 MARCH 1992

FINDINGS OF FACT

1. The Department of Defense never owned any acreage at the site. By agreement dated 22 October 1942, the Navy contracted with National Fireworks, Inc. for the company to build facilities on a 22-acre portion of the approximately 200 acres of land owned by National Fireworks. The facilities were owned by the United States.
2. The National Fireworks site was a contractor owned, contractor operated facility (COCO). Certain facilities at the site were owned by the United States but used by National Fireworks in connection with the manufacture and production of ordnance. CENED does not know the number and type of facilities built on the property. Among the ordnance manufactured at the site between 1942 and 1970 were 20mm shells, 20mm tracer ammunition, 60 mm illuminating rounds (M-112), various types of detonators, bouchon fuses for hand grenades, incendiary grenades, primers, igniters, rocket igniters, M1-A1 squibs, pop-up explosive charges for anti-personnel mines, "Gravel" non-metallic land mines, dispenser cannisters for C-S gas, tetryl explosive pellets, MOX explosives, flame thrower cartridges, and illuminating flares. There is insufficient independent documentation for CENED to conclude that DOD "used" the site. According to affidavits (taken on behalf of Susquehanna Corporation) of two former private employees of the site, military and civilian inspectors and quality assurance personnel paid by DOD were at the site from the 1940s to 1970, and they oversaw and directed the disposal of waste material and rejected munitions. National Fireworks and its successors/assigns (American Potash & Company; Atlantic Research Corporation; Susquehanna Corporation) owned and apparently controlled the site. CENED-RE has seen no information indicating whether National Fireworks and its successors/assigns used the site to manufacture other materials, or munitions for other than DOD departments. According to one affidavit, from 1960 to 1970 practically the sole function of the plant was to manufacture munitions under contract or subcontract to the military. At times between 1942 and 1970, wastes from the

SITE NO. D01MA0489

Massachusetts Institute of Technology (MIT), Avco (parent company of Textron, Inc.) and Scoville, Inc. used the site to dispose of wastes. There is no evidence to suggest that these wastes were in any way connected to the military.


3. By agreement dated 19 August 1946, the Navy conveyed its facilities to National Fireworks. In the document, National Fireworks released and forever discharged the Government from all obligations with respect to the demolition and removal of facilities and the decontamination of all properties leased or used under the contract. The Government paid National Fireworks \$118,495.00 in consideration of this release.

#### DETERMINATION

Based on the foregoing findings of fact, facilities once existing at the site have been determined to be formerly owned by DOD. These facilities are therefore eligible for the Defense Environmental Restoration Program--Formerly Used Defense Sites established under 10 USC 2701 et seq.

At present, there is insufficient information to conclude that the lands at the site were formerly used by DOD. Therefore, at this time the lands are not eligible for consideration under the Defense Environmental Restoration Program--Formerly Used Defense Sites.

23 May 92  
Date

  
PHILIP R. HARRIS  
COL, EN  
Commanding



PROJECT SUMMARY SHEET  
FOR  
DERP-FUDS HTW PROJECT NO. D01MA048901  
PROPERTY OF SUSQUEHANNA CORPORATION  
(NATIONAL FIREWORKS SITE)  
HANOVER, MASSACHUSETTS  
SITE NO. D01MA0489  
12 MARCH 1992

**DESCRIPTION OF HTW HAZARD:** In March 1988, the Environmental Protection Agency (EPA) found trichlorethylene, benzene, toluene, and other hazardous substances at the site. There are three areas at the site. The first is the "Landers site", which contains empty drums; construction debris; and empty cans which once contained latex resin or paint waste. This area was used as a dump site for neoprene rubber squeak toys. The materials found were typically associated with rubber production. The second area is the "Factory Pond", which had a few drums floating on its surface. The Pond was used to detonate explosives. A target shooting range is in the vicinity of the Pond. The range contains a large quantity of plastic, colored shells and larger metal shells. It is adjacent to a marsh. There is also a waste burn pit in the Pond area. A third area is the "MIT Pit", which contained one barrel of trichlorethylene and has elevated levels of mercury.

In May 1988, EPA notified the current owners (the Town of Hanover and Drinkwater), one former owner (Susquehanna Corporation), and one entity that sent waste to the site (Massachusetts Institute of Technology) that they were considered Potentially Responsible Parties in connection with hazardous waste contamination at the site. In December 1988, EPA ordered Susquehanna to undertake a removal action of drums at different areas throughout the site. Susquehanna anticipates that a future remedial action will be needed at the site. Susquehanna has told the Army and Navy that it considers the United States to be an "operator" of the site and responsible under CERCLA (42 U.S.C. 9601, et. seq.) for at least a portion of the costs for drum removal and future site remediation.

**PROJECT ELIGIBILITY:** The site was contractor-owned, contractor-operated. At present there is insufficient evidence to conclude that DOD "used" or "operated" the site. Therefore, a project under DERP-FUDS is not eligible.

PROJECT NO. D01MA048901

**POLICY CONSIDERATIONS:** If sufficient evidence becomes available to conclude that this site was used by DOD and is eligible for DERP-FUDS, then consideration should be given to the following: (1) that the contractor/landowner shared in the operations of the site; (2) that although DOD may have directed where to dispose of rejected munitions, DOD did not necessarily direct where manufacturing waste products should be disposed; (3) that third parties (MIT, Avco, and Scoville, Inc.) sent wastes to the site; and (4) that the EPA did not name DOD as a PRP to the response action. Also, the contractor/landowner signed an agreement releasing the Government from obligations to decontaminate the properties used under the 1942 contract.

**PROPOSED PROJECT:** Recommend that this INPR be referred to CEMRD for an archival records search. If sufficient evidence becomes available to conclude that this site was used by DOD and is eligible for DERP-FUDS, recommend that CEMRD take further action with regard to potential HTW hazards at the site.

**DD FORM 1391:** Not applicable.

**EPA FORM 2070-12:** Not applicable.

**DIVISION POC:** Maureen McCabe, CENED-RE-AM, 617-647-8269.

PROJECT SUMMARY SHEET  
FOR  
DERP-FUDS OEW PROJECT NO. D01MA048902  
PROPERTY OF SUSQUEHANNA CORPORATION  
(NATIONAL FIREWORKS SITE)  
HANOVER, MASSACHUSETTS  
SITE NO. D01MA0489  
12 MARCH 1992

**DESCRIPTION OF OEW HAZARD:** Explosives were produced at the site by a Government contractor between 1942 and the late 1960s. The munitions reportedly included 20mm shells, 20mm tracer ammunition, 60 mm illuminating rounds (M-112), various types of detonators, bouchon fuses for hand grenades, incendiary grenades, primers, igniters, rocket igniters, M1-A1 squibs, pop-up explosive charges for anti-personnel mines, "Gravel" non-metallic land mines, tetryl explosive pellets, MOX explosives, flame thrower cartridges, and illuminating flares. A firing range is located on the site. There is the potential that ordnance or explosive waste remains at the site. (A metal container seen at the site in 1989 contains a label that reads something like "Z9MMA, TETRYL., 28 NW GUNS, Mk 2 MK4, BRMKH MK IV, SPBN--5629, LOT NO ZC 690, NEB 44. CODE, 121 LBS 1.3 CU FT LOADED 11/44". Another container says something like "100 CTGS, 20 MM AA, LOT NO. ZC-698NFB44, PROJ. NE\_, TETRY").

Also, dispenser cannisters for C-S gas reportedly were manufactured at the site. There is the potential that chemical surety material may be on the site.

**PROJECT ELIGIBILITY:** The site was contractor-owned, contractor-operated. At present there is insufficient evidence to conclude that DOD "used" or "operated" the site. Therefore, a project under DERP-FUDS is not eligible.

**POLICY CONSIDERATIONS:** If sufficient evidence becomes available to conclude that the land at this site was "used" by DOD between the 1940s and 1970 and is therefore eligible for DERP-FUDS, then consideration should be given to the following: (1) that the contractor/landowner shared in the operations of the site; and (2) that while the property has been under the ownership of the Town of Hanover, people have occasionally fired guns in the area. Also, the contractor/landowner signed an agreement releasing the Government from obligations to decontaminate the properties used under the 1942 facilities contract.

**PROPOSED PROJECT:** If sufficient evidence becomes available to conclude that this site was used by DOD and is eligible for DERP-FUDS, recommend that this INPR be referred to CEHND-PM-OT for further action.

PROJECT NO. D01MA048902

DD FORM 1391: Not applicable.

RAC: Not applicable.

DIVISION POC: Maureen McCabe, CENED-RE-AM, 617-647-8269.



DEPARTMENT OF THE ARMY  
U.S. Army Corps of Engineers  
WASHINGTON, D.C. 20314-1000

REPLY TO  
ATTENTION OF:

08 APR 1992

CEMP-RF (200-1a)

MEMORANDUM FOR

COMMANDER, NEW ENGLAND DIVISION, ATTN: CENED-ED-P (T. Riccio)

SUBJECT: DERP-FUDS Inventory Project Report (INPR) for Site No. D01MA0489, Property of Susquehanna Corporation (Former National Fireworks Site), Hanover, Massachusetts

1. Reference CEMED-RE-AM memorandum, 23 March 92, SAB.
2. This HQ does not concur in the recommendation made in the above referenced memorandum to have MRD conduct an archival records search at the subject site to better determine whether the land is eligible for DERP-FUDS. The INPR clearly indicates that the Department of Defense never owned any acreage at the site which was solely used as a contractor owned, contractor operated (COCO) facility. Additionally, the Findings of Fact states that there is insufficient information to conclude that the lands at the subject site were formerly used by DOD. Until independent documentation becomes available to provide credibility to the two affidavits taken on behalf of a former owner (Susquehanna Corporation) the INPR will be officially classified as requiring no further action (NOFA).
3. CEMP-RF POC for this action is J. R. Gibson, (202) 504-4709.

FOR THE DIRECTOR OF MILITARY PROGRAMS:

MICHAEL H. FELLOWS  
Colonel, Corps of Engineers  
Chief Environmental Restoration  
Division  
Directorate of Military Programs

CF:  
CEMRD-MD-HA  
CEHND-PM-EA



DEFENSE ENVIRONMENTAL RESTORATION PROGRAM  
FORMERLY USED DEFENSE SITES  
FINDINGS AND DETERMINATION OF ELIGIBILITY  
DERP-FUDS SITE NO. D01MA0489  
PROPERTY OF SUSQUEHANNA CORPORATION  
(NATIONAL FIREWORKS SITE)  
HANOVER, MASSACHUSETTS  
12 MARCH 1992

FINDINGS OF FACT

1. The Department of Defense never owned any acreage at the site. By agreement dated 22 October 1942, the Navy contracted with National Fireworks, Inc. for the company to build facilities on a 22-acre portion of the approximately 200 acres of land owned by National Fireworks. The facilities were owned by the United States.

2. The National Fireworks site was a contractor owned, contractor operated facility (COCO). Certain facilities at the site were owned by the United States but used by National Fireworks in connection with the manufacture and production of ordnance. CENED does not know the number and type of facilities built on the property. Among the ordnance manufactured at the site between 1942 and 1970 were 20mm shells, 20mm tracer ammunition, 60 mm illuminating rounds (M-112), various types of detonators, bouchon fuses for hand grenades, incendiary grenades, primers, igniters, rocket igniters, M1-A1 squibs, pop-up explosive charges for anti-personnel mines, "Gravel" non-metallic land mines, dispenser canisters for C-S gas, tetryl explosive pellets, MOX explosives, flame thrower cartridges, and illuminating flares. There is insufficient independent documentation for CENED to conclude that DOD "used" the site. According to affidavits (taken on behalf of Susquehanna Corporation) of two former private employees of the site, military and civilian inspectors and quality assurance personnel paid by DOD were at the site from the 1940s to 1970, and they oversaw and directed the disposal of waste material and rejected munitions. National Fireworks and its successors/assigns (American Potash & Company; Atlantic Research Corporation; Susquehanna Corporation) owned and apparently controlled the site. CENED-RE has seen no information indicating whether National Fireworks and its successors/assigns used the site to manufacture other materials, or munitions for other than DOD departments. According to one affidavit, from 1960 to 1970 practically the sole function of the plant was to manufacture munitions under contract or subcontract to the military. At times between 1942 and 1970, wastes from the

SITE NO. D01MA0489

Massachusetts Institute of Technology (MIT), Avco.(parent company of Textron, Inc.) and Scoville, Inc. used the site to dispose of wastes. There is no evidence to suggest that these wastes were in any way connected to the military.

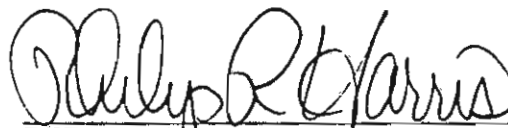
3. By agreement dated 19 August 1946, the Navy conveyed its facilities to National Fireworks. In the document, National Fireworks released and forever discharged the Government from all obligations with respect to the demolition and removal of facilities and the decontamination of all properties leased or used under the contract. The Government paid National Fireworks \$118,495.00 in consideration of this release.

#### DETERMINATION

Based on the foregoing findings of fact, facilities once existing at the site have been determined to be formerly owned by DOD. These facilities are therefore eligible for the Defense Environmental Restoration Program--Formerly Used Defense Sites established under 10 USC 2701 et seq.

At present, there is insufficient information to conclude that the lands at the site were formerly used by DOD. Therefore, at this time the lands are not eligible for consideration under the Defense Environmental Restoration Program--Formerly Used Defense Sites.

23 May 92  
Date

  
\_\_\_\_\_  
PHILIP R. HARRIS  
COL, EN  
Commanding

ORDNANCE AND EXPLOSIVE WASTE  
CHEMICAL WARFARE MATERIALS  
ARCHIVES SEARCH REPORT

NATIONAL FIREWORKS SITE

WEST HANOVER, MASSACHUSETTS  
PLYMOUTH COUNTY

DERP-FUDS NO. D01MA048900

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**ORDNANCE AND EXPLOSIVE WASTE  
CHEMICAL WARFARE MATERIALS  
ARCHIVES SEARCH REPORT**

**NATIONAL FIREWORKS SITE**

**WEST HANOVER, MASSACHUSETTS  
PLYMOUTH COUNTY**

**DERP-FUDS NO. D01MA048900**

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**MAPS**

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**ORDNANCE AND EXPLOSIVE WASTE  
CHEMICAL WARFARE MATERIALS  
ARCHIVES SEARCH REPORT**

**NATIONAL FIREWORKS SITE**

**WEST HANOVER, MASSACHUSETTS  
PLYMOUTH COUNTY**

**DERP-FUDS NO. D01MA048900**

**APPENDICES**

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## **1.0 Introduction**

### **1.1 Authority**

In 1980, Congress enacted the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) 42 USC 9601 et seq. Ordnance and explosive wastes are included in the CERCLA definition of pollutants and contaminants that require a remedial response.

In 1983, the Environmental Restoration Defense Account (ERDA) was established by Public Law 98-212. This Congressionally directed fund was to be used for environmental restoration at Department of Defense (DOD) active installations and formerly used properties. The DOD designated the Army as the sole manager for environmental restoration at closed installations and formerly used properties. The Secretary of the Army assigned this mission to the Corps of Engineers (USACE) in 1984.

The 1986 Superfund Amendments and Reauthorization Act (SARA) amended certain aspects of CERCLA, some of which directly related to OEW contamination. Chapter 160 of the SARA established the Defense Environmental Restoration Program (DERP). One of the goals specified for the DERP is "correction of environmental damage (such as detection and disposal of unexploded ordnance) which creates an imminent and substantial endangerment to the public health or welfare or to the environment."

The DERP requires that a CERCLA response action be undertaken whenever such "imminent and substantial endangerment" is found at:

- a. A facility or site that is owned by, leased to, or otherwise possessed by the United States and under the jurisdiction of the Secretary of Defense.
- b. A facility or site that was under the jurisdiction of the Secretary of Defense and owned by, leased to, or otherwise possessed by the United States at the time of actions leading to contamination.
- c. A vessel owned or operated by the Department of Defense.

The National Contingency Plan (NCP) was established by the Clean Water Act of 1972. The NCP has been revised and broadened several times since then. Its purpose is to provide the organizational structure and procedures for remedial actions to be taken in response to the presence of hazardous substances, pollutants, and contaminants at a site. Section 105 of the 1980 CERCLA states that the NCP shall apply to all response actions taken as a result of CERCLA requirements.

The March 1990 National Oil and Hazardous Substances Pollution Contingency Plan given in 40 CFR part 300 is the latest version of the NCP. Paragraph 300.120 states that "DOD will

be the removal response authority with respect to incidents involving DOD military weapons and munitions under the jurisdiction, custody, and control of DOD."

On April 5, 1990, U.S. Army Engineer Division, Huntsville (USAEDH) was designated as the USACE Mandatory Center of Expertise (MCX) and Design Center for Ordnance and Explosive Waste (OEW). As the MCX and Design Center for OEW, USAEDH is responsible for the design and successful implementation of all Department of the Army OEW remediations required by CERCLA. USAEDH will also design and implement OEW remediation programs for other branches of the Department of Defense when requested. In cooperation with the Huntsville Division the U.S. Army Corps of Engineers St. Louis District has been assigned the task of preparing Archives Search Reports for those Formerly Used Defense Sites (FUDS) suspected of chemical warfare materials (CWM) contamination.

## **1.2 Subject**

The former **National Fireworks Site (NFS)**, located near West Hanover, Massachusetts in Plymouth County, is a 200 acre tract bordering the Drinkwater River used by various companies to produce munitions for the U.S. Government.

## **1.3 Purpose**

This Archives Search Report (ASR) compiles information obtained through historical research at various archives and records holding facilities, interviews with individuals associated with the site or its operations, and personal visits to the site. All efforts were directed towards determining possible use or disposal of chemical warfare materials on the site. Particular emphasis was placed on establishing the chemical (agent), the type of munitions or container, quantities and area of disposal. Information obtained during this process was used in developing recommendations for further actions at the site.

## **1.4 Scope**

The entire area of the National Fireworks Site was considered in assessing the potential for chemical warfare material contamination.

## **2.0 Previous site investigations**

### **2.1 Inventory Project Report (INPR)**

The U.S. Army Corps of Engineers, New England Division (CENED), has prepared an Inventory Project Report (INPR), dated 23 March 1992, which questioned the eligibility of this property as a Formerly Used Defense Site (FUDS) under the Defense Environmental Restoration Program (DERP). The Navy had owned buildings on a portion of the tract, but these buildings were razed and removed from the site. The U.S. Government did not own or lease any of the land or other structures. The Government did provide quality assurance and production inspectors and some of the materials for the ordnance manufacturing done on the site.

A memorandum from the Headquarters, U.S. Army Corps of Engineers (HQUSACE) to CENED, dated 8 April 1992, indicated that the INPR will officially be classified as requiring no further action pending development of new information on the involvement of the U.S. Government with the site. A copy of the INPR and this memorandum are included in Appendix C-2.

### **2.2 Environmental assessment reports**

An environmental assessment of the property has been undertaken by the Goldman Environmental Consultants, Inc. for the Susquehanna Corporation, one of the former owners. The Environmental Protection Agency (EPA) ordered in 1988 that barrels on the property be removed and site stabilized. Documents relating to this remediation and detailing areas of contamination are included in Appendix C-3. Drawings in Appendix H-1 and H-2 show the disposal areas present on the site at the time of the Atlantic Research Corporation ownership.

No other engineering or environmental reports were found for this site.

### **3.0 Site and site area description**

#### **3.1 Location**

The National Fireworks Site - Hanover is located near the community of West Hanover, Massachusetts, approximately 20 miles southeast of Boston. Figure 3-1 shows the general location of the site and Figure 3-2 shows the vicinity around the site.

#### **3.2 Past uses**

Records indicate that site had been used for the manufacture of fireworks between 1907 and 1941. Ammunition production under contract with the U.S. Government began in 1941 and continued until 1970. Several different companies operated the facilities during this time period.

#### **3.3 Current uses of site**

The Town of Hanover currently owns about 130 acres of the site and uses it for a recreational area. The remaining 70 acres are owned by the Drinkwater Investment Company which has been developing an industrial park there. There are still several of the original ordnance production buildings on the site in addition to the new industrial facilities.

#### **3.4 Demographics**

##### **3.4.1 Centers of activity**

Centers of activity for the town of Hanover include Sylvester Field, John Curtis Library, and the Fourth Floor Group Theater.

##### **3.4.2 Population density**

The population statistics for the Town of Hanover and Plymouth County are as follows:

Town: Hanover	County: Plymouth
Area: 15.6 sq.mi.	Area: 660.6 sq.mi.
Population: 11,912	Population: 435,276
Density: 764 persons per sq. mi.	Density: 659 person per sq. mi.

Population and area are based on the U.S. Department of Commerce, Bureau of the Census, 1990 statistics, and telephone interviews.

#### 3.4.3 Types of business

A review of both telephone interviews and County Business Patterns (1990) assisted in developing a business profile of the area. The main types of business in the town of Hanover include retail outlets, service type businesses, and restaurants. Examples of these are Hanover Mall and Hearth Side restaurant.

#### 3.4.4 Types of industry

The town of Hanover is a bedroom community for surrounding cities. The main industries in the area are service and retailing.

#### 3.4.5 Types of housing

There are a total of 3,742 occupied housing units in the city of Hanover. Of these, 86.1% are owner occupied. Statistics for housing types are as follows: 86.8% are 1-unit detached, .7% are 1-unit attached, 5.2% are 2-4 units, .4% are 5-9 units, 6.1% are 10 or more units, and .8% are mobile homes and trailers. The median dollar housing value is \$195,100 in the city of Hanover.

#### 3.4.6 New development in the area

The Hanover Mall on Washington Street is currently being expanded. The town is asking for federal funding to restore the old manufacturing district in West Hanover. Small area businesses are also being renovated.

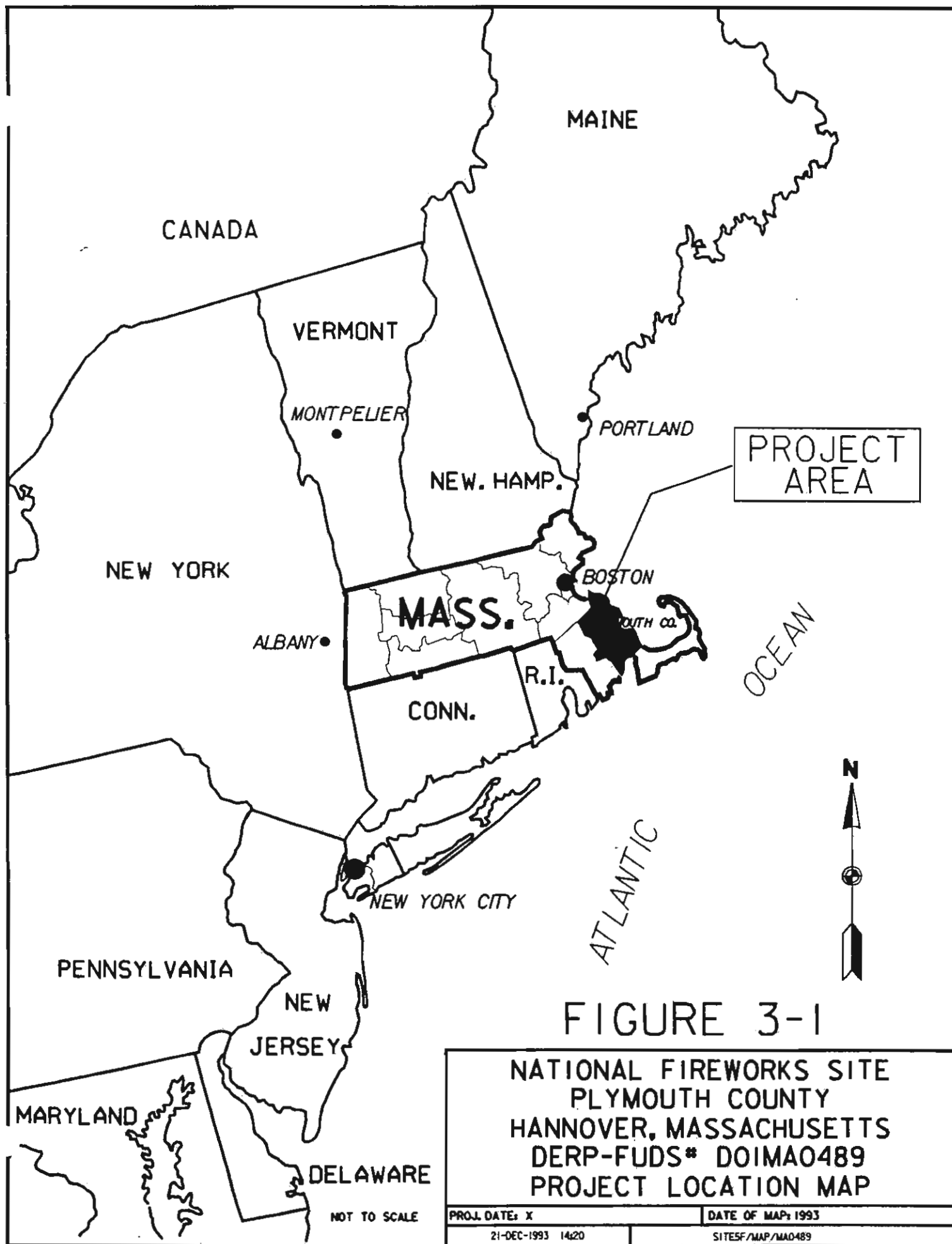
#### 3.4.7 Typical cross-section of the population

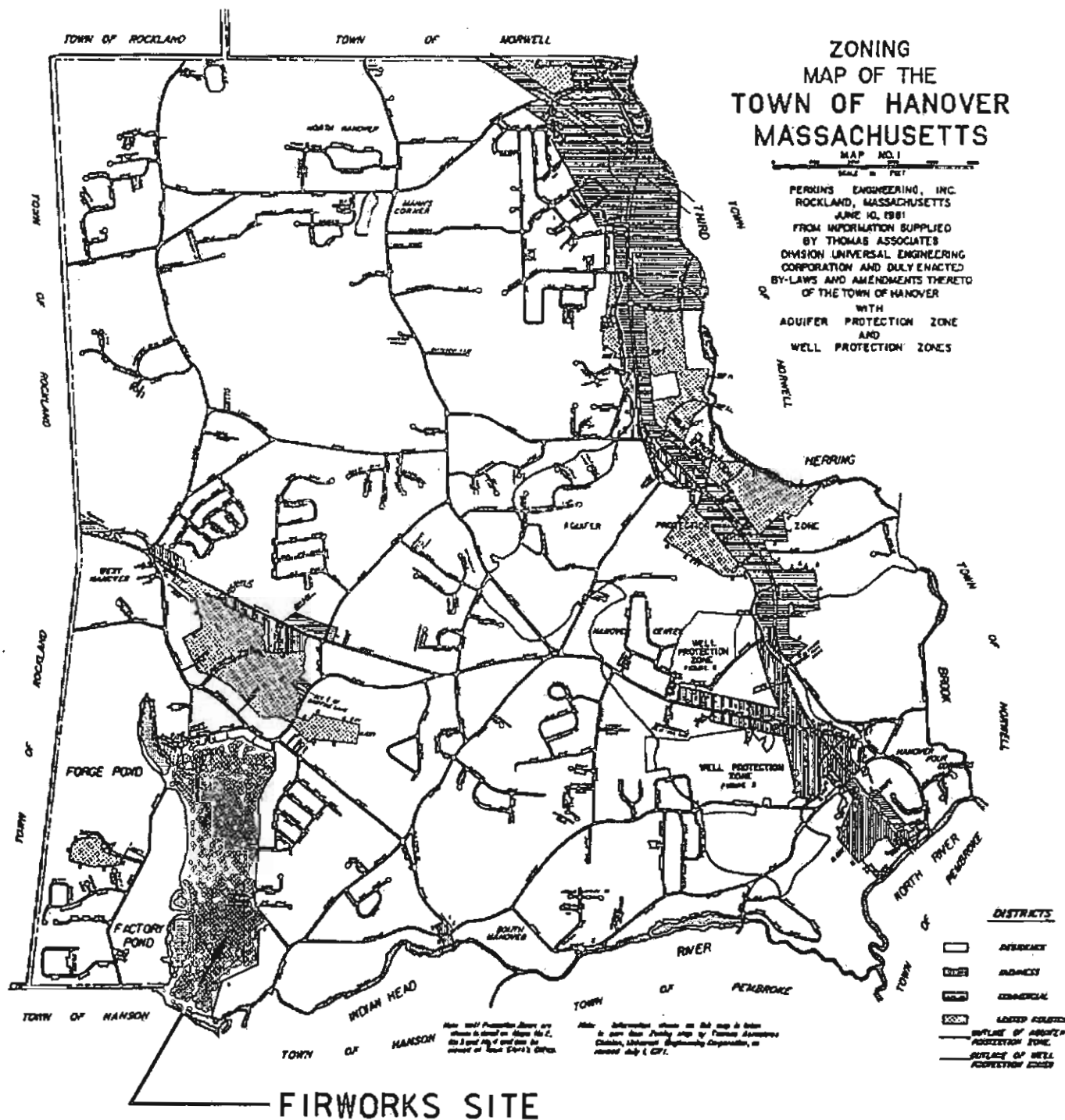
The percent of the total population under the age of 18 is 27.4%, between the ages 18-44 is 42.2%, between the ages 45-64 is 21.2% and over 65 years is 9.2%. The median age is 34.1.

#### 3.4.8 Information sources for demographics

Hanover City Hall: (617) 826-8865







# FIGURE 3-2

NATIONAL FIREWORKS SITE  
PLYMOUTH COUNTY  
HANOVER, MASSACHUSETTS  
DERP-FUDS® DOIMAO48900  
SITE VICINITY MAP

PROJ. DATE: JAN., 1994

DATE OF MAP: JUNE, 1981

24-JAN-1994 11:33

freeman/site51/map/firevic.dgn - firevic.dlt

## **4.0 Physical characteristics of the site**

### **4.1 Geology/physiography**

The National Fireworks site lies within the Seaboard Lowland Section of the New England physiographic province (Thornbury, 1965). This section is characterized by rounded hills and broad, poorly drained lowlands. The topography has been produced by the dissection of a plateau and the subsequent deposition of glacial drift over the surface. Downcutting by streams was interrupted early in Pleistocene time by the passage of ice sheets across the area. A variety of ice-contact landforms were formed, such as eskers, kames, and kame terraces and plains, drumlins, and with further melting, melt-water streams spread outwash across the bottoms of valleys. Preglacial valleys became partly or completely filled, and the relief of the area decreased. Another effect of glaciation was the derangement of the preglacial drainage pattern. The streams were diverted from one preglacial valley to another by ice dams or glacial drift. In Recent times, low terraces were formed along established, post-glacial streambeds.

The bedrock underlying the Pleistocene and Recent deposits consist of various igneous and metamorphic rocks which range in age from middle Paleozoic to Triassic. The bedrock is jointed and fractured, most joints are planar and are steeply inclined to vertical, some are curved, conforming roughly to the topography. These joints or fractures are spaced from a few inches to several tens of feet apart (Massachusetts Water Supply Paper 1669Y).

### **4.2 Soils**

The site surficial soils at the National Fireworks Site consist of droughty, level to steep gravelly soils that formed in thick deposits of water-sorted sand and gravel.

In wooded areas that were formerly cultivated, the organic litter is underlain by a gray mineral layer less than 1 inch thick. Below this to a depth of 6-9 inches is a brown gravelly silty clayey sand with some organics. It is underlain abruptly at a depth of 18 inches by sand, gravel, and cobblestones. About two-thirds of the substratum is composed of gravel and cobblestones. The surface layer is about 25 percent gravel, by volume.

This soil is low in moisture-holding capacity and low in organic matter content. It is very permeable with a vertical permeability of  $>6.3$  in/hr and has a low shrink-swell potential (Upham, 1969).

TABLE 4.1 NATIONAL FIREWORKS SITE NEAR-SURFACE SOIL PROFILE					
DEPTH (IN)	SOIL DESCRIPTION	PERCENTAGE PASSING SIEVE NUMBER			PERME- ABILITY (IN/HR)
		#4	#10	#200	
0-9	Gravelly, silty, clayey sand with organics (SM)	70-95	65-90	15-35	> 6.3
9-24	Very gravelly, coarse sand (SM,SP)	35-90	30-90	5-15	> 6.3
24-40	Sand, gravel, and cobblestones (SM,GP)	25-80	15-60	0-5	> 6.3
SOURCE: SCS SOIL SURVEY OF PLYMOUTH COUNTY, MA.					

### 4.3 Hydrology

#### 4.3.1 Groundwater

The groundwater in this area occurs in both the bedrock and in the unconsolidated deposits. In the unconsolidated deposits, depth to water is generally less than ten feet below land surface in areas underlain by outwash and alluvium, and less than 35 feet below surface in areas underlain by the ice-contact type deposits. The water table roughly parallels the topography.

Bedrock contains water chiefly in the openings along joints and fractures, and where wells reach water in bedrock, the water commonly rises and stands above the level where it was first struck. Water level data suggests that the piezometric surface of water in bedrock approximates the position of the water table in overlying unconsolidated deposits. The joints and fractures are not uniform or widespread and therefore, neither the depths nor yields can be accurately predicted. The bedrock acts as a barrier to groundwater and is one of the dominant factors controlling the occurrence of water in unconsolidated deposits.

The principal recharge areas are the outcrop areas of ice-contact deposits and outwash and alluvium. Where the water table is lowered by pumping, recharge from streamflow may take place. Under normal conditions, the groundwater is discharged into the streams, but when the streams are in flood, the natural gradients are reversed, and the streams supply water to the ground-water reservoir (Massachusetts Water Supply Paper 1669Y).

#### 4.3.2 Surface water

The study area which is located in the head water of the Indian Head River is in the northern part of Plymouth County, Massachusetts. The stream gage for the Indian Head River near Hanover, located about 2.5 miles downstream from the study area, has recorded a maximum discharge of 1390 cfs on 18 March 1968 with a stage of 10.3 ft-NGVD (1967-1987). The gaging station has a drainage area of 30.2 square miles. The river flows eastward into the North River which flows northward then eastward into the Atlantic Ocean. The study area can possibly be affected by surface stream on the site.

#### 4.4 Weather

The climate in the study area is characterized by moderately warm summers, moderately cold winters, and ample rainfalls. The ocean has a moderate influence on the climate. The data collected at Boston, Massachusetts for the period of 1962-1991 shows an average annual precipitation of 41.59 inches including 40.5 inches in snowfall. It is distributed evenly throughout the year. The greatest rainfall recorded in a 24 hour period is 8.40 inches. Average annual temperature for the area is about 51°F. The extremes vary from 102°F to -12°F. A wind speed of 30 mph or higher may be expected every month of the year and gales are common and severe in the winter. Summarized climatic and wind data for Boston about 16 air miles north of the study area, are shown in the following tables:

CLIMATOLOGICAL DATA FOR BOSTON

MONTH	TEMPERATURE (°F)					PRECIPITATION (INCHES)				
	HIGH	LOW	RECORD MAX	MIN	MONTHLY MEAN	MIN	MAX	MONTHLY MEAN		
JAN	63	-12	36	3	21	3	28	8	61	10 55
FEB	70	-4	37	1	21	8	29	4	72	7 81
MAR	81	6	44	7	29	7	37	2	62	11 00
APR	94	16	55	2	39	1	47	2	1 24	9 46
MAY	95	34	66	5	49	3	57	9	53	13 38
JUN	100	45	75	8	58	3	67	1	48	13 20
JUL	102	50	81	1	64	0	72	7	52	8 12
AUG	102	47	78	9	62	9	70	9	83	17 09
SEP	100	38	72	1	56	1	64	1	35	8 31
OCT	90	28	62	0	46	2	54	1	96	8 68
NOV	78	15	50	8	36	5	43	7	64	8 89
DEC	73	-7	39	8	25	7	32	8	81	9 74
YEAR	102	-12	58	3	42	6	50	5	35	17 09
YEARS OF RECORD	40	40	40	40	40	40	40	40	40	40

# WIND DATA FOR BOSTON, MA.

MONTH	PREVAILING DIRECTION	WIND SPEED (MPH)	
		MEAN	PEAK GUST
JAN	NW	8.9	51 (NW)
FEB	WNW	9.6	58 (NW)
MAR	NW	9.9	63 (NE)
APR	WNW	9.3	55 (NE)
MAY	SW	8.8	52 (S)
JUN	SW	8.0	68 (W)
JUL	SW	7.4	54 (NW)
AUG	SW	7.2	64 (NW)
SEP	SW	7.7	76 (S)
OCT	SW	8.6	55 (NE)
NOV	SW	8.5	55 (NW)
DEC	WNW	8.6	66 (W)
ANNUAL	SW	12.5	76 (S)
YEARS OF RECORD		34	8

## 4.5 Ecology

The information provided for this site has been compiled from the U. S. Fish and Wildlife Service and the Commonwealth of the Massachusetts Division of Fisheries and Wildlife.

The U.S. Fish and Wildlife Service lists the Plymouth red-bellied turtle (Pseudemys rubriventris bangsi) and piping plover (Charadrius melodus) endangered and threatened, respectively in Plymouth County.

State protected species and habitats for the Hanover area include: Estuary beggar-ticks (Bidens hyperborea var. colpophila), estuary pipewort (Eriocaulon parkeri), river arrowhead (Sagittaria subulata var. subulata), four-toed salamander (Hemidactylium scutatum), Eastern pondmussel (Ligumia nasuta), and Gulf of Maine freshwater tidal marsh.

No additional information on the occurrence of rare or endangered species or natural communities is known at this time. This does not mean that other State or Federally-listed species may not be present within the areas of interest. An on site inspection by appropriate state and federal personnel may be necessary to verify the presence, absence or location of listed species, or natural communities if remedial action is recommended as part of the final ASR.

## **5.0 Real estate**

### **5.1 DOD ownership**

The U.S. Government has not ever owned or leased any portion of the 200 acres which comprise the National Fireworks Site at West Hanover. In 1942 the U.S. Navy contracted with National Fireworks, Inc. to build facilities on private property of National Fireworks. The facilities were owned by the United States but used by National Fireworks in connection with the manufacture and production of government ordnance. The number and type of facilities built on the property are not known. In 1946, the Navy conveyed the structures to National Fireworks, Inc.

### **5.2 Significant past ownership**

National Fireworks ceased munitions manufacturing operations in 1947. Sometime after that, the site was purchased by American Potash and Company and later by the Atlantic Research Corporation. Atlantic Research was a government contractor producing various explosives for the U.S. Army and Navy. The drawings in Appendix H show the structures on the property during the Atlantic Research ownership. Other companies and entities disposed of hazardous wastes on the site during the time that Atlantic Research operated the facility. The Atlantic Research Corporation was merged into the Susquehanna Corporation in October 1967. Atlantic Research operating as a subsidiary of Susquehanna continued to manufacture munitions there until the late 1960's. The Town of Hanover purchased approximately 130 acres in 1972, mostly around the Factory Pond. Susquehanna sold the remaining portion of the property to the Drinkwater Investment Company in May 1983.

### **5.3 Present ownership**

The current owners of the land are the Town of Hanover, Massachusetts and the Drinkwater Investment Corporation. The Town of Hanover Conservation Commission controls about 130 acres for use as a recreation area, this includes land and bodies of water. Drinkwater is developing the other 70 acres as an industrial area. Map M-1 shows the approximate property limits of the National Fireworks Site and the present subdivision of the property.

## **6.0 OEW/CWM site analysis**

### **6.1 Historical summary of OEW/CWM activities**

#### **6.1.1 Dates of operation**

The earliest mention of National Fireworks, Inc. was in 1907 when they began producing pyrotechnics. During World War I National Fireworks, located in West Hanover, Massachusetts, handled explosives. It is not known the exact types of explosives or the quantities used. During 1941, the U.S. Government contracted with National Fireworks for the production and loading of several types of ordnance items.

National Fireworks loaded or manufactured numerous types of munitions during World War II. Several government contractors delivered bomb bodies to the National Fireworks to be loaded and then shipped. National Fireworks was a subcontractor to the Casco Products Corporation located in Bridgeport, Connecticut, which loaded and tested the 4.2" mortar fuzes. The following list states other types of munitions or explosives which National Fireworks dealt with or manufactured.

- M2 Fuze filled with white phosphorous (WP)
- M3 Fuze filled with high explosives (HE)
- M50 Magnesium Bombs
- M-50X Incendiary Bombs
- T2 Adapters
- M50XA3 to load
- M10A1 Clusters to load
- M50A1 Packed without bursters
- M1 100-lb. loaded clusters
- Grenades
- M29 Bomb Bursters
- Tetryl Pellets
- 37 mm Shells
- 155 mm Shell Noses

All of the different types of munitions manufactured or loaded were tested, some on the site, some at Edgewood Arsenal, Maryland, or at Pine Bluff Arsenal, Arkansas (Monograph, n.d.). Historical photographs of the 155 mm shell production at the National Fireworks are included in Appendix D.

Two of the main CWS items loaded at National Fireworks were the M-2 and M-3 mortar round fuzes. Due to continuing delays and lack of production the Boston Procurement District sought to terminate the National Fireworks contract for these items. Total production reached by the end of September 1944, when the contract was cancelled, were 387,340 M-2 and 86,680 M3 fuzes loaded. However shortly after this, increased production requirements at other ordnance plants necessitated National Fireworks continuing on the fuze program. In



December 1944, problems were experienced with the 4.2" fuze because of premature firing. National Fireworks was not following the established CWS crimping procedure and was required to change its methods to coincide with other fuze manufacturers. Technical support was provided by Edgewood Arsenal to check the revised procedures. Additional difficulty was experienced in staking the detonator into the fuzes. Other manufacturers besides National Fireworks had used the staking method. The staking created a burr which might have caused some of the premature firing. In the latter part of December 1944, all 4.2" fuzes with detonators staked in place were impounded. This amounted to almost 1 million fuzes. National Fireworks was selected as one of the facilities to re-work these defective items. The critical material situation existing at that time required a careful operation to salvage as much of the materials as possible (Boston CW Procurement District History, volume 8).

Another CWS item produced in considerable quantity at National Fireworks was the M-50 incendiary bomb. Production began in 1942 and continued through the middle of 1944. During the last part of 1943 this work was being carried out on a 7 day a week schedule. The bomb production program was affected by work slowdowns and technical delays. Some 285 people were working on the M-50 program at the close. Historical photographs of the M-50 program are included in Appendix D.

National Fireworks had many fires and explosions during the plant's history and several of the employees were injured or killed during the manufacturing processes of the various munitions. Several buildings were demolished, or had to be, due to the incidents.

In 1947, National Fireworks ended production of munitions and disposed some of the waste products from the site. In the demolition area, also known as the test range, waste products were burned although it is not known what types. The Goldman Environmental Report states that Magnesium Flares and 20mm shells were tested in this location during World War II, however, other munitions may also have been tested in this area.

After production ended, the American Potash & Company purchased National Fireworks and then was subsequently purchased by Atlantic Research Corporation shortly thereafter. The Atlantic Research Corporation acquired a government contract in which they developed and manufactured land mines, lead azide, RDX (cyclonite), and TNT (trinitrotoluene)-based materials for the Army and Navy (Goldman Report, 1988).

According to two affidavits (Appendix C-4) obtained from the law firm of Hale and Dorr, additional munitions were produced at the National Fireworks Plant. Contracts were held with the U.S. Military (Air Force, Army, Navy, and Chemical Corps) throughout its history for the manufacture of munitions. The following list details the variety of munitions produced according to employees of the former National Fireworks.

- 20 mm Shells
- 20 mm Tracer Ammunition
- 60 mm illuminating round (M-112)

- Various detonators
- Bouchon fuses for hand grenades
- Incendiary grenades
- Primers
- Igniters
- Rocket igniters
- M1-A1 squibs
- Pop-up explosive charges for anti-personnel mines
- "Gravel" non-metallic land mines
- Dispenser canister for C-S gas
- Tetryl explosive pellets
- MOX explosives
- Flame thrower cartridges

(Affidavit, 1989)

During the ownership by the Atlantic Research Corporation, the Massachusetts Institute of Technology (MIT) arranged to dispose of hazardous waste materials on the site. These wastes included drums of trichloroethylene, toluene, xylene, and benzene, and other hazardous materials (Goldman Report, 1988). It is suspected that other groups disposed of hazardous materials on the site as well. The Historical Map, Appendix H-1 shows the facilities and disposal areas known at the time of the Atlantic Research Corporation ownership.

In 1967, the Atlantic Research Corporation merged with the Susquehanna Corporation based in Delaware. Munitions production continued under the subsidiary Atlantic Research until the end of the 1960s.

The town of Hanover purchased 130 acres of the former National Fireworks site in December 1972. In May of 1983, Drinkwater Corporation bought the remaining land interests held by the Susquehanna Corporation.

#### 6.1.2 Use of CWM materials

The Chemical Warfare Service held contracts with National Fireworks Company during World War II. These contracts were for incendiary munitions or fuzes. According to affidavits from former employees at the site tear gas (CS) canisters were manufactured there. There was no documentation found stating that CW agents were stored or used to fill munitions at the National Fireworks site.

The Technical Escort Unit (TEU) made approximately 115 trips to the Atlantic Research Corporation, Flare Northern Company located at the National Fireworks Site during the period of 19 April 1966 through 4 September 1968. About 10 of these trips involved bringing items to the site, the remainder involved shipments from the National Fireworks Site. Items were brought to the site for reloading before shipment to the final destination.

The listing below shows the various types of ordnance and munitions that the TEU picked up at the National Fireworks Site.

XM 2	BB Project 972
XM 22 E2	Micro-gravel
XM 24	Micro-G
SM 27	Micro-G Dig-3
XM 27 E14	"G" Mix
XM 27 E16	Micro mines
XM 27 E47	HE
XM 27 E49	CDU 4/B
XM 40	CDU 4/13
XM 40 E5	CDU 5/B
XM 41 (mines)	CDU 10B canisters
XM 41 in XM 145 ES can	MS
XM 41 E1 (aerial mines)	MS-4
XM 42	Canisters
XM 42 E1	
XM 42 E2	
XM 45	
XM 45 E1	
XM 47 (mines)	
XM 47 (reload kits)	
XM 47 (mine disp. kit)	
XX 47 (mine disp. kit)	
XM 48	
XM 51	
XM 54 (anti-intrusion mines)	
XM 65 (mines)	
XM 145 E1	
XM 145 E5 (containers)	
XM 145 ES	
XM 551	

There was no indications in the records that any materials were disposed of by the TEU at the National Fireworks Site. The TEU escorted the above items to various parts of the United States and outside the country.

#### 6.1.3 Use of conventional munitions

The National Fireworks Company loaded and manufactured a large variety of munitions throughout its history. The first list (from historical sources) provided in the historical overview section is inclusive for the World War II era only. The second list in that same section was developed from affidavits of employees for the World War II period through

1970. National Fireworks manufactured explosives and munitions under several different ownerships.

#### 6.1.4 Previous site investigations

An affidavit obtained by the Susquehanna Corporation indicates that Army personnel from Fort Devens might have undertaken ordnance disposal work on the site in 1970. This possible clean-up could not be confirmed by the Explosive Ordnance Disposal (EOD) unit stationed there because of the limited time that they maintain records.

In 1983 the EPA became interested in the site because of concern expressed by the Hanover Conservation Commission. A site assessment was conducted and hazardous materials were located on the site. In January 1988, the EPA's Oil and Hazardous Materials Section conducted a site visit. Many 55-gallon drums were discovered on the site. In March 1988, water samples were taken, analyzed, and the results stated that there was contamination present and the land owners were notified of the findings. The historical maps, Appendix H-2, developed in conjunction with the Goldman report, shows the locations of the barrels on the Atlantic Research property map.

A remedial action was conducted and numerous drums were removed from the site. Details of the remedial action are included in the documents in Appendix C-3.

#### **6.2 Records review**

**National Military Personnel Records Center  
Military Records  
9700 Page Avenue  
St. Louis, MO 63132**

The master accession list was reviewed but no information was located on the National Fireworks site.

**State Library of Massachusetts  
341 State House, Beacon Street  
Boston, MA 02133**

The state library did not have any information on the National Fireworks site.

**National Archives and Records Administration  
Still Pictures Branch  
8th and Pennsylvania  
Washington, D.C. 20408**

**Hanover Historical Society  
PO Box 156  
Hanover, MA 02339**

The historical society sent a brief background historical summary of the National Fireworks site.

**Corps of Engineers-New England Division  
424 Trapelo Road  
Waltham, MA 02254-9149**

Pertinent documents obtained from this office are listed below.

Author unknown

1942 Drawing "General Plan of National Fireworks Siding Area, West Hanover, Massachusetts." January 30.

Author unknown

1967 Drawing "Flare - Northern Division of the Atlantic Research Corporation, West Hanover, Massachusetts; site name, Main Plant - West Hanover."

Author unknown

1989 Report on National Fireworks Superfund Site - Hanover, Massachusetts, Meeting of PRP's at Hale and Dorr. March 10.

McCabe, Maureen A.

1989 "Memorandum for the Record, Former National Fireworks Site, Hanover, Massachusetts." March 10.

Johnson, Richard A.

1989 Letter from Hale and Dorr, Counsellors at Law, re: National Fireworks Site, Hanover, Massachusetts to USACE, New England Division." April 6.

Bogaczyk, Richard T.

1989 Letter from USACE, New England Division, Real Estate Division to U.S. Attorney, Boston, Massachusetts, re: DERP--National Fireworks Site, Hanover, Massachusetts. July 14.

1989 Letter same as above. July 21.

McCabe, Maureen A.

1989 Working papers written in anticipation of litigation, per conversation with U.S. Attorney George Henderson. ca. August 8.

Johnson, Richard A.

1989 Letter from Hale and Dorr, Counsellors at Law, to George B. Henderson II, Assistant U.S. Attorney, Boston, Massachusetts, re: National Fireworks Site, Hanover, Massachusetts. This letter includes affidavits from three former employees at the site. November 21.

Henderson, George B. II

1989 Letter from U.S. Attorney, Boston, Massachusetts to USACE, NED, re: National Fireworks Site. December 21.

Brown, William D., Jr.

1990 Memorandum for Commander, USACE Huntsville Division from USACE New England Division, Real Estate Division, DERP National Fireworks Site, No.D01MA048900. January 5.

McCabe Maureen A.

1992 Conversation Records, DERP-FUDS, National Fireworks Site, March 11-13.

McCabe, Maureen A.

1992 Memorandum for the Record, DERP-FUDS-National Fireworks Site, Hanover, Massachusetts. March 18

Harris, Col. Philip R.

1992 DERP-FUDS Inventory Project Report (INPR) for Site No. D01MA0489, Property of Susquehanna Corporation (Former National Fireworks Site), Hanover, Massachusetts. March 23.

Fellows, Col. Michael H.

1992 Memorandum for Commander, USACE New England Division, DERP-FUDS INPR for Site No. D01MA0489, Property of Susquehanna Corporation (Former National Fireworks Site), Hanover, Massachusetts. April 8.

Author unknown

n.d. Legal description of property used for Navy buildings at National Fireworks Site.

Author unknown

1942 "General Plan of National Fireworks Siding Area, West Hanover, Massachusetts." January 30.

**Chemical and Biological Defense Agency Historical Office  
AMSCB-CIH  
Aberdeen Proving Ground, MD 21010**

In the Institutional Historical Files of the Boston CW Procurement District information was obtained detailing the National Fireworks site.

"Monographs of Incendiary Bomb Production"

Technical Escort Unit Trip Report Files

**National Archives and Records Administration  
Suitland Branch  
4205 Suitland Road  
Suitland, MD**

Several record groups were reviewed but no pertinent information was obtained. The following list includes record groups reviewed.

**RG 77 Records of the Chief of Engineers**

Entry 391 - Construction Completion Reports  
Entry 58A1076 - Real Estate Files

**RG 92 Records of the Quartermaster**

Entry 1891 - Geographic File  
Entry 1974 - Construction Completion Reports  
Entry 1975 - Construction Completion Reports  
Entry 1998 - Real Estate Records

**RG 112 Records of the Surgeon General**

Entry 31 - Geographic Series  
Entry 32 - Geographic Series

**RG 156 Records of the Chief of Ordnance**

Entry 41 - Correspondence Relating to Inspections  
Entry 44 - Reports Relating to Operations  
Entry 646 - Histories of Ordnance Installations  
Entry 775 - Records Relating to Government-Owned, Contractor-Operated Facilities  
Entry 776 - Records Relating to Government-Owned, Government-Operated Facilities  
Entry 794 - Facilities Relating to Expansion  
Entry 948 - Histories Concerning the Office of the Chief of Ordnance  
Entry 1051 - Reports and Blueprints Relating to Manufacturing

7

Entry 794 - Facilities Relating to Expansion  
Entry 948 - Histories Concerning the Office of the Chief of Ordnance  
Entry 1051 - Reports and Blueprints Relating to Manufacturing

**RG 159 Records of the Inspector General**

Entry 11 - Annual Inspections  
Entry 26E - General Correspondence from Government Owned Installations

**RG 175 Records of the Chemical Warfare Service**

Entry 2 - Index Briefs to CWS Correspondence  
Entry 67A4900 - Station Files

**Fort McClellan  
Fisher Library  
Anniston, AL**

Records were reviewed at Fisher Library but no pertinent information was located on the National Fireworks.

**6.3 Summary of interviews**

**6.3.1 Officer Roach**

Hanover Police Department  
617-826-3812

Officer Roach, who has been with the department for a considerable time, indicated that there have been no reports of any munitions or ordnance being found at the National Fireworks Site. The usual procedure in the area is for the local police department to take the bomb calls and pass it on to the state police.

**6.4 Site inspection**

SLD personnel performed a cursory inspection of the National Fireworks Site for any evidence of OEW or chemical warfare materials on 6 and 7 December 1993. The Site Safety Plan is included in Appendix C-1. The inspection was confined to the areas along the public roadways around the perimeter of the site and the two new roads that have been constructed in the industrial areas of the property. Both of the new roads go through areas that were used for manufacturing and storage during period when Chemical Warfare Service munitions were being produced at the facility. Photographs taken during the site inspection are included in Appendix G. Several of the buildings used during World War II are still present on the site and are shown in Appendix G. New businesses in the area are characterized by modern buildings and neat storage yards. Older establishments seem to be surrounded by materials of questionable worth. No OEW or CWM were noted or found.



## 6.5 Air photo interpretation and map analysis

### 6.5.1 Parameters

Photo analysis and land use interpretation was performed at the site with the use of aerial photography from 1960, 1963, and 1974. The Hanover, Massachusetts 1978 and Whitman, Massachusetts 1977 quadrangle maps were used as reference for the photography. The approximate negative scale of the photography is as follows:

<u>Photography Date</u>	<u>Scale</u>	<u>Source</u>	<u>Identifier(s) Frame(s)</u>
4 Dec 1960	1" = 2,000'	EROS	5-03 thru 5-05 5-33 thru 5-35
29 Mar 1963	1" = 1,500'	INTERA	1244 73 2708 & 1244 73 2709
27 Feb 1974	1" = 2,000'	EROS	2-27 & 2-28 6-164 & 6-165

### 6.5.2 Air photo interpretation

6.5.2.1 The 1960 aerial photography shows no indication of military activities. The main building complex area is in the northern end of the site. Outside or small building storage areas are visible to the east of the building complex along a small stream that meanders through the site. The southern portion of the site is primarily wooded east of the ponded areas on the main tributary. Several roads/trails traverse the wooded area and excavated areas along the roads/trails can be seen on the photographs.

6.5.2.2 The 1963 aerial photography shows little change in the building complex and storage areas. The excavated areas in the wooded area on the site appear to be more numerous and larger in extent when compared to the 1960 photos.

6.5.2.3 The 1974 aerial photography shows the excavated areas in the wooded area to be even more extensive in some locations than was indicated on the 1963 photos. No direct implication can be made in regards to the manufacturing, storage, or disposal of chemical warfare materials or ordnance. However, the possibility of numerous storage and disposal areas exists throughout the site.

### 6.5.3 Map analysis

6.5.3.1 The site was analyzed by referencing the following USGS 7.5 minute quadrangle maps:

Hanover, Mass.	1935
Hanover, Mass.	1948
Hanover, Mass.	1962
Hanover, Mass.	1978
Whitman, Mass.	1935/36
Whitman, Mass.	1948
Whitman, Mass.	1962
Whitman, Mass.	1977

The site is located at 42 degrees 7 minutes North and 70 degrees 52 minutes 30 seconds West.

6.5.3.2 National Fireworks, Inc. is labeled on the 1935-36 quadrangle maps listed above and is labeled as Fireworks on the later quadrangle maps. The site is elongated north-south along the eastern bank of the Drinkwater Creek. The river has been dammed in several areas to form ponds along the western and southern boundaries of the site boundary. The southern and southwestern ponded areas are labeled as 'Factory Pond' on all the quadrangles. The area is low in elevation with about 20-40 feet of relief. Marshy areas are indicated along both sides of the river throughout the site. Clark landing field is to the east of the site and is labeled as Clark Airport on the 1948 quadrangle. The Clark Airport has become a new housing area on the 1962 quadrangle. No evidence of the airport exists on the 1962 quadrangle.

6.5.3.3 The building complex area on the site is consistent between the 1935/36 and 1948 quadrangle maps. The roads appear to be unimproved in 1935 and improved on the 1948 quadrangle. There are less buildings on the 1962 quadrangle but the roads throughout the area appear to be identical. There are even fewer buildings shown standing on the 1977/78 quadrangle maps. The primary roads are still in place and several have been extended and connected to other roads.

6.5.3.4 The entire area surrounding the site contains marshy areas. As indicated from the 1935 through 1978 quadrangles, there is a continual progression, throughout the area surrounding the site, of swampland being converted to residential subdivisions. No evidence of chemical warfare material or ordnance storage or disposal is indicated by the quadrangle maps.

6.5.3.5 An additional plan map of the site was reviewed for this analysis. The title block gives the following information: the company, Flare - Northern Division of the Atlantic Research Corporation, West Hanover, Massachusetts; site name, Main Plant - West

Hanover. The date appears to be in 1967. This plan map shows storage areas and pits, a magazine facility and area, buried radioactive waste area (in the magazine area), waste dumps, and a demolition area located in the wooded portion of the site (southern half of the site area - south of Torrey Brook). The plan has been further marked by showing the locations of drums that were stored/buried on the site. No indication of drum contents is shown. Buildings throughout the main complex and remainder of the site are numbered on this plan but there is no accompanying index.

## **7.0 Evaluation of contamination**

### **7.1 Ordnance and munitions contamination**

Historical documents indicate that the Chemical Warfare Service had inspectors at the National Fireworks site to monitor production of various munitions including the M-50 incendiary bomb, the M-2 and M-3 fuzes for the 4.2" white phosphorous and HE mortar rounds, bomb bursters, tetryl pellets, and 37 mm and 155 mm shells.

Affadavits obtained by the law firm of Hale and Dorr indicate that materials were destroyed on the site, generally by burning or detonation. Materials were disposed of both on the land and in the surrounding ponds. Incomplete destruction necessitated that a second charge be used even for the disposals in the pond areas. Historical drawings showing the facilities and locations of contaminated areas are included in Appendix H. Air photo interpretation indicates that considerable ground disruption activity took place between the 1963 and the 1974 air photos.

Additionally during the Vietnam era, the Technical Escort Unit from the Edgewood Arsenal made at least 115 trips to the National Fireworks Site for transporting various aerial and anti-intrusive mines. There is no mention made in the reports of these trips that there were any incidents which would have required disposal of materials at the site.

### **7.2 Other contamination**

The site has been used for various other types of manufacturing and for disposal of chemical compounds. The Goldman report included in Appendix C-3 addresses some of the known contaminants. The historical maps in Appendix H show one area as possibly contaminated with radioactive materials.

## **8.0 Conclusions and recommendations**

### **8.1 Conclusions**

#### **8.1.1 CWM contamination**

Based on the archives search it does not appear that any chemical warfare agents were used at the National Fireworks site. The Chemical Warfare Service was involved with the site but only through incendiary, fuze, and explosive mine devices. Wastes from the manufacturing operations for these items may have been destroyed on the site, particularly during the World War II period. Documents from the TEU which escorted munitions from the site during the Vietnam War indicate that reject munitions were removed from the National Fireworks Site and disposed of at military installations.

#### **8.1.2 Conventional ordnance contamination and site conclusions**

Although the Chemical Warfare Service provided quality control for the munitions produced at the National Fireworks site, the U.S. Government did not ever own or lease any of the property there. During World War II the Navy paid for the construction of some buildings used in the production of munitions, but did not purchase or lease the land on which the buildings were situated. Similarly although the Technical Escort Unit of the CWS made numerous trips to the site during the Vietnam War there is no evidence which would indicate that the Government ever owned or controlled any of the property. Based upon historical documents and recent environmental assessments it appears that ordnance waste was disposed of at the site. Considering the detonation and burning of the wastes both on the land area and in the ponds it would be possible that explosive wastes could still exist there.

### **8.2 Recommendations**

The Risk Assessment Procedures for Ordnance and Explosive Waste Sites Form, dated February 10, 1993, has not been prepared for the National Fireworks, West Hanover Site, since the site does not qualify under the conditions of the Defense Environmental Restoration Program for Formerly Utilized Defense Sites.

**APPENDIX A**  
**REFERENCES**

## MAPS / DRAWINGS

**ORDNANCE AND EXPLOSIVE WASTE  
CHEMICAL WARFARE MATERIALS  
ARCHIVES SEARCH REPORT**

**NATIONAL FIREWORKS SITE**

**WEST HANOVER, MASSACHUSETTS  
PLYMOUTH COUNTY**

**DERP-FUDS NO. D01MA048900**

**APPENDIX A**

**REFERENCES**

**REFERENCES FOR OEW/CWM ACTIVITIES**

**Author Unknown**

n.d. "Monograph of Incendiary Bomb Production." Chemical and Biological Defense Agency Historical Office, RG 7 Chemical Procurement Districts, Cabinet GH, Drawer 1 (970-5a), file folder "Boston Chemical Warfare Procurement Dist. History Volume 11, Aberdeen Proving Ground, MD.

**Goldman Environmental Consultants, Inc.**

1988 "Proposed Scope of Work Surface Drum Removal National Fireworks I Hanover, Massachusetts." Corps of Engineers- New England Division, Waltham, MA. July.

**Kent, Edmund H.**

1989 "Affidavit of Edmund H. Kent." Hale and Dorr, Counselors at Law. Boston, MA.

**Various Authors**

1966-1968 Technical Escort Unit, Edgewood Arsenal, Trip Reports

**REFERENCES FOR GEOLOGY AND SOILS**

**Thornbury, Wm. J.**

1965 Regional Geomorphology of the United States, John D. Wiley and Sons, Inc.

**Author unknown**

n.d. Massachusetts Water Supply Paper 1669Y, Groundwater Resources of the Lowell Area, MA.



**ORDNANCE AND EXPLOSIVE WASTE  
CHEMICAL WARFARE MATERIALS  
ARCHIVES SEARCH REPORT**

**NATIONAL FIREWORKS SITE**

**WEST HANOVER, MASSACHUSETTS  
PLYMOUTH COUNTY**

**DERP-FUDS NO. D01MA048900**

Upham, Charles W.

1969 Soil Survey of Plymouth County, Massachusetts, USDA, Soil Conservation Service, in cooperation with the Massachusetts Agricultural Experiment Station.

## APPENDIX B

### ACRONYMS

**ORDNANCE AND EXPLOSIVE WASTE  
CHEMICAL WARFARE MATERIALS  
ARCHIVES SEARCH REPORT**

**NATIONAL FIREWORKS SITE**

**WEST HANOVER, MASSACHUSETTS  
PLYMOUTH COUNTY**

**DERP-FUDS NO. D01MA048900**

**APPENDIX B**

**ACRONYMS**

ASR	Archive Search Report
BGR	Bombing and Gunnery Range
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CEHND	Corps of Engineers, Huntsville Division
COE	Corps of Engineers
CWM	Chemical Warfare Material
CWS	Chemical Warfare Service
DERA	Defense Environmental Restoration Account
DERP	Defense Environmental Restoration Program
DOD	Department of Defense
DPG	Dugway Proving Ground
EOD	Explosives Ordnance Disposal
EPA	Environmental Protection Agency
FUDS	Formerly Used Defense Sites
GSA	General Services Administration
HTW	Hazardous and Toxic Waste
INPR	Inventory Project Report
IRP	Installation Restoration Program
MCX	Mandatory Center of Expertise
OEW	Ordnance and Explosive Waste
SARA	Superfund Amendments and Reauthorization Act
SLD	St. Louis District, Corps of Engineers
USACE	U.S. Army Corps of Engineers
USADACS	U.S. Army Defense Ammunition Center and School
USAEDH	U.S. Army Engineer Division, Huntsville, AL
WD	War Department
WNRC	Washington National Records Center

## **APPENDIX C**

### **REPORTS/STUDIES/LETTERS/MEMORANDUMS**

**ORDNANCE AND EXPLOSIVE WASTE  
CHEMICAL WARFARE MATERIALS  
ARCHIVES SEARCH REPORT**

**NATIONAL FIREWORKS SITE**

**WEST HANOVER, MASSACHUSETTS  
PLYMOUTH COUNTY**

**DERP-FUDS NO. D01MA048900**

**APPENDIX C**

**REPORTS/STUDIES/LETTERS/MEMORANDUMS**

- |     |   |
|-----|---|
| C-1 | Site Specific Safety Plan                                   |
| C-2 | Inventory Project Report                                    |
| C-3 | Significant Documents from Meeting at Hale and Dorr Offices |
| C-4 | Correspondence from Hale and Dorr                           |

## **APPENDIX C-1**

### **Site Specific Safety Plan**

**SITE SPECIFIC SAFETY AND HEALTH PLAN (SSHP)  
OEW/CWM ARCHIVES SEARCH SITE INSPECTION VISIT  
NATIONAL FIREWORKS SITE  
West Hanover, MA  
DERP-FUDS #DO1MA048900**

**1. PURPOSE.** This plan prescribes the safety and health requirements for team activities and operations conducted to determine the presence of ordnance and explosive waste (OEW) from conventional munitions and/or chemical warfare material (CWM) at the specified site.

**2. APPLICABILITY.** This plan applies to HQUSACE personnel and assigned elements under the control of HQUSACE.

**3. REFERENCES.** The provisions of this plan implement safety and health standards and requirements contained in 29 CFR 1926, 29 CFR 1960, 30 CFR 56, Executive Order 12196, DODI 6055.1, AR 385-10, AR 385-40, and EM 385-1-1.

**4. STATEMENT OF SAFETY AND HEALTH POLICY.**

A. No person shall be required or instructed to work in surroundings or under conditions which are unsafe or dangerous to his or her health.

B. Each team member has the responsibility to immediately halt the team's operations and activities upon encountering an unsafe situation or act.

C. Each team member is responsible for reading the SSHP before a site visit, complying with applicable safety requirements, wearing prescribed safety equipment, knowing the symptoms of chemical agents, and preventing avoidable accidents.

**5. TRAINING.** Prior to site visits each team member shall have received the necessary training, to include refresher training on a scheduled basis, as required by the references listed in paragraph 3.

**6. REPORTING REQUIREMENTS.** Safety violations will be immediately reported to the designated team safety officer. The team safety officer shall report the findings of fact regarding the safety violation(s) through designated channels, as prescribed by the references listed in paragraph 3.

**7. SITE SPECIFICS.**

A. Site Descriptions: The National Fireworks Site was the location of an ammunition assembly facility. Various types of munitions were manufactured there including M50 incendiary bombs, 4.2-inch mortar rounds, M-2 and M-3 fuzes, and mines. Besides the above military items, the site was also used in the production of fireworks. The site consists of approximately 200 acres. Significant portions are still wooded or covered with lakes. There is a roadway system that runs throughout the site. Hazardous and explosive wastes had been discarded there. Clean-up operations were undertaken in 1988 which removed several hundred empty barrels and numerous other barrels which contained unknown contaminants. All barrels were disposed of off-site.

B. Possible Hazards.

a. OEW/CWM Hazards. Explosives wastes have been destroyed on-site. Most were either incinerated or detonated. Barrels containing possible residues from explosives have been removed from the site. Some of the demolition involved detonation of explosives in the lakes. If the first detonation did not seem to destroy the barrelled material subsequent charges were placed in the same area.

b. Toxic Wastes. Other toxic wastes had been brought to the site for disposal. Some of the barrels already removed from the site had not originated there.

c. Natural Hazards. Uneven terrain and thick undergrowth can be expected on this site. There are also several large bodies of water present.

d. Other Hazards. None identified.



### C. OEW/CWM Reconnaissance Procedures.

- a. Movement. Before walking in a particular direction, scan your approach with your eyes. Do not stray from travelled paths or enter areas with dense vegetation. REMEMBER -- STAY ALERT, STAY ALIVE! Teams will walk in pairs with a safety officer monitoring a pair of individuals. It is important to stay in eyesight of team members and to stay in pairs.
- b. Sighting. Upon sighting a suspicious object, note its size, shape, any markings, and specific location. DO NOT TOUCH ANYTHING!
- c. Actions. Alert all team members. Withdraw to a safe distance. The safety officer will mark the area with survey tape. If the suspicious object is considered to be an immediate threat, designated team members will remain in the area at a safe distance to warn civilians until the unexploded ordnance (UXO) personnel arrive. Notes regarding the suspicious object will be compiled by the project manager on the team for the archival search report.
- d. Notification. If the suspicious object is considered to be an immediate threat, the safety officer will contact and advise the Huntsville Safety Division and the local police.

### D. Emergency Telephone Numbers.

- a. Medical: (617) 826-2335\* South Shore Hospital.
- b. Fire: (617) 826-2335\* Hanover Fire Department.
- c. Police: (617) 826-2335\* Hanover Police Department.

\* NOTE: This same phone number is used for all emergency type situations as may be needed.

- d. Other Contacts. Huntsville Safety Division, (205) 955-4968; St. Louis District Corps of Engineers, PM-M (Mike Dace), (314) 331-8036.

E. Location of Nearest Telephone to Site. The site inspection team will carry a cellular telephone for emergency use. There is cellular service available in this area.

F. First Aid. If a medical emergency arises, each team member qualified in Standard First Aid/CPR should be prepared to administer aid, until medical personnel arrive.

G. Personnel Protective Equipment.

a. Personal Equipment on Site. Check the following equipment: eye protection, ear protection, gloves, boots, notebook/pen, chemical identification charts, and personal SSHP.

b. Team Equipment on Site. Check the following equipment: first aid kit, survey tape, flashlight w/batteries, 35 mm camera, 35 mm film (24 exp.), binoculars, general purpose knife, maps of area, FM 9-16 (Explosive Ordnance Recognition), and carrying bag.

H. Weather Precautions.

a. Cold Weather: Weather may be cold, proper clothing should be worn to protect against cold temperatures, wind, frost-bite conditions, etc.

b. Heat: Not applicable for this trip.

c. Severe Weather. The safety officer will monitor local newscasts for any type of severe weather and take the necessary safety precautions.

I. Team Personnel and Responsibilities.

a. Safety Officer: Mr. Tom Freeman.

b. Project Manager: Mr. Tom Freeman. Prior to actually entering the site, the project manager will inform the safety officer of the time schedule, routes to be taken and the specific locations

on the site to be surveyed. If the safety officer becomes incapacitated, the project manager will assume the duties of the safety officer.

c. Other Team Members: Mr. Gregg Kocher. Team members will assist the safety officer as necessary. Under no circumstances will any team member participate in any activity contrary to the advice of the safety officer.

d. On-Site Personnel: No on-site personnel will be present.

e. Other Personnel: All other accompanying personnel must attend the safety briefing of this plan.

#### J. Site Control and Communications.

a. Site Control. While on site, team members will stay together in pairs and remain within eyesight and vocal contact with each other.

b. Site Communications. The site inspection team will be carrying a cellular telephone.

c. Hand Signals among members. If audible communications are not possible, the following standard hand signals will be used:

Hand gripping throat---choking/can't breathe due to smoke or other airborne contaminants.

Grip partner's wrist or both hands around waist---Leave area IMMEDIATELY/stop movement.

Hand gripping nose---Unusual smell detected.

Thumbs up/down---OK, I am all right, I understand/No, negative.

Wave hand in a circular motion above head---gather together here, now.

K. Changes to SSHP. As the situation dictates and without risking the safety of team personnel, the safety officer may modify aspects of the plan in coordination with team personnel.

## 8. CHECKLIST.

Date/Time 6 + 7 Dec 93

### General

Purpose of Site Visit ✓ Statements of Safety and Health ✓  
Training Received ✓  
Administrative Reporting Requirements ✓

### Specifics

Site Description ✓  
Possible Hazards: OEW/CWM Hazards ✓ Toxic Waste ✓  
Natural Hazards ✓ Other Hazards ✓

OEW/CWM Reconnaissance Procedures: General ✓  
Movement ✓ Sighting ✓ Actions ✓  
Notification ✓

Emergency Telephone Numbers: Medical ✓ Fire ✓  
Police ✓ Other Contacts ✓

Location of Nearest Telephone to Site ✓  
Location and Telephone Number of Nearest Hospital ✓  
First Aid ✓  
Personnel Protective Equipment: Personal Equipment ✓  
Team Equipment ✓

Weather Precautions: Cold Weather ✓ Heat ✓  
Severe Weather ✓

**Team Personnel and Responsibilities:**

Safety Officer ✓  
Project Manager ✓  
Other Team Members ✓

**Site Control and Communications:**

Site Control ✓  
Site Communications ✓  
Alternate Audible ✓  
Hand Signals ✓

Changes/Additional Comments \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

**9. ACKNOWLEDGEMENT OF BRIEFING BY TEAM PERSONNEL**

Full Name & Organization

Signature

_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

Safety Briefing Presented by:

WOS. R. FREEMAN  
(Print Name)

Signature



**APPENDIX C-2**  
**Inventory Project Report**

## **APPENDIX C-3**

**Significant Documents from  
Meeting of PRP's  
at Hale and Dorr Offices  
10 March 1989**

**National Fireworks Superfund Site -- Hanover, Massachusetts**

**Meeting of PRP's at Hale and Dorr**

**March 10, 1989**



The Following  
Document Contains

**Some Poor Quality**

**Originals**

National Financial Security Act  
Meeting at HIA and  
March 10, 1971  
Attendance List

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- 742  
10 1. Richard Johnston, Howard & Sons  
Counsel to Sargent & Lundy Corp.
- me 2. Richard Hoffman, Sargent & Lundy  
Counsel to Sargent & Lundy
- 892  
10 3. Ronald Edgar, Sargent & Lundy  
Counsel to Sargent & Lundy
- 848  
12 4. Robert R. Smith, Sargent & Lundy  
5. Gary Siegel, Sargent & Lundy  
Counsel to Sargent & Lundy
6. MAUREEN McCABE, U.S. ARMY CORPS OF ENGINEERS, NEW ENGLAND  
ATTORNEY/ADVISOR FOR REAL ESTATE DIVISION (617) 647-8269
7. ~~Bob Hedges~~, OGLETREE, DEKKUS, NISHT, SUDAK & STEWART, ATLANTA,  
for SCOVILLE INC. (404) 881-1800
8. Barbara Hoffman - Kerr-McGee Corp. 405/370-3883
9. John Fresina, Mass. Inst. of Technology, Safety Director 401-457-2247
10. M. Nicole Marcey - Textron Inc.
11. Ralph A. Child, Palmer + Dodge (617) 573-0151  
Counsel to MIT

National Fireworks Superfund Site -- Hanover, Massachusetts  
Meeting of PRP's at Hale and Dorr

March 10, 1989

AGENDA

I. Introduction

A. Purposes of the Meeting

1. Review information regarding history of the National Fireworks Site and the involvement of the various PRP's;
2. Review past and potential future cleanup costs at the Site; and
3. Discuss costs sharing agreement between PRP's regarding past and future cleanup costs.

II. Distribution of Significant Documents

A. Binder

1. Proposed Scope of Work prepared by Goldman Environmental Consultants, Inc. on behalf of Susquehanna Corporation (July 1988)
2. Scope of Work: Drum Removal and Site *the revised (after disc w/ EPA)* Stabilization (October 1988)
3. Magnetic Survey: National Fireworks I Site - *to locate barrels*
4. Administrative Order (12/6/88)
5. Schedule (attachment to Administrative Order)
6. Amendments to Administrative Order (12/22/88)
7. Site Activity Overview prepared by Goldman *+ test results* Environmental Consultants, Inc. (March 1989)
8. EPA Sample Data Report MIT Waste Pit (February 1989)
9. Susquehanna Corporation's Removal Project Cost Summary: Consultants and Contractors

III. Historical Information

A. Overview of Site

1. Used for production of fireworks (1900-1941) and munitions (1941-1970).
2. Originally owned by the National Fireworks Manufacturing Co.; subsequent property owners included National Fireworks, Inc., National Northern Corporation, National Associates, American Potash and Chemical, Atlantic Research Corporation and The Susquehanna Corporation.
3. Currently owned by several entities; primary landowners are Drinkwater Investment and the Town of Hanover;
4. EPA apparently first investigated the Site in 1984.
5. Information request letters sent in early 1988 to entities that may have been involved with the site; PRP letters to the Town of Hanover, Drinkwater Investment, MIT and Susquehanna.

IV. Removal Action

A. Actions Undertaken to Date

1. Susquehanna has undertaken to conduct a removal action at the site pursuant to an Administrative Order issued December 5, 1988.
2. Removal action is approximately 75% complete. Completion in Spring 1989.
3. MIT has contributed financially to the action.
4. Test results.

B. Remaining Removal Actions

C. Expenses of the Removal Action

V. PRP's

A. Entity/Responsibility

1. Town of Hanover
  - present owner of the Site
  - to date no willingness to participate in kind or financially
  - pushing for more extensive site investigation (e.g. Fox Island)
2. Drinkwater Investment Corporation
  - low profile; recent showing of interest; unable to attend meeting due to conflict in scheduling
3. Susquehanna
  - past owner of the Site
4. MIT
5. Kerr-McGee
  - survivor of merger with American Potash  
past owner of the Site
6. Scovill
  - arranged for disposal of materials which were deposited at the Site
7. AVCO
  - arranged for disposal of materials which were deposited at the Site
8. Army (Chemical Corps)/Navy
  - past owner/operator; arranged for disposal

VI. PRP Agreement

A. Removal Expenses

1. Past Expenses
2. Future Expenses

B. Remediation Expenses

C. Non-settling PRP's

National Fireworks Superfund , Site - Hanover, Massachusetts  
Significant Documents

Proposed Scope of Work prepared by Goldman Environmental Consultants, Inc. on behalf of Susquehanna Corporation (July 1988).....	1
Scope of Work: Drum Removal and Site Stabilization (October 1988).....	2
Magnetic Survey: National Fireworks I Site.....	3
Administrative Order (12/6/88).....	4
Schedule (attachment to Administrative Order).....	5
Amendments to Administrative Order (12/22/88).....	6
Site Activity Overview prepared by Goldman Environmental Consultants, Inc. (March 1989).....	7
EPA Sample Data Report MIT Waste Pit (February 1989).....	8
Susquehanna Corporation's Removal Project Cost Summary: Consultants and Contractors.....	9

PROJECT NUMBER 293-001-88

*EPA # Fireworks I  
MAD 980908842*

**PROPOSED SCOPE OF WORK  
SURFACE DRUM REMOVAL  
NATIONAL FIREWORKS I  
HANOVER, MASSACHUSETTS**

**Prepared For:  
Robert Tuchmann, Esq.  
Hale & Dorr  
60 State Street  
Boston, Massachusetts 02109**

**July, 1988**

**Prepared By:  
Goldman Environmental Consultants, Inc.  
161 Forbes Road Suite 204  
Braintree, Massachusetts 02184**



**PROPOSED SCOPE OF WORK  
SURFACE DRUM REMOVAL  
NATIONAL FIREWORKS I  
HANOVER, MASSACHUSETTS**

**Introduction and Objectives**

GEC is providing herein on behalf of the Susquehanna Corp. a proposed scope of work for drum removal at three separate areas on the Fireworks I site in Hanover. The three areas covered by this scope are known as the Lander's site, the Factory Pond area and the MIT waste pit. A more precise definition of these areas is provided later in this scope and on the attached site maps (Figs. 1-3).

All visible and accessible drums will be removed. Additionally, obvious surface contamination from drum spillage will be sampled and, if appropriate, removed without the utilization of any heavy equipment for excavation. GEC's proposal will result in an immediate and efficient cleanup, with the least disruption of natural vegetation and wetlands areas.

All visible empty drums, within the defined waste areas, will be removed and disposed off site as non-hazardous waste. Non-empty containers and spilled surface contaminants in the defined areas will be removed, repacked and analysed as necessary for quick and proper disposal off-site.

**General Scope of Work and Procedures for Waste Site Drum Removal**

All site work will be performed and supervised by a contractor, selected by GEC, with experience in cleanup work of this type. The contractor will be responsible for performing the tasks outlined in the scope of work in accordance with applicable OSHA regulations for work on hazardous waste sites and

standard industry practices. Compliance with the site safety plan, and field decisions regarding necessary levels of protection using safety plan guidelines, will be the responsibility of the contractor's site safety officer. Properly trained GEC personnel will oversee the field work and act as a liaison between EPA oversight personnel and the contractor.

In preparing the plan discussed below GEC considered the following objectives of the National Contingency Plan (40 CFR §300) and the proposed Massachusetts Contingency Plan (310 CMR 40.00):

1. Actual or potential exposure to the discarded drums by nearby receptors such as populations, animals, and drinking water supplies.
2. Actual or potential exposure to soil contamination caused by releases from the drums of hazardous substances or pollutants.
3. Potential threat of fire and explosion resulting from the improper handling of drums which may have contained such materials.

The following removal actions consistent with the aforementioned contingency plans have been evaluated:

1. Fences, warning signs or other security or site control precautions. Signs have been posted and site access will be limited. However, the size and location of specific disposal areas, and the nature and extent of surface drum disposal do not require fencing of these areas at this time. The areas should be policed by the Town of Hanover and P. A. Landers.
2. Removal of drums barrels and other containers will be completed under this removal proposal, along with immediately spilled or released contents. No further immediate environmental impacts were noted during site inspections.
3. There is no need for other measures such as the construction of stabilization berms, dikes or impoundments; or capping of contaminated soils. Such measures are not appropriate removal or immediate mitigative measures for this site.

The same basic order of tasks will be performed at each of the three waste locations. Characterizations and differences unique to each location are

discussed in the next section. A schedule for the entire project is attached. It is expected that the project will take 5 weeks from the initial site survey.

#### 1 - Site Survey and Surface Characterization

The purpose of the survey is to collect appropriate information to prepare for the removal work and develop a site safety plan. This would involve an extensive field survey with GEC's cleanup contractor to determine exactly how many drums are at each location, and without any intrusive investigation, determine if the drums contain any residual waste material. Each drum would be tagged and logged to expedite removal later. The survey would be conducted at Level D. GEC and the contractor will further utilize the services of two ex-employees of Atlantic Research Corp. (Ed Kent and Byron Osborne), who are familiar with the types of wastes generated at the Fireworks facility and the facility's methods of disposal.

#### 2 - Site Safety Plan

Based on the site surveys, detailed safety plans will be developed in accordance with OSHA regulations (29 CFR §1910.120). Particular emphasis will be placed on contingencies regarding the discovery of undetonated explosive material. Based on information supplied by Messrs. Kent and Osborne, all potentially explosive material has been detonated or burned. Since the removal will only involve surface materials, even if unreacted material had been left, it is remote that any could still pose a danger after over 20 years exposure to the elements. Regardless, all employees working at the site will be briefed on the probable appearance of potentially detonative material containers. Susquehanna will attempt to have Mr. Kent or Mr. Osborne available,

either on call or on site, to identify questionable containers or material. Concurrently final removal procedures and equipment requirements will be formulated based on the number and condition of the drums at each location.

## **2 - Site Access**

Susquehanna Corp. does not own the land covered by this proposal, therefore any work under this scope is contingent upon obtaining permission from the current landowners. For the proposed work at the Lander's site Mr. Landers will be notified. The Town of Hanover Conservation Commission and Fire Department will be notified of the cleanup plans for the other two sites. Invitations to observe the removal work will be given to both owners provided that their representatives have received the OSHA required training.

## **3 - Contractor Mobilization**

At each site the contractor would establish a base of operations including a field laboratory, decontamination area and temporary drum staging area. Any additional measures deemed necessary to notify the public and restrict access will be done during mobilization. Based on the survey, an access route to each site may require some clearing and earthwork.

## **4 - Removal of Empty Accessible Containers**

All empty drums that are accessible, without disturbing drums with unknown contents, will be removed from the site, crushed and placed in a dumpster. Removal of the carcasses will likely be done by hand and with the use of a Bob Cat. This work is expected to be done under Level D with field monitoring.

**5 - Non-empty Drum Removal, Repacking and Staging.**

All drums not determined to be empty will be removed by hand or with a drum grappler and immediately placed in an overpack drum before being taken to the staging area. Though not expected to be found, fully sealed containers will only be removed by hand, and only after consultation with the site safety coordinator. These drums will be staged separately and will not be opened until a separate safety plan has been developed.

As part of this phase, visible releases will be sampled for analysis to determine removal precautions and disposal methods. Work under this phase is likely to start at Level B with the site safety supervisor having the option to reduce it to Level C or D, if conditions warrant.

**6 - Fingerprinting of Staged Drums**

While work continues at the site, identification sufficient to properly transport and dispose of the material will be performed on each of the drums in the staging area utilizing a portable laboratory. The primary objectives of the field lab will be to collect information needed for a waste characterization form and do any compatibility testing necessary to consolidate the collected residuals into as few drums as possible for disposal. Sample analysis is likely to include a flashpoint determination, organic vapor scanning, pH measurement, density, and some colorimetric metals analyses.

The actual size of the field laboratory and the extent of field analysis will be determined based on the results of the Task 1 field survey. If the survey finds few drums or materials requiring identification, lab services

available in the field will be reduced and needed work will be provided by an outside laboratory on a short-turnaround basis.

#### **7 - Spilled Contaminant Removal**

Visible surface contamination will be excavated either manually or with a Bob Cat and placed in containers for transport to the staging area. Work under this phase is likely to start at Level B with the site safety supervisor having the option to reduce it to Level C or D, if conditions warrant.

#### **8 - Final Removal of Remaining Empty Drums**

Any empty drums that were not accessible during the first phase because of potential interference with non-empties, would be removed at this point in the same manner described above. This would likely include partially buried containers or containers under piles of debris or non-empty containers.

#### **9 - Disposal**

It is GEC's intent to have all collected materials removed from the site as soon as possible. Crushed drum carcasses would be sent to a licensed local or out-of-state non-hazardous landfill selected by the contractor in water-tight and covered dumpsters. Staged material and drums would be shipped off-site for incineration either to ENSCO in Arkansas or Marine Shale Processors in Louisiana. Final selection of the disposal site will be made based on acceptability of material, the time needed to obtain acceptance, and cost.

#### **10 - Demobilization**

Each area of drum removal activity would be completely broken down and moved to the next location. No material, either collected

under this scope or brought to the site by the contractor will remain at a site after demobilizing and moving to the next location.

### **Specific Site Descriptions and Procedures for Drum Removal**

#### **Lander's Drum Site**

This site is located approximately 200 yards west of the P. A. Landers Co. garage in an isolated wooded area. For the purpose of this survey, surface removal boundaries for this area will extend approximately 50 yards from the known drums disposal locations but not extending to the cleared and graded land which surround the site (see Figure 1). No precise drum count has been made, but initial estimates indicate that there are up to 60 drums in the area, of which a significant portion appear to be open and empty. There are two piles of partially burned rubber toys. Some powder chemical spillage is visible in one area.

No subsurface disposal appears to have been done at this site. Mr. Kent has provided extensive information on the history and disposal products present at the site. Waste at the location appears to be limited to raw materials and by products associated with the manufacture of neoprene rubber toys. It is assumed, based on existing information, that no detonation or disposal of hazardous or reactive chemicals occurred at the Landers site. All work in this area will be performed using Level D, unless the site survey or empty drum removal suggests a higher degree of caution.

Cleanup of this area will include the removal of all visible drums and metal debris, the two piles of toys and any identified spilled resins.

**Factory Pond Area**

For purpose of this scope, this area is defined as the land adjacent to Factory Pond where the primary waste combustion and detonation occurred (see Figure 2). This includes the area where sodium drums were allegedly discarded into the Pond and 100 yards of the Pond bank in either direction from that location; the area now used as a target shooting range; and the woods bordering the access roads between the Lander's property and the MIT waste area. After the site survey, the Town of Hanover, which owns the land will be informed of the project scope and the precautions planned to prevent any impact to adjacent wetland areas. A Notice of Intent and subsequent Order of Conditions is not required, because the project only involves superficial removal of discarded drum carcasses and no dredging in the pond or excavation adjacent to the pond is planned.

The exact number of drums in this area has not been determined. Initial estimates suggest that there are between 20 to 40 drums scattered on the surface throughout the area, including drums in the Pond that are visible to a depth of 3 feet. It is assumed that a significant portion of the drums on the surface /bank of the pond or submerged in the pond are empty.

Removal includes any drums on the surface, and along the bank of the Pond within the area described above. Visible drums submerged in water not exceeding 3 feet in depth will be removed if it can be determined that the drums are not sealed.

From discussions with Mr. Osborne, GEC has learned that the area by the pond was used for the destruction of metallic sodium. Therefore, a sealed drum could still contain unreacted material according to Mr. Osborne. For this reason sealed drums that could be breached while underwater will not be disturbed.



Based on historical information it is unlikely that any drums are still sealed. Mr. Osborne stated that all materials taken to this area were detonated or burned. The drums found in this area are most likely the remains of the drums used to transfer the waste from the plant to the combustion area. Residues and ash from past waste combustion would not be removed.

#### MIT Waste Pit Area

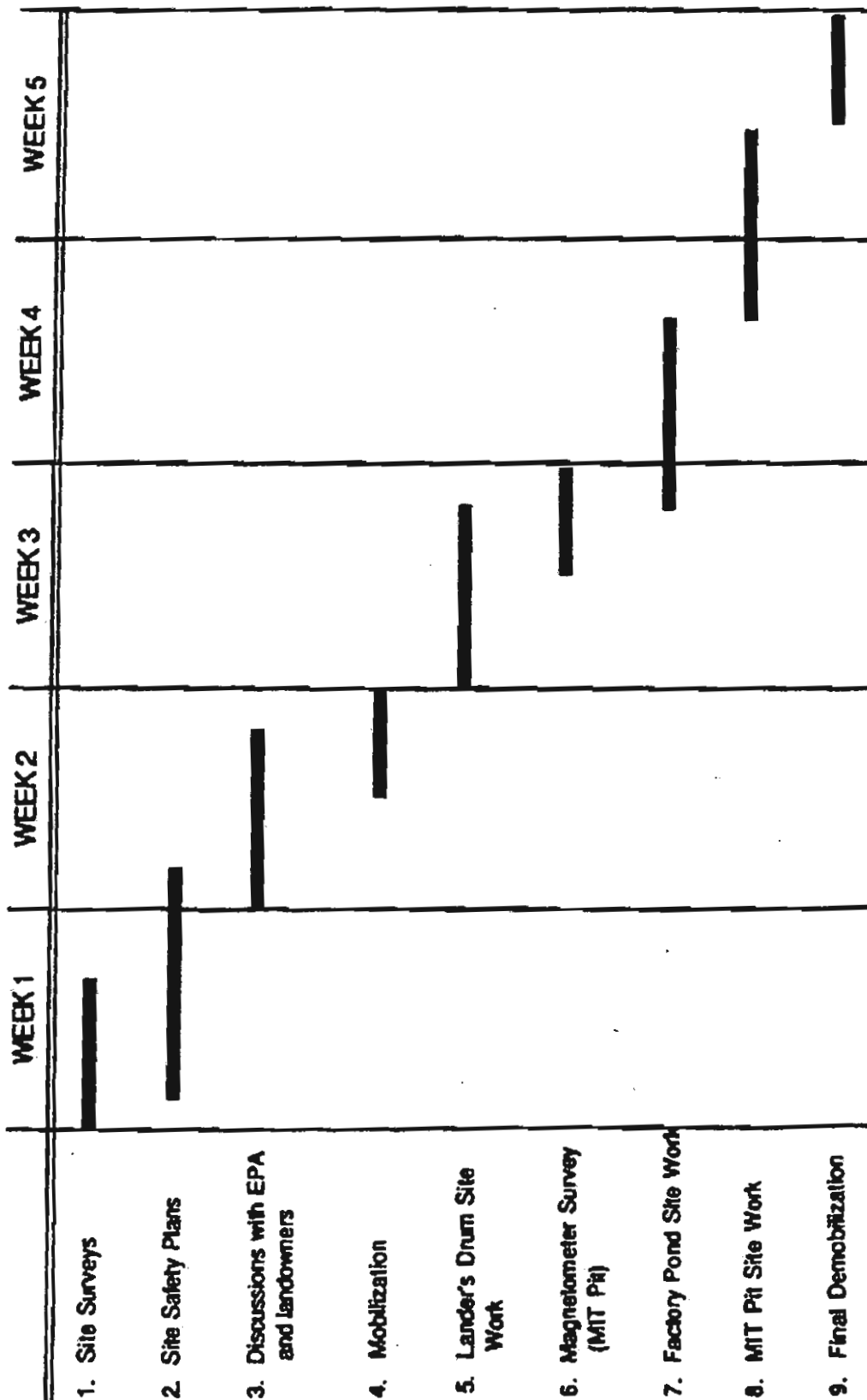
The survey associated with the MIT waste area will be limited to approximately a 50 yard radius from the center of the clearing (see Figure 3). This includes the original clearing, identified in the aerial photos and still present; the small excavated pool between the clearing and the wetland; and the woods immediately surrounding the clearing. No investigatory or removal work will occur in the undisturbed wetlands adjacent to the waste area. A preliminary survey of the wetlands shows no evidence of excavation, waste destruction or drum disposal. The wetland soil appears to have formed naturally and shows no signs of disturbance. This appraisal is supported by Mr. Osborne who supervised disposal at the site from 1962 to 1970. Unlike the other sites the initial assessment will include a magnetometer survey since, based on appearance and some rumors, it is possible that subsurface burial of drums may have occurred. Mr. Osborne has stated that drum burial did not occur during his time at the facility and, like the factory pond site, all wastes were either detonated or burned.

After the site survey, the Town of Hanover, which owns the land will be informed of the project scope and the precautions planned to prevent any impact to adjacent wetland areas. A Notice of Intent and subsequent Order of Conditions is not required because the project only involves superficial removal

of discarded drum carcasses and no dredging in the pond or excavation adjacent to the pond is planned.

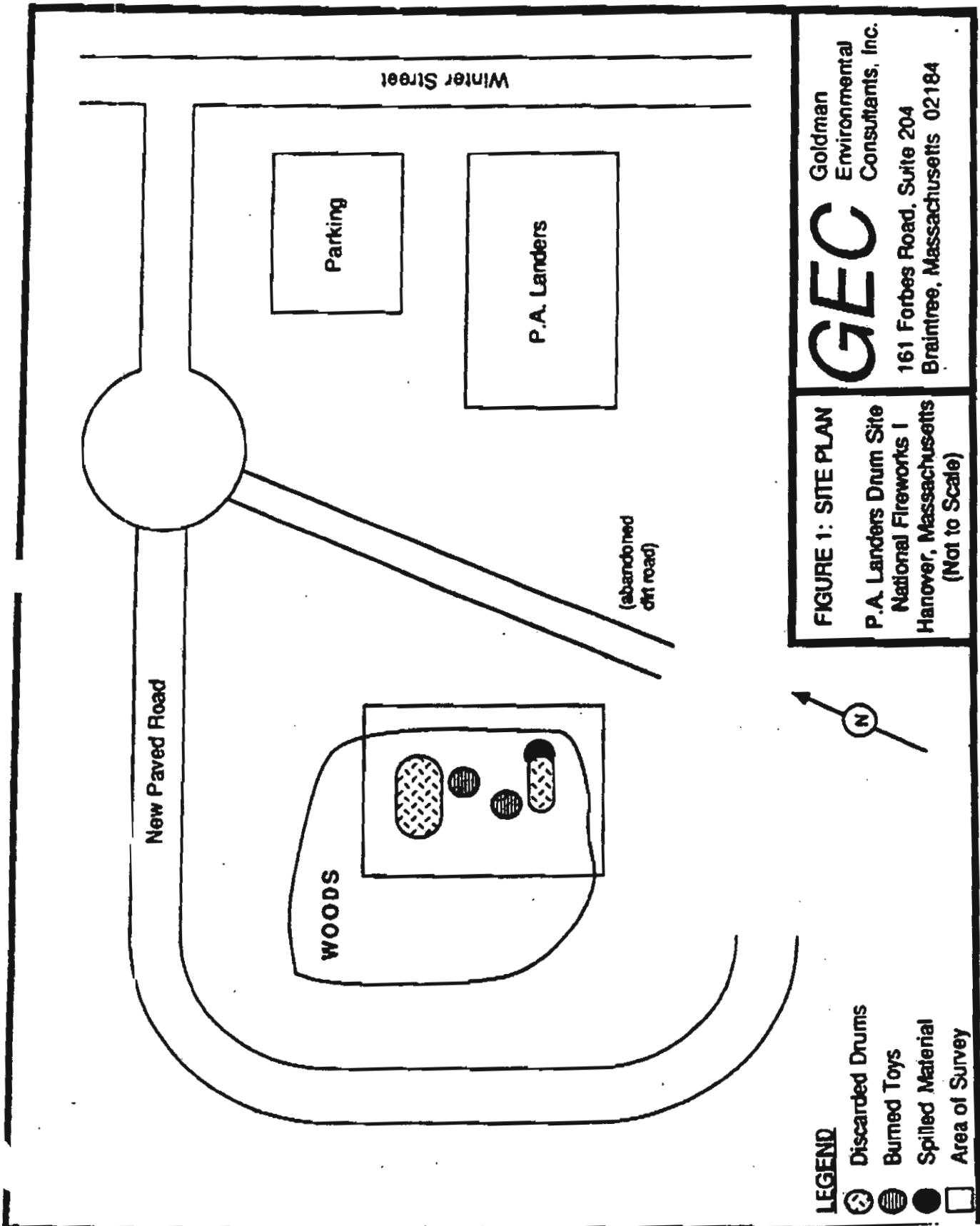
Similar to the other sites an accurate drum inventory has not been done. It is estimated that there are up to 40 drums in this area. Cleanup of this area will include all drums visible from the surface, the drums in the shallow pool adjacent to the wetlands and spilled materials present on the surface near some of the drums.

**PROJECT SCHEDULE**  
Surface Drum Removal  
National Fireworks I  
Hanover, Massachusetts



7/19/88

Goldman Environmental Consultants, Inc.



**SCOPE OF WORK  
DRUM REMOVAL AND SITE STABILIZATION  
NATIONAL FIREWORKS I  
HANOVER, MASSACHUSETTS**

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- Fig. 1 - Site Location Map
- Fig. 2 - Plot Plan and Drum Location
- Fig. 3 - Landers Drum Site Sketch
- Fig. 4 - Factory Pond Demolition Area Site Sketch
- Fig. 5 - MIT Waste Pit Site Sketch
- Fig. 6 - Landers Drum Site Command Post
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- Fig. 9 - Staging Area Locations

## APPENDICES

- A - Pre-Mobilization Reconnaissance
- B - Health and Safety Plan
- C - Magnetometer Survey Report
- D - Analytical Results
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## **PROJECT OVERVIEW**

### **Introduction and Objectives**

In 1988 EPA notified Susquehanna Corporation ("Susquehanna"), the Massachusetts Institute of Technology ("MIT") and others that they were potentially responsible parties (PRPs) at the National Fireworks I site in Hanover, Massachusetts (see Fig. 1, Site Locus Map). Susquehanna and MIT have entered into an agreement whereby Susquehanna would conduct certain activities on the site and MIT would participate in funding these activities. In July, 1988, Goldman Environmental Consultants, Inc. ("GEC") submitted, on behalf of Susquehanna, a Proposed Scope of Work for drum removal and general site stabilization. EPA and Susquehanna agreed that for purposes of this project, investigatory and removal work would be limited to certain drum removal in the following areas: 1) All undeveloped land originally owned by Atlantic Research Corp. south of Torrey Brook with borders defined by the eastern shoreline Lily Pond and Factory Pond, and a site security fence on the eastern and southern perimeters, and currently owned by Drinkwater Investment Corporation ("Drinkwater Investment ") or the Town of Hanover ("the Town"); 2) the entire shoreline of Factory and Lily Pond from the point where the Drinkwater River enters to the dam where the Indian River exits; 3) any visible material in either pond; and 4) the two islands at the northern end of Factory Pond (this description is collectively referred to as the "Fireworks Site").

There are three specific areas of known disposal activity within the defined Fireworks Site. They are known as the Landers Drum Site, the Factory Pond Demolition Area and the MIT Waste Pit. A more precise description of these areas is provided later in this scope, on the attached plot plan, and specific location maps (Figs. 2-5).

Pursuant to the July, 1988 proposed Scope of Work, GEC conducted an extensive reconnaissance at the Fireworks Site. Based on the reconnaissance work, GEC herein submits a Revised Scope of Work on behalf of Susquehanna. The activities are comprised of two major parts. The first consists of a site investigation to determine the nature and extent of material deposited on the property. In the second part, drums identified as containing hazardous material will be removed from the site and transported to an appropriate disposal facility.

Investigations to date have revealed that 99% of the drums found at the site are

either empty or contain non-hazardous materials. Even though not required under CERCLA to remove empty barrels or those containing non-hazardous materials, Susquehanna will remove such barrels from the MIT Waste Pit. Susquehanna also will remove the only two (2) containers containing hazardous materials which GEC encountered during the reconnaissance of the Fireworks Site. There are still thirty (30) drums to be investigated due to inaccessibility. Any such drums containing hazardous materials will be removed, repacked, sampled (if necessary), and properly disposed by Susquehanna. Additionally, hazardous materials spilled from drums will be sampled and removed. This Revised Scope of Work identifies all visible areas of waste disposal, and sets out a cleanup with the least disruption of natural vegetation and wetlands areas.

### **Regulatory Considerations**

In preparing the plan discussed below, GEC considered the following objectives of the National Contingency Plan (NCP) (40 CFR §300):

1. Actual or potential exposure to the discarded drums by nearby receptors such as populations, animals, and drinking water supplies.
2. Actual or potential exposure to soil contamination caused by releases from the drums of hazardous substances or pollutants.
3. Potential threat of fire and explosion resulting from the improper handling of drums which may have contained such materials.

The following removal actions consistent with the aforementioned NCP has been evaluated:

1. Removal of drums, barrels and other containers will be completed under this removal proposal, along with immediately spilled or released contents. GEC noted no further immediate environmental impacts during site reconnaissance.
2. There is no need for other measures such as the construction of stabilization berms, dikes or impoundments or the capping of contaminated soils. Such measures are not appropriate removal or immediate mitigative measures for this site.
3. The size and location of specific disposal areas and the nature and extent of surface drum disposal do not require fencing of these areas at this time. The areas should be policed by their owners, Drinkwater



### **Investment and the Town.**

The tasks identified in this Revised Scope and its appendices will be conducted in a manner which complies, to the greatest extent practicable, with applicable, or relevant and appropriate Federal environmental and public health requirements as required by 40 CFR §300.65(f). Any materials or wastes removed off-site as part of this Scope which are determined to be hazardous waste, will be subject to the generation, transportation and disposal requirements of 40 CFR Parts 261 and 262 and Massachusetts regulations, 310 CMR. 30.000 as required by 40 CFR §300.65(g). Further, all hazardous wastes stored off-site will be in accordance with appropriate treatment, storage or disposal facility (TSDF) requirements at the time of shipment.

GEC and its sub-contractor will complete the above referenced tasks within health and safety guidelines established by the USEPA and required by OSHA. GEC developed a Site Safety Plan which supplements this Revised Scope. The safety plan identifies the worker protection requirements for various tasks conducted on-site and addresses those contingency measures to be taken in the event of an emergency.

Susquehanna understands from discussions and correspondence prior to October 3, 1988, with EPA and the Massachusetts Department of Environmental Quality Engineering (DEQE), that the removal action described herein will not be subject to the requirements of the Massachusetts Contingency Plan (310 CMR 40.00). However, a copy of this Revised Scope of Work is being sent to the Southeast Regional office of DEQE for its review and comments.

### **General Scope of Work and Procedures for Drum Removal**

The Revised Scope of Work shall be conducted by GEC, its subcontractors or agents. GEC has selected the following persons or companies to conduct portions of the "Work": (1) ENSCO Environmental Services, Inc. ("ENSCO") to perform the removal portions of the Work; (2) Mr. Jack Kick to conduct the geophysical tasks and (3) Alpha Analytical Labs, for sample analysis. GEC and its sub-contractors will be responsible for performing the Work in accordance with applicable OSHA regulations regarding hazardous waste sites and with standard industry practices. Compliance with the Site Safety Plan, and field decisions regarding necessary levels of protection using safety plan guidelines will be the responsibility of ENSCO's site safety officer. Properly trained GEC personnel will oversee all field work and act as a liaison between EPA oversight personnel, consultants for landowners and other responsible

parties and all GEC sub-contractors.

The following is a description of the general tasks included in this Revised Scope. Details on each of the described tasks are discussed in referenced appendices or in proceeding sections.

### 1 - Site Reconnaissance and Drum Characterization

The purpose of this reconnaissance work was to: 1) determine the complete extent of discarded drums and other debris; 2) determine the nature of the remaining contents of these drums; 3) collect appropriate information to prepare a removal work plan; and 4) enable GEC to develop a site safety plan. The original scope for this work is described in GEC's "Proposed Scope of Work, Surface Drum Removal", dated July 1988. The framework of this task subsequently agreed to by EPA is included herein as "Appendix A - Pre-mobilization Reconnaissance and Pre-entry Work Plan".

GEC conducted an extensive survey of the entire Fireworks site from September 6 to September 19, 1988. This reconnaissance work involved an extensive search of the ponds and woods by GEC's cleanup contractor to determine exactly how many drums are at each location, determine without intrusive investigation, if the drums contain any residual waste material. Each drum has been marked and logged to expedite removal.

### 2 - Site Safety Plan

Based on the site reconnaissance and sampling results, a Site Safety Plan has been developed in accordance with OSHA regulations (29 CFR §1910.120). The Safety Plan is attached as Appendix B. Initial concerns regarding the discovery of undetonated explosive material have been substantially reduced based on conversations with ex-employees and the reconnaissance work. Regardless, all employees working at the site are to be briefed on the probable appearance of potentially detonative material containers.

### 3 - Site Access

Susquehanna does not own the Site. Susquehanna has been granted access to the Site by Drinkwater Investment and the Town, the current owners

of the property. The access agreements are included as Appendix F.

#### 4 - Contractor Mobilization

Upon approval of this scope by EPA, GEC will direct ENSCO to mobilize its equipment and set up operations at the site. Mobilization will include construction of drum staging areas, clearing access routes to the drumsites, and the implementation of any necessary security measures.

#### 5 - Removal of Accessible Empty Containers

Those empty drums and drums containing non-hazardous residues which are to be removed, will be collected from the three sites, brought to a central location, then crushed and placed in containers or dump trailers for appropriate off-site disposal. GEC marked any drums and debris meeting either of these criteria with blue paint during the reconnaissance.

Susquehanna's removal of the carcasses will be done by hand and with the use of an all-terrain vehicle (ATV) with an attached trailer.

#### 6 - Drums Containing Hazardous Waste - Removal, Repacking and Staging

All drums containing hazardous wastes will be excavated or removed by hand and placed in overpack drums before being taken to the staging area. If such drums or other potentially hazardous materials are uncovered that were not sampled during the reconnaissance, these will be sampled. The samples will be subjected to a field screening and, if appropriate, sent to an outside laboratory for analysis.

#### 7 - Disposal

It is GEC's intent to have collected materials removed from the site as soon as possible. Non-hazardous drum carcasses will be crushed and sent to a licensed local or out-of-state non-hazardous landfill in water-tight and covered dumpsters or dump trailers. Staged material and drums determined to contain hazardous waste are to be shipped off-site to a licensed hazardous waste treatment, storage or disposal facility for incineration. Final selection of the disposal site will be made based on acceptability of material, the time needed to obtain acceptance, and cost.

## **8 - Demobilization**

Each area of drum removal activity will be completely concluded before moving to the next location. No material, either collected under this Revised Scope or brought to the site by ENSCO, will remain at the Fireworks Site after ENSCO demobilizes.

## **SITE DESCRIPTION AND RECONNAISSANCE RESULTS**

### **Introduction**

This section summarizes the results of the reconnaissance work conducted by GEC. That work is described in more detail in Appendix A, attached herein. GEC identified approximately 250, 55-gallon drums spread out over the entire Fireworks site in about 90 different locations during the two week reconnaissance. Additionally, GEC discovered 42 areas where smaller metal containers and paint cans have been discarded. Of the drums identified to date, 218 are empty or contain non-hazardous resin or debris, while only 2 contain hazardous waste and 30 are awaiting excavation under the Revised Scope for a determination. Based on preliminary assessments these drums are not expected to differ from those already identified.

For purposes of providing more detailed descriptions of the reconnaissance findings, the site has been divided into five areas: 1) the Landers Drum Site, 2) the Factory Pond Demolition Area, 3) the MIT Waste Pit, 4) Lily and Factory Ponds and 5) undeveloped woodlands not included in the other areas. A description of the search of those areas and the materials that were found is presented below. Extensive descriptions of the drums found at each site can be found in the survey logs which are attached in Appendix D.

### **Landers Drum Site**

#### **Description and Extent of Survey**

This site is located approximately 200 yards west of the P. A. Landers Co. garage in an isolated wooded area. Waste at the location appears to be limited to raw materials, trash and by-products associated with the manufacture of neoprene rubber

toys. The boundaries for this area extend approximately 20 yards from the known drums disposal locations, but not extending to the cleared and graded land which surround the site (see Figure 3). An embankment at the north end of the site contains a number of partially buried drums. There are two piles of partially burned rubber toys. Some powder chemical spillage is present in one area.

### Summary of Findings

The Landers site contains 98 visible drums. Most of the drums are found in a pit, apparently manmade, that is now overgrown with young pine and maple trees. The highest concentration of drums is along the embankment at the northern portion of the site. Other dense concentrations are found to the south of the neoprene doll pile. Scattered drums are located above the pit area to the east and along a trough to the north of the main site.

The site contains 75 drums and 34 containers that are empty or contain non-hazardous residues, 23 drums and 2 containers are inaccessible and require further investigation under the work plan. A single lab jar contains a RCRA hazardous waste due to its high pH. Most of the inaccessible drums are buried in the embankment and require excavation of the soil around the drums for further investigation. No evidence indicates that these drums will contain material different from that already analyzed.

Drums and containers with residue or debris were determined to be non-hazardous by sampling and testing in the manner described in Appendix A. GEC and ENPRO employees sampled the contents of 5 drums, 1 smaller container, and 1 lab jar at locations L-402, L-502, L-503, L-717, L-901 and L-709 and L-718. The sampled contents of the drums and containers, in respective order, were burnt rubber, a burnt tar substance, a silty black substance, a black solid, a putty substance, and two drums with liquids determined to be rainwater. These were tested and determined to be non-hazardous. A white granular substance was sampled from a small glass jar at location L-719, and tested to be a hazardous waste due to a pH of 11. This is the only hazardous waste found at the Landers site to date. The contents of drum L-201 was not sampled because it looked exactly the same as the contents of drum L-402, which was determined to be non-hazardous. Also, the contents of drums L-101 and L-103 were not sampled because these drums were crushed in the Landers excavation process, therefore allowing small amounts of dirt into the drums.

## **Factory Pond Demolition Area**

### **Description and Extent of Survey**

This area is defined as the approximately 11 acre parcel of land adjacent to Factory Pond where most of the past waste combustion and detonation occurred (see Figure 4). This includes the area where drums were discarded and detonated in the Pond; the area now used as a target shooting range; and the woods bordering the access roads between the Drinkwater Investment property and the MIT Waste Pit.

### **Summary of Findings**

The Factory Pond site contains 46 visible 55-gallon drums and 63 other metal containers. The drums are scattered over the entire area described above. Heavy concentrations of drums are located to the north and south of the cold waste dump area, around the Northern Waste Burn Pit, and in the woods along the southern border of the site.

All but five (5) of the drums and containers are empty or contain non-hazardous residue. The five drums that are closed are located to the north and south of the Cold Dump area and require further investigation under the Revised Scope. The closed drums will be opened during the drum removal stage and investigated in the same manner as that of all other drums. No drums containing hazardous waste have been found at this site.

The eight (8) drums and containers with residue or debris were determined to be non-hazardous by investigation or sampling and testing. GEC and ENPRO employees sampled the contents of three (3) drums and two (2) 5-gallon containers from locations F-011, F-013, F-026, and F-027. The sampled contents of the drums and containers were burnt rubber, burnt black/brown material, a liquid determined to be rainwater, and a white paint-like substance. These were tested and determined to be non-hazardous. The contents of drums F-001, F-015, and F-016 were not sampled because drum F-001 had contents visually identical to the material sampled at location F-027 (determined non-hazardous) and drums F-015 and F-016 were determined to contain dirt via field screening and visual analysis.

### **Magnetometer Survey Results**

A magnetometer survey was conducted, at the request of EPA, on the Southern

Waste Burn Pit. The "Pit" is actually a raised, elongated mound with a shallow trench in the center. It is about 100 feet long and 10 feet wide at the top. Past employees have explained that the Pit was used for the open controlled burning of flammable and combustible waste. The survey included the top and sides of the Pit, plus the area immediately surrounding it. Wide variations in the magnetic field were recorded in this area. The large swings are due to substantial quantities of surface iron (i.e. shell casings, iron lugs, drum carcasses and miscellaneous scrap metal) which are scattered throughout the area. Large anomalies that appear distinct from the surface interference were detected at both ends of the Pit. This appears to be consistent with past operations as described to GEC by Mr. Byron Osborn, Plant Safety Director from 1962 to 1971. Periodically, any remaining material, which was primarily scrap metal, was removed from the pit with a backhoe to make room for more material.

## **MIT Waste Pit Area**

### **Description and Extent of Survey**

The MIT Waste Pit consists of approximately a half-acre clearing and small pool at the far southern end of the Site (see Figure 5). This area includes the original clearing, identified in aerial photos and still present; the small excavated pool between the clearing and the wetland; and the woods immediately surrounding the clearing. A survey of the wetlands shows no evidence of excavation, waste destruction or drum disposal. For a description of the survey and its findings refer to Appendix C.

### **Summary of Findings**

The MIT Pit site contains 21 visible drums, and 20 smaller containers. Most of the drums are found in a mound at the center of the site and in the swamp to the west of this. Scattered drums are located just to the north.

The site contains 19 55-gallon drums and 20 containers that are either empty or contain non-hazardous residue. One (1) drum is inaccessible and requires further investigation under the work plan. One (1) drum contains hazardous waste. The inaccessible drum, M-103, is buried in the embankment and requires excavation of the soil around it for further investigation. The drum containing hazardous waste, M-101, was determined to contain water contaminated with trichloroethylene and is located in the main drum pile.

All eight (8) drums containing residue or debris, M103 through M-107, M201, and M-301 were determined to be non-hazardous by sampling and testing except for drum M-101. The sampled contents of the drums and containers were sand, a gray silt material believed to be packing material, and the liquid determined to be contaminated with trichloroethylene.

#### Magnetometer Survey Results

A magnetometer survey of the clearing, detonation pool, and the surrounding wetlands and woods was completed. The readings indicate that most of the pit is free from iron debris. The only anomaly detected is centered at the location where drums visibly protrude the surface and it extends down to the edge of the pond where a partially buried winch is located. The maximum depth of the buried metal is estimated at 15 feet.

#### **Factory and Lily Ponds**

##### Description and Extent of Survey

Using a canoe, GEC examined the entire shoreline of Factory and Lily Ponds for the presence of drums and debris. The search extended from approximately one-quarter mile upstream the Drinkwater River to the outfall of Factory Pond. The shorelines of the two islands in Factory Pond were searched, along with accessible wetlands and any area with a depth of less than three feet. A landing was made on the larger of the two islands for an onshore search. Assessments of a drum's condition and contents were done from the boat.

##### Summary of Findings

GEC employees located 34 drums and 19 smaller containers in Factory and Lily Ponds. The presence of duckweed on the water made the location of underwater drums very difficult. The highest concentration of the drums are found along the shore to the north of cold waste dump area. Other drums are scattered along shore of the ponds, on the shore of the islands, and in the middle of the pond.

The ponds contain 27 drums and 19 containers that are empty or contain non-hazardous residue, six (6) drums that are open and submerged or partially submerged underwater and contain unknown material, and one (1) drum that is closed and



contains unknown material. The seven drums that contain unknown material (locations D-004, D-007, D-008, D-009, D-011, and D-026) are believed to contain only mud and water except for one drum (D-009), which contains a solidified material. These drums will be investigated under the Revised Scope during the drum removal stage. No drums in the pond areas have been sampled yet because they must be removed from the water to determine if they contain residual materials.

## **Undeveloped Woodlands**

### **Description and Extent of Survey**

GEC also completed a walk-through search of undeveloped areas not included in any of the above described areas. The methodology used to search these areas is described in Appendix A. These remaining undeveloped areas were divided and identified based on natural boundaries such as roads, clearings and fences. Each area searched was assigned a Grove number. These are identified on Fig. 2. Drums found in each Grove are shown on Fig. 2 and described in Appendix D.

### **Summary of Findings and Locations**

The undeveloped woodlands contain 36 visible 55-gallon drums and 44 other metal containers. The drums are scattered over a large area described as all non-site areas. There are no specific concentrations of drums or containers but they are typically located close to roads or old bunkers.

Since no closed drums or containers were found, all of the drums and containers have been determined to be empty or contain non-hazardous residue. The five (5) drums and eight (8) containers with residue or debris were determined to be non-hazardous by field screening and/or sampling and testing. GEC employees sampled the contents of one (1) 55-gallon drums and five (5) 5-gallon containers in locations R-020, D-037, R-037 and D-052. The contents of the drums and containers were, in respective order, a rubber material, a white powder, a red granular latex, and a liquid determined to be rainwater. These were tested and determined to be non-hazardous. The contents of the drums and containers at locations D-027, D-031, D-036, and D-047 were not sampled because a closer investigation showed that these drums and containers were either completely crushed or corroded. The contents of the container at R-008 was not sampled because it was determined to contain dried and solid paint

residue. Drum D-050 was investigated and determined to belong to P. A. Landers, Inc.

## **WORK PLAN**

### **Mobilization**

Prior to conducting removal operations at the Fireworks Site, site preparation will be conducted by ENSCO, GEC's drum removal sub-contractor. Site preparation will include the locating and set-up of command posts and designated parking areas, waste staging areas, specific communication routines, security, and equipment mobilization. Each of these tasks is described in more detail in the following sections..

#### Initial Set-up

##### *Command Post Locations*

The command post will be a mobile van supplied by ENSCO. The van will be equipped with the everyday supplies (hand equipment, personal protective gear, decontamination equipment, etc.) needed to conduct the on-site removal work as well as emergency response equipment. The van will also be used as the location for site briefings with personnel and a staging area for personnel during an emergency event.

In order to efficiently conduct the drum removal operations, the command post will be situated near each of the points of operation: the Landers Drum Site, the Factory Pond Demolition Area(cold dump and demolition area), and the MIT Waste Pit. Figures 6 through 8 (attached herein) show the approximate location of each command posts at the above referenced areas.

##### *Parking*

Parking for visitors and on-site personnel will be provided at the cul-de-sac southeast of the Landers site as depicted in Figure 9. No personal vehicles will be permitted near the designated work areas.

##### *Communications*

On-site communications will be provided by ENSCO. Communication will consist of fully functional two-way radios. Each radio will undergo daily tests for proper

function prior to use by on-site personnel. In addition, commands issued during an emergency to personnel may be augmented with warning whistles or bullhorns to assist in the safe evacuation of personnel.

Off-site communications will be restricted to mobile phones provided by ENSCO or a regular telephone located at the Landers building on G Street. Use of the Landers telephone will be restricted to emergencies only. Routine calls will be made off-site or by mobile phone.

### Staging and Storage Areas

There will be one (1) storage area and two (2) staging areas established for the removal operations. The storage area will be for the heavy equipment, such as dozers, backhoes, etc., The location of this area is shown in Figure 9.

Two (2) staging areas will be established near the Landers gravel pit. The first area will be designated for the unidentified or hazardous waste drums removed from the target areas. This drum staging area will be adjacent to the equipment storage area on G Street east of the Landers Drum Site. Refer to Figure 9. This area will be approximately 200 square feet, cleared of all vegetation and bermed with an impermeable material to provide secondary containment. A snow fence will surround the drum staging area.

The second staging area will be designated for non-hazardous materials collected for disposal. The area will be located south of the Landers gravel pit as shown in Figure 9. This area is presently a grass field and will not be specifically prepared prior to use. Materials taken to this area will be crushed by a dozer and disposed as rubbish.

### Security

The areal extent of the Fireworks site does not lend itself to routine personnel security or physical barriers. The work areas as presently define are easily accessible by the public. However, during operations at a particular work site, such as the MIT Waste Pit, public access will be prohibited. On-site personnel will be instructed to discourage curiosity seekers and persons who inadvertently wander into the work area. Public access during off hours will be controlled to the extent practicable with the use of a chain barrier across the MIT Waste Pit access road and by the placing of warning signs around work areas.

Heavy equipment, such as a backhoes, dozers, etc., will be stored in the temporary storage area within view of the Landers garage. The storage area will not be fenced. Precautions will be taken by the operators to disable the equipment until its next use.

The staging area for hazardous wastes will be surrounded by a snow fence. This area will be adjacent to the equipment storage area and be in view from the Landers garage.

Weekend and evening security measures will not be taken at the non-hazardous materials staging area. As with the other work areas, the general public will be prohibited from this staging area during the daytime.

#### Manpower Requirements

The ENSCO site personnel team will consist of a minimum of: two (2) heavy equipment operators, two (2) technicians, and one (1) foreman/safety officer. Their specific job responsibilities are as follows:

- \* Equipment Operators - maintain and operate the heavy equipment, such as the backhoe, dozer, etc.
- \* Technicians - perform all manual work, handle drums and debris, and assist the equipment operators.
- \* Foreman/Safety Officer - supervise all field operations and ensure the safety of all site personnel

During on-site operations, GEC personnel will assist ENSCO in coordinating the removal effort. GEC personnel will not be directly involved with individual removal tasks, such as handling drums. Tasks performed by GEC personnel will include: overall field supervision; relocating drums and debris for removal; assistance in decontamination; additional reconnaissance as necessary; and ambient air monitoring as necessary. The GEC team will consist of one (1) field manager and staff technicians as required.

Other persons who may monitor the removal effort include representatives from EPA, State regulatory agencies, the Town, Drinkwater Investment and MIT.

### **Equipment Requirements**

The equipment required for the remediation effort at the site consists of heavy and manual equipment. The heavy equipment will be used to gain access to remote locations, remove and transport drums to the staging areas, and crush non-hazardous materials for disposal. The equipment will consist of a track dozer, backhoe and an All Terrain Vehicle (ATV) with trailer. In addition, a rowboat will be used by personnel to gain access to drums located in Factory Pond. Other heavy equipment may be required as needed.

ENSCO personnel will be equipped to clear vegetation for access to isolated drums and manually handle the drums as required. Manual equipment to be available for use include: chain saws, machetes, chippers, and other hand tools.

There will be sufficient safety equipment to protect a minimum of four (4) site workers. Disposable and respiratory equipment for Levels B, C, and D will be available for use depending upon work conditions. Any Level B and C operations will be conducted by two (2) fully equipped persons. Two (2) complete sets of Level B and C gear will always be available for emergency response. As part of the health and safety program, decontamination equipment will be available for all levels of protection. The site safety plan describes in detail the equipment requirements and procedures.

### **Removal Work**

#### **General Drum Removal Operations**

A three (3) member team of GEC and ENSCO personnel will relocate drums selected for removal pursuant to this Revised Scope. An ATV with a trailer will be used to collect and transport drums to a central collection point. Personnel will use hand tools to assist in removal of the brush to access drums, as needed. Generally at each area drum removal will be done in phases. Empty and identified non-hazardous drums will be removed first. Easily accessible drums containing hazardous materials will be collected second, followed by excavation and removal of drums with unknown contents. This method will speed up the work and require the wearing of higher levels of protective equipment only when necessary.

Drums which contain wastes and do not meet DOT shipping requirements will be

overpacked in 80 gallon salvage drums of steel or plastic as appropriate. These drums have been color coded with orange or yellow spray paint. The salvage drums will be loaded onto the trailer for transport. Empty drums, color coded with blue, will be directly loaded onto the trailer. The ATV will then transport the drums to the waste drum staging or non-hazardous materials staging areas.

Orange and yellow coded waste drums, which contain uncharacterized wastes, and visibly contaminated soil will be excavated and removed to the drum staging area in salvage drums. The contents of those drums will be screened for analysis using a Photovac TIP and pH paper. Laboratory analysis will be performed as specified in the site reconnaissance work plan as described above. The laboratory will provide 24-hour turnaround for the analytical results. These drums will be stored separately in the drum staging area until fully characterized. Should any wastes or soil be determined non-hazardous, the materials will be move to the second staging area for off-site disposal at a sanitary landfill.

#### Landers Drum Site

##### *Planned Scope of Removal*

The one container of hazardous waste identified during the reconnaissance (L-719) will be removed to the staging area. Additionally, partially buried drums will be excavated and screened under the same criteria as other drums identified to date and, if necessary, sampled for laboratory analysis. Any identified hazardous wastes will be appropriately disposed off-site.

Removal will not include any construction debris, scrap metal or any other non-hazardous trash. During removal operations these materials will be placed aside only to the extent that unidentified materials can be accessed. Susquehanna, GEC and ENSCO are willing to cooperate with Drinkwater Investment to arrange for economical and efficient removal of non-hazardous drums or other debris not within this Revised Scope of Work, provided that Drinkwater Investment pay the costs of such removal efforts. Otherwise removal of these materials will be left to Drinkwater Investment.

##### *Removal Procedures*

In order to excavate partially buried drums from this site, vegetation will be cleared using chain saws and the bulldozer when possible. An access road will be

cleared using heavy equipment. Unidentified drums will be excavated by hand or with a backhoe. If necessary, potentially hazardous drums will be loaded on the ATV trailer for transport to the staging area. The backhoe will also be used to move aside large pieces of debris and to carefully excavate partially buried containers.

### Factory Pond Area

#### *Planned Scope of Removal*

All containers or drums identified as being partially buried or having unknown contents in the reconnaissance of this area will be collected and screened under the same criteria as other drums identified to date and, if necessary, sampled for laboratory analysis. Any identified hazardous wastes will be appropriately disposed off-site. Included in this area are the open but completely submerged drums just offshore of the cold dump and on-shore drums along the immediate shoreline from the cold dump. Scrap metal, rubbish, shell casings, and ash are not included under this scope. Susquehanna, GEC and ENSCO are willing to cooperate with the Town to arrange for economical and efficient removal of non-hazardous drums or other debris not within this Revised Scope of Work, provided that the Town pay the costs of such removal efforts. Otherwise removal of these materials will be left to the Town.

#### *Removal Procedures*

Drums will be made available for screening primarily using hand excavation or by dragging them out of the brush using slings, the ATV or other heavy equipment. If necessary, potentially hazardous drums will be loaded on the ATV trailer for transport to the staging area. Access to drums in brush will be obtained using chain saws and machetes.

The anomaly identified during the magnetometer survey at the northwest end of the Southern Waste Burn Pit will be investigated by using the back hoe to dig a trench across the center line of the anomaly. The size of the trench will be approximately 20 feet long, as wide as one bucket width and not exceeding three feet in depth. Depending on the type, hazard and extent of the material uncovered, Susquehanna will discuss a further Revised Scope of Work for this area with EPA.

If possible, submerged drums will be placed in overpacks while still in the water, to prevent the drum from breaking apart during removal. Two employees will work in

waders and gloves to free and then overpack the drums for removal. Another worker will stay onshore to operate a winch or heavy equipment to drag the barrels out after repacking.

### MIT Waste Pit Area

#### *Planned Scope of Removal*

All drums identified in the reconnaissance will be removed and disposed of in the manner described in the general procedures. Removal will be limited to only drums, metal containers, and rusted remnants of drums. Scrap metal, and other debris is not included in this scope.

#### *Removal Procedures*

Surface drums will be removed first. Drums in the demolition pool will be excavated by hand and dragged out from the clearing. No heavy equipment will impinge on the wetland areas adjacent to the site. Excavated drums will be temporarily staged in the clearing for the same preliminary screening done during the site survey, before being transported to the staging areas for further sampling and eventual disposal.

### Factory and Lily Ponds

None of the drums along the shoreline, in the water or on the islands which GEC identified during the reconnaissance was found to contain hazardous waste or substances. The two (2) submerged drums which have not been screened will be collected and screened under the same criteria as other drums identified to date and, if necessary, sampled for laboratory analysis. If possible, the submerged drums will be placed in overpacks while still in the water, to prevent the drum from breaking apart during removal. Two employees will work in waders and gloves to free and then overpack the drums for removal. Any identified hazardous wastes will be appropriately disposed off-site.

Susquehanna, GEC and ENSCO are willing to cooperate with the Town to arrange for economical and efficient removal of non-hazardous drums or other debris not within this Revised Scope of Work, provided that the Town pay the costs of such removal efforts. Otherwise removal of these materials will be left to the Town.



### Undeveloped Woodlands

None of the drums and chemical containers identified during the reconnaissance were found to contain hazardous waste or substances. Therefore Susquehanna will not undertake their removal.

Susquehanna, GEC and ENSCO are willing to cooperate with Drinkwater Investment and the Town to arrange for economical and efficient removal of non-hazardous drums or other debris not within this Revised Scope of Work, provided that Drinkwater Investment and the Town pay the costs of such removal efforts. Otherwise removal of these materials will be left to Drinkwater Investment and the Town.

### Non-hazardous Waste Disposal

Wastes and debris collected within this Revised Scope and deemed as non-hazardous will be stored in the temporary staging area shown in Figure 9 and described above. At the staging area a track dozer or other equipment will crush the materials which consist of empty drums and solid waste in order to reduce the volume for off-site removal. Removal of the crushed material will be provided by a private carrier to a sanitary landfill.

### Hazardous Waste Disposal

All containers of hazardous waste will be collected and stored at the drum staging area. Any drums which do not meet the DOT shipping requirements will be overpacked in 80 gallon plastic or steel drums as appropriate for the waste. Drums containing characterized wastes and ready for shipment off-site will be stored separate from those drums collected and requiring further characterization. Drummed wastes requiring further characterization will be appropriately marked or tagged, sampled in accordance with the procedures discussed in Appendix A, and analyzed on a 24-hour turnaround basis for determination of final disposal.

ENSCO will arrange for the proper transportation and disposal of the waste drums. All wastes will be disposed by a licensed disposal facility.

### **Demobilization**

Demobilization will be conducted in two (2) phases. The first phase will consist

of decontamination of equipment which has contacted any hazardous wastes. The decontamination of heavy equipment, such as the backhoe, is by steam cleaning to remove all traces of material. Manual equipment will be washed and rinsed as described in the site safety plan.

The second phase of demobilization is the removal of all equipment (heavy and manual) and the restoration of the site. Primarily, the staging areas will be cleaned and restored to their former condition. Any temporary fencing will be removed and residual debris taken off-site.

**APPENDIX C**

**MAGNETOMETER SURVEY  
REPORT**

**NATIONAL FIREWORKS I  
HANOVER, MASSACHUSETTS**

**September 27, 1988**

DR. JOHN F. KICK

Geophysical & Geological Consulting

Box 6, Dunstable, Mass. 01827  
(617) 649-6650

MAGNETIC SURVEY  
NATIONAL FIREWORKS I SITE  
HANOVER, MASSACHUSETTS

prepared for

Goldman Environmental Consultants  
161 Forbes Road  
Braintree, Massachusetts 02184

MAGNETIC SURVEY  
NATIONAL FIREWORKS I SITE  
HANOVER, MASSACHUSETTS

Introduction

A magnetic survey was conducted over the MIT Waste Pit and Waste Burn Pit areas within the Fireworks I Site in Hanover, Massachusetts by John Kick, Geophysicist. The purpose of the survey was to determine the extent and depth of concentrations of iron that might include iron drums. The information is needed to support investigations of the site being conducted by Goldman Environmental Consultants of Braintree, Massachusetts.

Magnetic Search Method

Magnetic search methods involve the detection and measurement of anomalies in the Earth's magnetic field caused by the presence of materials with contrasting magnetic susceptibility. Iron and steel objects for example, generally form high magnetic susceptibility contrasts with usual surrounding materials and therefore produce magnetic anomalies. The amplitude, size, and shape of an anomaly depend on the size, shape, and depth of burial of the object searched for, and its magnetic susceptibility contrast with surrounding materials.

Magnetic Field Work

268 measurements of total magnetic field intensity were made at the MIT Waste Pit and Waste Burn Pit on September 13, 1988.

Field equipment included an EG&G Memory-Mag G-856 proton precession magnetometer. The instrument has a resolution of 0.1 gamma. The magnetic field detector is separate from the rest of the instrument and is mounted on an 8 foot staff to provide measurements that are a constant height above the surface of the ground.

A series of magnetic field measurements were made at adjacent base stations at regular time intervals throughout the survey to form the basis of daily variation curves. The base stations were located at sites with typical low gradient "background" magnetic field intensity.

At each of the two areas traverse lines were laid out so that measurements could be made at grid points. The gridded areas are portrayed on the magnetic contour maps of Figure 1.

Each grid is referenced to features on site that were witnessed by Goldman personnel, so that data points can be retrieved.

At the MIT Waste Pit, measurements were made mainly at 10 foot intervals along lines spaced 10 feet apart. Along lines of higher magnetic intensities, measurements were made at 5 foot intervals. In the pond area measurements were made at greater than 10 foot intervals because of obstacles.

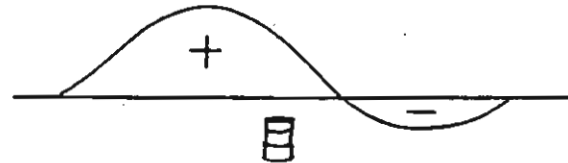
At the Waste Burn Pit measurements were made at 10 foot intervals along traverses normal to the base line. Most of the traverses are 10 feet apart, exceptions being where access was difficult.

### Analysis

Data from the field was reduced by correcting for temporal variations due to extraterrestrial sources, and regional earth field and gradient values. Various considerations involving the site and the data justified the assumption that the base station values could be used directly as reference values. Values were initially read to  $\pm 0.5$  gammas, but such accuracy proved irrelevant considering the large local gradients encountered. Reduced values were contoured with an interval of 100 gammas.

### Interpretation

Anomaly patterns manifested by magnetic contour lines indicate the extent, location and shape of a given source concentration of iron or steel objects. If sufficiently isolated or simple, each anomaly will be seen to have a positive and negative component. The center of any given iron object or cluster of objects causing an anomaly is usually located between the positive and negative peaks, but somewhat closer to the positive as shown in the cartoon below.



Definition of the nature of the sources and of depth of burial at this site is difficult for reasons including the following. Iron objects of all sorts as well as drums are to be found on the surface as well as below. Drums seen on the site show signs of rusting which would lower their contribution to the anomaly magnitude. Attempts were made to calculate maximum depths using simple formulae.

#### Area 1 - MIT Waste Pit

Over most of this site there is a broad, relatively featureless anomaly due most likely to small disseminated near surface objects; (refuse articles, etc.). One relatively large, complex anomaly is seen in the area near the pond, and a smaller anomaly southeast of the larger. Partly exposed drums are visible in the large anomaly area. An especially sharp portion of the anomaly is associated with the "winch post" apparatus at reference point B. The anomaly indicates a concentration of iron objects, possibly drums, trending east - west, 40 - 50 feet long. Rough estimates give a maximum depth extent of 15 feet.

#### Area 2 - Waste Burn Pit

Area 2 shows a complex of interfering anomalies, some with high amplitude, indicating the presence of many concentrations of iron - steel objects in the subsurface. A large source south of the survey area is partially recorded. The southern portion of the "pit" is relatively quiet, and reveals the presence therefore of a relatively small quantity of iron objects, perhaps the equivalent of 20 drums. Proceeding northward the anomalies increase in amplitude and gradient. Most are only partially recorded by the survey. It appears clear from this work that the pit needs further investigation.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
REGION I

In the Matter of:

NATIONAL FIREWORKS SITE

THE SUSQUEHANNA CORPORATION

Respondent.

Proceeding Under Section 106(a)  
of the Comprehensive Environmental  
Response, Compensation and Liability  
Act of 1980, as amended by the  
Superfund Amendments and  
Reauthorization Act of 1986,  
Pub. L. No. 99-499, 100 Stat. 1613  
(October 17, 1986).

U.S. EPA  
Docket No.

I-88-1002

ADMINISTRATIVE ORDER  
FOR REMOVAL ACTION

JURISDICTION

1. This Administrative Order ("Order") is issued pursuant to the authority vested in the President of the United States by Section 106(a) of the Comprehensive Environmental Response, Compensation and Liability Act of 1980 ("CERCLA"), 42 U.S.C. § 9606(a), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), Pub. L. No. 99-499, 100 Stat. 1613 (October 17, 1986). This authority was delegated to the Administrator of the United States



Environmental Protection Agency on January 23, 1987 by Executive Order 12580, 52 Fed. Reg. 2926 (January 29, 1987), and further delegated to the Regional Administrator, EPA Region I by EPA delegation No. 14-14-C. The State of Massachusetts has been given notice of this Order.

#### PARTIES BOUND

2. This Order shall apply to the Respondent the Susquehanna Corporation (Susquehanna) and its agents, officers, employees, receivers, trustees, successors and assigns. No change in ownership or corporate status shall in any way alter Susquehanna's responsibilities under this Order. Susquehanna shall provide a copy of this Order to all contractors, sub-contractors, laboratories, and consultants retained to conduct any portion of the work performed pursuant to this Order within three (3) calendar days of the effective date of such retention. Such contractors, subcontractors, laboratories and consultants shall perform all work in conformance with the terms and conditions of this Order.

#### FINDINGS OF FACT

3. The National Fireworks Site (the Site) is located on approximately 200 acres of land, situated in the Town of Hanover, Massachusetts. The Site is bounded on the

east and south by Factory Pond, on the west by Winter Street, and on the north by residential areas.

4. The Site has a long history of fireworks and munitions manufacturing. In 1907, the production of fireworks began under the auspices of National Fireworks Company (National Fireworks). Under federal order, National Fireworks began producing munitions at the Site during World War II. In 1947, National Fireworks ceased munitions manufacturing, and in the course of winding up its business, disposed of some of its remaining wastes by burning them in a demolition area in the southern end of the Site. This area was also used as a testing range for magnesium flares and 20mm shells during World War II production of munitions and explosives.
5. Sometime after National Fireworks ceased operations, the Site was purchased by American Potash & Company and later by the Atlantic Research Corporation (Atlantic Research). This company was a government contractor which developed and manufactured various explosives for the United States Army and Navy, including land mines and lead azide, RDX (cyclonite) and TNT (trinitrotoluene)-based materials. During the time Atlantic Research operated the Site, various entities

arranged for disposal of hazardous wastes at the Site. Specifically, between 1962 and 1967, the Massachusetts Institute of Technology (MIT) arranged for disposal at the Site of drums containing trichloroethylene, toluene, xylene, benzene and other hazardous substances.

6. In October of 1967, Atlantic Research Corporation merged with Susquehanna, a Delaware corporation, with Susquehanna being the surviving corporation. Susquehanna is engaged through subsidiaries in the manufacture of a variety of building materials and other products. Munitions and explosives manufacturing continued at the Site under the auspices of Atlantic Research, which was then operating as a subsidiary of Susquehanna. In the late 1960's, Atlantic Research ceased the munitions and explosives manufacturing operations at the Site.
7. In December 1972, approximately 130 acres of the Site property (mostly in the vicinity of Factory Pond) was purchased by the Town of Hanover. The Town of Hanover is the present owner. The remaining acres comprising the Site for the most part were retained by Susquehanna until May 1983, when the property was purchased by

Drinkwater Investment Corporation. Drinkwater Investment Corporation is the present owner.

8. EPA became involved with the Site in December 1983 following notification from the Hanover Conservation Commission concerning potential hazardous waste contamination at the Site. A Remedial Site Assessment was conducted in July 1986 to determine the extent of the on site contamination and to assess the potential impact to the surrounding environment. Surface water, sediment and soil samples collected on and adjacent to the Site revealed the presence of hazardous substances, including but not limited to, trichloroethylene, benzene, and toluene.
9. The Site was referred to EPA's Oil and Hazardous Materials Section (OHM) in December, 1987. A Site visit was performed in January 1988, but assessment was limited by snow cover. As partially buried drums were noted at that time, OHM returned to the Site in March, 1988. Test results of a surface water sample taken from a pool of water near the so-called MIT Waste Pit on the Site indicate the presence of trichlorofluoromethane, trichloroethylene, and 1,1,2-trichloro-1,2,2-trifluoroethane in concentrations as high as 270 parts per billion (ppb), 97 ppb, and 23,000 ppb,

respectively. Results of tests performed on a sample taken from a partially buried drum no more than ten (10) feet from the water body indicates the presence of trichloroethylene at a concentration of 1,800 parts per million (ppm). In addition, water samples taken from the so-called MIT Waste Pit indicate the presence of trichloroethylene.

10. In May 1988 EPA sent notices to Susquehanna, MIT, Drinkwater Investment Corporation, and the Town of Hanover to advise them that they were considered "Potentially Responsible Parties" in connection with hazardous waste contamination at the Site.
11. On July 11, 1988, Susquehanna, MIT and the Town of Hanover conducted an investigation at the Site to review EPA's findings. Susquehanna arranged to have two former Atlantic Research employees join the Site visit.
12. On July 20, 1988, Susquehanna, without acknowledging any legal liability, submitted a Proposed Scope of Work for reconnaissance on a removal action at the Site.
13. After refinements of the Proposed Scope of Work by EPA, Susquehanna conducted a comprehensive reconnaissance of the Site, including magnetometer studies of certain

areas designated by EPA and testing of the contents of barrels.

14. Upon completion of the reconnaissance work and submission of results to EPA, Susquehanna submitted a Revised Scope of Work to EPA on October 14, 1988. While continuing to deny legal liability, Susquehanna agreed to undertake certain removal actions and cooperate with Drinkwater Investment Corporation and the Town of Hanover with respect to other potential removal actions.
15. EPA has prepared a final Scope of Work, a copy of which is attached as Exhibit A.
16. Drinkwater Investment Corporation and the Town of Hanover have executed Access Agreements with Susquehanna to afford Susquehanna access to the Site for removal actions. Those Access Agreements are attached hereto, respectively, as Exhibits B and C.
17. Endangerment. Samples taken by EPA's Oil and Hazardous Material Section reveal the presence at the Site of the hazardous substances identified in Paragraph 9 herein. The barrels found on Site are partially buried and visual observation clearly reveals that their

structural integrity has deteriorated. The fact that trichloroethylene from a deteriorated drum was found in surface water indicates that a release of a hazardous substance into the environment has occurred. In addition, the close proximity of the drum to the surface water presents a threat of continued or additional release of hazardous substances into the soil, surface water and groundwater on or about the Site. Moreover, the Site is located in an open area which is readily accessible to trespassers. Thus, the potential for human exposure exists.

#### DETERMINATIONS

18. On the basis of the findings of fact cited herein, EPA has determined that:

- a. Chemicals found on the Site are "hazardous substances" within the meaning of Section 101(14) of CERCLA, 42 U.S.C. § 9601(14).
- b. The past, present, or potential future migration of hazardous substances at or from the Site constitutes an actual or substantial threat of a "release" as that term is defined by Section 101(22) of CERCLA, 42 U.S.C. § 9601(22).

- c. The actual releases or threatened releases of hazardous substances from the Site may be an imminent and substantial endangerment to the public health or welfare or the environment within the meaning of Section 106(a) CERCLA, 42 U.S.C. § 9606(a).
  - d. The property comprising the Site is a "facility" within the meaning of Section 101(9) of CERCLA, 42 U.S.C. § 9601(9).
  - e. Respondent Susquehanna is a "person" within the meaning of Section 101(21) of CERCLA, 42 U.S.C. § 9601(21).
  - f. Respondent Susquehanna was the owner of a facility at the time of disposal of hazardous substances and is therefore a potentially responsible party pursuant to Section 107(a)(2) of CERCLA, 42 U.S.C. § 9607(a)(2).
19. In order to protect the public health and welfare and the environment, and reduce further release of hazardous substances from the National Fireworks Site, it is necessary and appropriate that a removal action be taken to abate the danger and threat that may be posed by the actual or threatened release of hazardous substances. EPA has



determined that such actions include the implementation of the Work Plan, attached hereto as Exhibit A.

ORDER

Based upon the above Findings of Fact and Determinations it is hereby ordered:

20. Susquehanna shall forthwith retain the services of a qualified and experienced contractor and shall abate forthwith the imminent and substantial threat posed by the hazardous substances in accordance with the terms and conditions of the Work Plan appended hereto as Exhibit A. Such removal activities include, but are not limited to, the sampling, excavation and proper disposal of the drums on the Site. All work pursuant to the Work Plan shall be consistent with the National Contingency Plan (NCP), 40 CFR Part 300, and any amendments thereto.
21. Susquehanna in conjunction with its contractor shall within two working days of receipt of this Order submit the name and address of the contractor required by paragraph 20 and the name and telephone number of the primary contact person for that contractor.

22. EPA will review each plan, drawing, specification, or other document submitted in accordance with paragraphs 20 and 21 above, within 14 days of receipt, and approve, disapprove, or require modifications to, each of them. Upon receipt of EPA approval of the plan, drawing, specification, or other document, the Respondent shall implement it as approved, including all schedules and timetables contained therein.
23. No later than thirty (30) days after the completion of the response activities at the Site, as specified in paragraphs 20 through 22 or in plans or documents developed thereunder, Susquehanna shall submit to EPA a complete written report describing the response activities, including all monitoring data and documentation to verify that the work was performed in accordance with the Work Plan.

#### DESIGNATION OF COORDINATORS

24. Within twenty-four hours of the receipt of this Order the Susquehanna shall designate a coordinator who shall be responsible for administration of all actions called for by this Order, and shall submit his name, address, and telephone number to EPA. The EPA On-Scene Coordinator (OSC) will administer EPA's responsibilities and receive all written matter required by this order. EPA will submit the name, address and telephone number of its OSC to Susquehanna's coordinator.

25. EPA's OSC shall have the authority vested under the National Contingency Plan, 40 C.F.R. Part 300, and any amendments thereto, including, but not limited to, the authority to stop work being performed pursuant to this Order. Absence of the OSC from the Site shall not be cause for stoppage of work by Susquehanna.

#### ACCESS

26. To the extent authorized by law and the Access Agreements attached as Exhibits B and C, Susquehanna shall allow EPA's OSC and other employees, agents, consultants, contractors, and authorized representatives of EPA to enter the Site and freely move about all areas where work is being carried out pursuant to this Order at all reasonable times, including, but not limited to, any time that work is being carried out pursuant to this Order, for the purpose of conducting any activity authorized by CERCLA, including but not limited to inspecting and observing progress in implementing the activities undertaken pursuant to this Order, verifying the data submitted to EPA, and taking samples or split samples. Susquehanna and its contractor(s) shall permit such persons to inspect and copy all records, documents, and other writing pertaining to the work performed under the Order.

27. In the event that Susquehanna encounters any difficulties in gaining access to the Site under the Access Agreements attached as Exhibits B and C, Susquehanna will notify EPA promptly with a complete description of the reasons for the failure to gain access.
28. Nothing herein limits or otherwise affects any right of entry held by EPA pursuant to applicable laws, regulations or permits.

RECORD PRESERVATION

29. Until six (6) years after completion of all response actions at the Site, whether or not undertaken pursuant to this Order, Susquehanna shall preserve and retain all records, documents and information of any kind in its possession or in the possession of its officers, divisions, employees, agents, accountants, contractors, attorneys, successors and assigns, that relate in any way to the performance of work at the Site or releases or threatened releases of hazardous substances from the Site. Upon completion of work at the Site and termination of this Order, and upon request of EPA copies of all such records, documents, and information shall be delivered to the On-Scene Coordinator.

SUBMITTAL OF INFORMATION TO EPA

30. Upon request by EPA, Susquehanna shall provide copies to EPA of all records, documents and information generated by Susquehanna and its contractors in the course of performing work at the Site including, but not limited to sampling and analysis records, field sheets and field notes, engineering logs, chain of custody records, contracts, bills of lading, trucking logs and correspondence.
31. Susquehanna's employees, agents or representatives with knowledge of relevant facts concerning the performance of work at the Site shall be made available to EPA upon reasonable notice and at reasonable times and places to provide information concerning the performance of such work.
32. Susquehanna shall submit to EPA the results of all sampling or tests and all other data generated by Susquehanna or its contractors, or on Susquehanna's behalf, in the course of implementing this Order upon receipt of such information by Susquehanna.
33. At the request of EPA, Susquehanna shall allow split and/or duplicate samples collected by Susquehanna pursuant to the implementation of this Order. Susquehanna shall provide EPA reasonable notice prior to any sample collection activity.

CREATION OF DANGER

34. Upon the occurrence of any event during the activities conducted pursuant to this Order that causes or threatens a release of hazardous substances from the Site or an endangerment to human health or the environment, Susquehanna shall notify within twenty-four (24) hours the On-Scene Coordinator or, in the event of his or her unavailability, shall notify within the same twenty-four hour period the EPA Emergency Response Unit, telephone (617) 223-7265. Upon request of EPA, Susquehanna shall forthwith submit a written report setting forth the events that occurred and the measures to be taken to mitigate any harm caused or threatened by the event and to prevent the reoccurrence of such an event.
35. Whether or not a report is made to EPA pursuant to the preceding paragraph, if EPA determines that activities in compliance or noncompliance with this Order have caused or may cause a release of hazardous substances or a threat to human health or the environment, then EPA may:
- a. Order Susquehanna to stop further implementation of this Order for as long as may be needed to abate any such release or threat; or
  - b. Undertake any actions that EPA determines are necessary to abate such release or threat.

OTHER APPLICABLE LAWS

36. All actions required to be taken pursuant to this Order shall be undertaken in accordance with the requirements of all applicable local, state and federal laws and regulations, including laws relating to occupational health and safety.

NOTIFICATION TO LOCAL OFFICIALS

37. Susquehanna shall ensure that local officials, including but not limited to local police and fire department officials, are given reasonable notice of any work undertaken pursuant to this Order prior to the time such work is undertaken.

RESERVATION OF RIGHTS BY EPA

38. EPA expressly reserves all the rights and defenses that it may have, including EPA's right both to disapprove of work performed by Susquehanna and to request or order that Susquehanna perform tasks in addition to those detailed in the Order. In addition, EPA reserves the right to undertake removal actions and/or remedial actions at any time and to perform any and all portions of the work activities which Susquehanna has failed to perform. EPA reserves any and all rights to take any enforcement action pursuant to CERCLA and/or any available legal authority, including the right to

seek injunctive relief, monetary costs, damages or penalties, or punitive damages for any violation of law or of this Order.

DISCLAIMER

39. The United States government, including EPA, shall not be liable for injuries or damages to persons or property resulting from acts or omissions by Susquehanna, its employees, agents or contractors in carrying out activities pursuant to this Order. The United States government and/or EPA shall not be held as a party to any contract entered into by Susquehanna or its agents in carrying out activities pursuant to this Order.

NO PREAUTHORIZED FUNDING

40. Nothing in this Order shall be deemed to constitute any decision on preauthorization of funds under Section 111(a)(2) of CERCLA, 42 U.S.C. § 9611(a)(2), or 40 C.F.R. § 300.25.

AMENDMENTS; INCORPORATION BY REFERENCE

41. This Order may only be amended in writing by signature of the Regional Administrator of EPA, Region I. Amendments involving the Work Plan may be made by verbal direction of the OSC and confirmed by written change order.



42. Any contracts, reports, plans, specifications, schedules, and attachments required by this Order are, upon approval by EPA, incorporated into this Order.

43. No informal advice, guidance, suggestion, or comment by EPA regarding reports, plans, specifications, schedules, and any other writing submitted by Susquehanna will be construed as

relieving the Susquehanna of its obligations to obtain such formal approval as may be required by this Order.

#### PUBLIC ACCESS TO INFORMATION

44. Susquehanna may assert a confidentiality claim, if appropriate, covering part or all of the information required by or requested under this Order pursuant to Section 104(e)(7) of CERCLA, 42 U.S.C. § 9604(e)(7) and 40 C.F.R. 2.203(b). Such an assertion shall be adequately substantiated when made. Analytical data and other data specified in section 104(e)(7)(F) of CERCLA, as amended, shall not be claimed as confidential by Susquehanna. Information determined to be confidential by EPA will be afforded the protection specified in Section 104(e)(7) of CERCLA and 40 C.F.R. Part 2, Subpart B. If no such claim accompanies the information when it is submitted to EPA, it

may be made available to the public by EPA without further notice to Susquehanna.

PENALTIES FOR NON-COMPLIANCE

45. Pursuant to Section 106(b) of CERCLA, 42 U.S.C. § 9606(b), Susquehanna is advised that if, without sufficient cause, it willfully violates or fails or refuses to comply with this Order, Susquehanna may be fined in a civil action brought in federal district court up to twenty-five thousand dollars (\$25,000) for each day in which such violation occurs or such failure to comply continues. In addition, pursuant to Section 107(c) of CERCLA, 42 U.S.C. § 9607(c), failure to comply with this Order, without sufficient cause, may also subject Susquehanna to liability for punitive damages in the amount of three (3) times the amount of any costs incurred by the United States government as result of Susquehanna's failure to take proper action.

EFFECTIVE DATE - OPPORTUNITY TO CONFER

46. This Order is effective on the date of receipt by Susquehanna. Susquehanna may within twenty-four (24) hours after receipt of this Order request a conference with EPA to discuss the correctness of any factual determinations upon which the Order is based, the applicability of this Order to Susquehanna, and the appropriateness of any action Susquehanna is ordered to take. At any conference held

pursuant to Susquehanna's request, Susquehanna may appear in person or by attorney or other representative for the purpose of presenting any objections, defenses or contentions that it may have regarding this Order. If Susquehanna desires such a conference, it may contact Francisco Leal, Assistant Regional Counsel, U.S. EPA, Region I, JFK Federal Building Room 2203, Boston, MA, 02203, (617) 565-3438, within the time set forth above for requesting a conference.

IT IS SO ORDERED. Issued at Boston, Massachusetts this  
5th day, of December, 1981.

Paul M. Keough Acting  
Michael R. Deland  
Regional Administrator

## APPENDIX A

The following is the Scope of Work (Work Plan) to be employed at the Fireworks - Factory Pond Site and the Fireworks - Winter Street Site Removal Actions

### INTRODUCTION

The Fireworks-Factory Pond Site and the Fireworks-Winter Street Site are commonly referred to cumulatively as the "National Fireworks I Site", the "Fireworks I Site", or the "Fireworks Site."

Regardless, the physical boundaries of land in the Town of Hanover, Massachusetts to which this work plan applies is specified by both words and maps herein. The term "site" as used in this, the work plan proper, will be taken to mean all such land herein described. Use of the term "site" in this appendices and on maps may not refer to this entire plot of land.

Adherence to this plan is required. The means and methods set forth herein are a minimum. Any more stringent, exacting, or safe method may be employed.

The intent of this plan is to mitigate the release or threat of release of hazardous materials into the environment, and prevent exposure of the general public to any such release, by means of proper disposal off-site of all hazardous substances found at the Site.

### DESCRIPTION OF THE SITE

#### Areas

##### Landers Drum Area (Fireworks - Winter Street Site)

This area is located approximately 200 yards west of the P.A. Landers Co. garage in an isolated wooded area. The boundaries for this Area extend to the edge of the vegetation where the drums lie (see figure 3). An embankment at the north end of the Area contains a number of partially buried drums. There are two piles of partially burned rubber toys. Some powdery chemical spillage is present in one place in the Area. Most drums are found in a pit, apparently manmade, that is now overgrown with young pine and maple trees.

##### Factory Pond Demolition Area (Fireworks - Factory Pond Site)

This Area is defined as the approximately 11 acre parcel of land adjacent to Factory Pond where most of the past waste combustion and detonation occurred (see Figure 4). This includes the location where drums were discarded and detonated in the Pond: the location now used as a target shooting range; and the woods

bordering the access roads between the Drinkwater Investment property and the MIT Waste Pit Area.

The Factory Pond Demolition Area contains 46 visible 55-gallon drums and 63 other metal containers. The drums are scattered over the entire Area described above. Drums are heavily concentrated to the north and south of the cold waste dump area, around the Northern Waste Burn Pit, and in the woods along the southern border of the Area.

A magnetometer survey has been conducted. Large anomalies that appear distinct from the surface interference have been identified at both ends of the pit.

#### MIT Waste Pit Area (Fireworks - Factory Pond Site)

The MIT Waste Pit Area consists of a clearing, approximately one-half acre in size, and an abutting small pool at the southern end of the Area (see Figure 5). This Area includes the original clearing, identified in aerial photos and still present; the small excavated pool between the clearing and the wetland; and the woods immediately surrounding the clearing.

The MIT Waste Pit Area contains 21 visible drums, and 20 smaller containers. Most of the drums are found in a mound at the center of the site and in the swamp to the west. Scattered drums are located just to the north. The Area contains twenty-one 55-gallon and 20 smaller containers.

A magnetometer survey of the clearing was completed. Results indicate more than one anomaly is present.

#### Factory and Lily Pond Areas - (Fireworks - Factory Pond Site)

The Factory and Lily Pond Areas consist of the Factory and Lily Ponds: extending from approximately one-quarter mile along the Drinkwater River upstream of Factory Pond to the outfall of Factory Pond and the two islands in Factory Pond.

Thirty-four drums and 19 smaller containers are known to be present in Factory and Lily Ponds. The highest concentration of drums is found along the shore to the north of cold waste dump area.

#### Undeveloped Woodland Area (Fireworks - Factory Pond and Winter Street Sites)

The Undeveloped Woodland Area is the area of undeveloped woodlands not included in any of the above-described Areas. The Undeveloped Woodland Area contains 36 visible 55-gallon drums and 44 other metal containers. The drums are scattered over a large area. There are no specific concentrations of drums or

containers, but they are typically located close to roads or old bunkers.

## II. REMOVAL PROCEDURES

### General

#### 1. Site Safety Plan

All work carried out pursuant to this work plan will be in compliance with the Safety Plan which is attached as Appendix B.

#### 2. Site Access

The respondent of this order will obtain all and maintain all required access as provided in Paragraphs 26 and 27 of this Order.

#### 3. Contractor Mobilization

The contractor will mobilize its equipment and set up operations at the site pursuant to the removal action timetable set forth herein. Mobilization will include construction of staging areas, clearing access routes to Areas, and the implementation of all necessary security measures.

#### 4. Disposal

All materials disposed off-site pursuant to this plan will be in accordance with all applicable regulations. All facilities that will receive hazardous waste will be RCRA approved.

#### 5. Restoration

a. Trenching (magnetic anomaly investigation) - In light of the hazards posed by open trenches, soil removed will be replaced. In no case will any potentially contaminated soil from below grade be left at the surface upon final demobilization from the site.

b. Drum excavation - For similar safety concerns, holes created will be filled with soil to the grade existing prior to excavation.

#### 6. Demobilization

Activities will be completely concluded in one Area before commencement of activity at another Area. No material, either collected pursuant to performance of this work plan, or brought to the site by the contractor will remain at the site after final demobilization of all personnel.

### Specific

#### 1. Command Post Locations

A command post will be established at each Area. Figures 6 through 8 (attached herein) show the approximate location of the command post at each of the above-referenced Areas.

#### 2. Parking

The contractor will make arrangements for parking of vehicles as necessary. No personal vehicles will be permitted near the designated work Areas.

#### 3. Communications

On-site communications will be provided by the contractor. Communications will consist of fully functional two-way radios. Each radio will undergo daily tests for proper function prior to use by on-site personnel. In addition, commands issued during an emergency to personnel will be augmented with warning whistles and/or bullhorns as stipulated in the safety plan. Radio contact will be maintained between operators of heavy equipment, technicians assisting in excavation, the field foreman, and the command post. Off-site communications will also be provided.

#### 4. Staging and Storage Areas

There will be one (1) storage area and two (2) permanent staging areas established for the removal operations. The storage area will be for the heavy equipment, such as dozers, backhoes, etc. The location of the storage area is shown in Figure 9.

Two (2) permanent staging areas will be established near the Landers gravel pit. The first will be designated for the unidentified or hazardous waste containers collected or excavated from the target Areas. This drum staging area will be adjacent to the equipment storage area on G Street east of the Landers Drum Area. Refer to Figure 9. The permanent drum staging area will be as large as necessary, cleared of all vegetation, bermed, and lined with one thickness of 100 mil polyethylene. A snow fence will surround the drum staging area. Hazardous waste warning signs will be posted, at least one per side of the area.

The second staging area will be developed as needed for any contaminated soil that may be collected while carrying out this work plan. It will be prepared as the drum staging area, except that two thicknesses of 100 mil polyethylene will be used.

If empty containers are collected, a separate area will be designated for them.

Temporary staging areas will be established at remote locations, i.e., away from Landers' personnel, for the purpose of opening and sampling containers. After sampling and overpacking are

completed, containers will be brought to the permanent staging area.

#### 5. Security

During operations at each Area, public access will be prohibited. On-site personnel will be instructed to discourage curiosity seekers and persons who inadvertently wander into the work area. Caution tape will surround the entire work area until all operations in that Area are complete. Appropriate security measures must be taken during off-hours to restrict access to the Site. Drums containing hazardous materials must be properly secured during off-hours by a security guard.

Heavy equipment, such as a backhoes, dozers, etc., will be left overnight in the storage area within view of the Landers garage, when not used for securing an excavation or trench left overnight. The storage area need not be fenced. Precautions will be taken by the operators to disable the equipment until its next use.

Any area that will have a hole (excavation or trench) left overnight will be cordoned off with hazard tape, and will be covered with plywood or other suitable material to prevent injury to unauthorized personnel. Such an area accessible by vehicle will be blocked by heavy equipment being used on-site. If access can not be completely denied by this means, saw horses affixed with reflective markings will surround the excavation or trench.

#### 6. Manpower Requirements

The contractor will provide all personnel required to carry out this work plan.

#### 7. Equipment Requirements

a. The contractor will provide all equipment necessary to carry out this work plan. All equipment will be decontaminated in accordance with the specifications set forth in this plan.

b. There will be sufficient safety equipment to protect all personnel that require it, in accordance with the safety plan.

c. The contractor will also provide all sampling equipment and containers necessary to take any and all samples needed to fulfill the requirements of this scope of work as well as perform all documentation required by this plan, and provide all materials necessary for, or incident to, this task.

#### 8. Removal of Drums from Water

a. Containers in water that have been determined to be open will be removed through use of the row boat and/or men in waders. Drums that are sealed, or believed to be sealed, and can be accessed by heavy equipment will be removed by heavy equipment.



Any practical effort to eliminate or reduce the possibility of release will be made, including overpacking of drums underwater.

9. Overnight Containment

a. Any soil, whether in an excavation, trench, or stockpile, to be left overnight and which contains an exposed drum and/or is emitting unidentified total organic vapors above 5 parts per million at breathing height when standing upon or adjacent to the soil, and for which it is impractical to meet Restoration requirements set forth elsewhere in this plan, insofar as work will continue the following day, will be covered with one thickness of 100 mil polyethylene for the purpose of reducing or eliminating migration of vapors and minimizing precipitation infiltration.

10. Excavation

Start-up procedures

a. An access road will be cleared to the known drum deposit using hand tools and/or heavy equipment, as necessary. The approach will be determined in the field such that the entire drum deposit is in front of the vehicle, i.e., equipment will not be driving over partially buried drums. A line will be cleared perpendicular to the deposit relative to the direction from which the equipment has approached the deposit.

b. A temporary staging/sampling area will be established either by means of clearing and grubbing, as necessary, or, immediately outside the vegetated area surrounding the drum deposit. It will be bermed and lined with two thicknesses of 100 mil polyethylene. Ample bags of sorbent material will be located at this area. Aisles of will be maintained such that every container can be accessed by personnel.

c. The work area will be cordoned off with hazard caution tape.

d. Empty containers and other debris will be removed to a designated area, or otherwise taken out of the way of drum removal operations.

e. Non-empty surface drums will be transported to the temporary staging area for sampling. Drums will be overpacked prior to transport if leaking, or potential for leaking is deemed imminent.

Barrel extrusion

a. Barrels will be excavated starting with those partially buried and visible on the surface. Before proceeding beyond the line cleared (as described above), the excavator or backhoe

(hereinafter, excavator) will dig into the soil in front of the excavator to a depth not less than three feet to assure it will not drive upon drums buried just below the surface, or any other shallow subsurface feature that may not support the weight of the vehicle. The operator may, regardless, decide not to proceed at any time if vehicle stability is in question.

b. Personnel directly involved with excavation will adhere to the following guidelines:

- i. Two laborers in level B will assist in clearing away any overburden, assist in attaching lifting slings and/or assist in overpacking, as necessary. Heavy equipment will lift drums and move them to a pick-up point for transportation to the temporary staging area. The contractor will avoid contamination of the tires/undercarriage of the transport vehicle to minimize the spread of contaminants throughout the Area, as practicable. Where heavy equipment cannot be used, laborers using shovels will dig out the drums until a chain or sling can be securely attached. Two laborers in the excavation will operate as a team.

- ii. The equipment operators involved in the removal of barrels will have air supplied to them from cylinders secured to their vehicles.

c. Overpack drums will be present adjacent to the excavation to immediately contain leaking drums, or those for which the potential to leak is deemed imminent.

d. All equipment will be decontaminated by steam cleaning or flushing with high pressure water before leaving the site.

#### Contaminated Soil

a. All soil that is visibly contaminated, or observed to have been contaminated with container contents as a result of this operation, will be excavated and stockpiled.

#### 11. Opening Containers

a. Opening of sealed containers will be done in the temporary staging area, remotely, using the excavator affixed with a non-sparking spike. All containers that have been opened, or are open or without a lid, will be covered with polyethylene before leaving the site for the evening.

## 12. Sampling

### General

- a. All containers that do not meet the criteria of an empty container as specified in 40 CFR 267.1 will be sampled.
- b. Sample jars will be that (those) prescribed by the analytical method to be performed on the sample contained therein.
- c. All samples taken pursuant to this work plan are subject to all applicable requirements set forth in any part of this plan.

### Containers

- a. All container sampling will be carried out in the temporary staging area.
- b. Solid material will be considered any material that can not be poured from the container nor can be sampled using the method prescribed for liquids. Solids will be scooped, chiseled, cut, or otherwise removed from the container using non-sparking tools. If tools so used are not disposable, they will be decontaminated by wiping thoroughly with a clean cloth to remove all visible material, or any other more stringent method, as may be prudent in consideration of the analytical method to be employed. Disposable tools will be used to sample only one container, then collected for disposal as contaminated trash.
- c. Liquid material will be removed from its container in the following fashion. A glass tube of a length greater than the maximum depth of the container being sampled and of suitable diameter shall be carefully inserted into the container until the bottom of the container or solid layer is encountered. The tube will then be capped to create a vacuum, and withdrawn from the container. The vacuum will be broken, and the material held in the tube allowed to pour into the appropriate sampling container. This process will be repeated until the required amount of sample has been obtained. A clean, new, unused glass tube will be used for every container. When sampling is complete, tubing will not be put into the container. It will be collected and disposed of as contaminated trash. Samples to be taken from containers sufficiently small to be picked up by a single person, such as a five-gallon bucket, may be poured directly into the sample container, if desired.
- d. If a liquid sample can be seen to have more than one layer, or phase, a sufficient quantity of each layer will be collected to allow all required analyses to be performed on each layer.

e. If a solid layer is present below the liquid in the container of a thickness of more than one inch, the liquid phase will be poured off into another container to permit sampling of the solid layer.

#### Trenches

a. Sampling in trenches is specified under the section titled "Magnetic Anomaly Investigation".

#### Drum Excavations

a. Samples will be taken from the bottom of every excavation, at a frequency of not less than one per two-hundred-fifty square feet of excavation, but in no case be less than two per Area, and not less than one per discreet excavation in any Area, a discreet excavation not being every individual drum, but rather, a group of drums at one location within the Area. Safety precautions pertaining to depth of excavation as specified in Magnetic Anomaly Investigation of this plan will be observed.

#### Surficial Contamination

a. Material on the ground that was determined present by the GEC reconnaissance that does not naturally occur, or can reasonably be assumed not to occur naturally, such as "powdery chemical spillage" or "partially burned rubber toys," will be sampled.

### 12. Documentation

a. Each container discovered to-date has been given an alphanumeric designation and color coded. These shall be redesignated and/or recoded to meet the specifications of this work plan. All additional containers discovered will be labelled in the same manner. All additional labelling made necessary by discovery of more container will be carried out.

b. All jars of sample taken from a specific container will be labelled exactly as the container.

c. The chain of custody of samples will be maintained. All sample containers will be labelled at the time the sample is taken. Any sample removed from the sampling area (the temporary staging area) without an identifying alphanumeric designation will be considered without chain of custody. Chain-of-custody stickers will be affixed to all sample jars before said samples leave the site, or before being left overnight at the site. Any sample for which this is not done will be considered without chain of custody. Chain-of-custody forms will be completed prior to shipping samples off site, and accompany samples at all times during transport. Any sample shipped otherwise will be considered without chain of custody.

Any sample that is without chain of custody for any reason will be resampled. Analysis performed on samples without proper chain of custody will be considered invalid, and required to be performed again.

d. Drum investigation data will be compiled for every container, ~~as outlined in the attached example labelled "Exhibit A1"~~. The physical state of drum contents and characteristic of the container will be noted for every container so as to conform to the Analyses section of this work plan to assure there is no confusion as to the analytical tests that are required. All such information will be given to the EPA before demobilization.

e. Photographs will be taken as deemed necessary. One copy of each will be provided to the EPA before final demobilization.

### 13. Magnetic Anomaly Investigation

#### a. General

As used hereinafter, the terms "source of anomaly" and "source" will be defined as "any deposit of metal with a mass and density sufficient to account for the anomaly(ies) in the Area.

Trenching will be employed to reveal the source(es) of magnetic anomalies that are indicated present as a result of the magnetometer survey that has been performed. If containers are present, the entire extent of containers will be determined, and all such containers, metal or otherwise, which have not been demonstrated to meet the criteria of 40 CFR 267.1 will be excavated and handled in accordance with all applicable criteria set forth in this scope of work.

#### b. The Waste Burn Trench

##### Trenches Perpendicular to the Baseline

The Waste Burn Trench is shown as Area 2 in Appendix C. It will be investigated by a series of trenches. The baseline represented on the area 2 map will be established in the field. The first trench will be dug perpendicular to the baseline through point B for a distance of no less than fifty feet on each side of point B. This will be hereinafter called the B trench.

- i. If no containers of any kind are encountered at either end of this or any trench, the end being the 10 foot segment of trench furthest from the midpoint of the trench, the trench need not be extended additionally.
- ii. If containers are encountered at either end of a trench, the trench will be continued until 10 continuous feet are dug which do not contain containers.

No less than one parallel trench will be dug on each side of the B trench, each being a distance of eighty feet from the B trench.

- i. If no containers are discovered in the trench furthest from the B trench, no additional trenches oriented in this way, and further from the B trench, are required.
- ii. If containers are found in this furthest trench, additional trenches will be dug every forty feet until one is dug that does not contain containers.
- iii. The entire area between trenches in which containers are found will be excavated or trenched to the extent that all containers are exhumed, as well as all area between the furthest trench from the B trench which contains containers, and the furthest trench from the B trench that does not contain containers.

b. The MIT Waste Pit Area

Trenches will be dug in this Area after excavation of the known drum deposit. Trenches dug will start at the edge of the completed excavation, and be of a quantity and length sufficient to pass over each distinct anomaly that has been identified and remains uninvestigated.

c. Depth of trenches

All trenches will be of a depth not less than the maximum extent of the operational limitations of the equipment used, unless bedrock is encountered, groundwater fills the trench with soil as fast as it can be removed, or a source of anomaly is discovered.

The depth of the trench will be measured from the typical elevation of the area, and not from a local depression or mound. Specifically, measurements in the burning trench area will not be made from the mounded soil, but rather, from the surrounding grade. The accuracy which can be obtained through use of a standard tape measure will be sufficient.

d. Soil and Water Sampling

At both Areas, two samples will be taken from the B trench, and all those parallel to the B trench. Samples will be taken a distance of twenty-five feet from extreme end of the trench. Samples will be of either soil or groundwater, whichever is present at the bottom of the trench at that point. However, no less than twenty percent of all samples taken will be soil. That is, if the bottom of all trenches is groundwater, a sample of soil will be taken from between six and twelve inches above

the water level. These locations will be selected symmetrically about point B, and spread evenly over the entire trenched area.

As the extent of a trench will be determined by field conditions using the above criteria, the point of sampling can not be established until the end of the trench is reached. Thus, to minimize the volatilization of certain organic vapors, the sampling point will be established immediately after the end of the trench has been defined. A standard tape measure will be sufficiently accurate. Personnel to take samples will be ready to take samples immediately upon establishing the sample point.

Groundwater samples will be taken remotely from the edge of the trench. Soil samples will be taken either remotely from the top of the trench, or by personnel entering the trench, however, no person will enter an unsupported trench of a depth greater than five feet, nor any trench of a depth less than five feet when hazardous ground movement may be expected, nor any trench of a depth greater than four feet without a ladder or other means of egress located such that no more than twenty-five feet of lateral travel is required to reach said point of egress. All other applicable OSHA regulations will be employed.

To the greatest extent possible, all sampling devices will be disposable. New, clean, and unused devices will be used for every sample. If not disposable, the devices will be decontaminated between each sample location by means of washing with a mild detergent in water solution, and thoroughly drying with a clean cloth.

#### e. Documentation

A log will be kept noting soil type, stratification, depth to source of anomaly, description of anomaly, maximum depth of trenches every twenty feet if not noted otherwise, water table, sample depth, and concentration of organic vapors at the location where the sample is taken. A map will be drawn noting all sample locations, extent of trenches, and locations of anomaly(ies). Both a copy of the original field log and field map will be delivered to EPA. Both a typed copy of the field log will be delivered to the EPA, as well as a final map.

#### Air monitoring

a. Air monitoring will be performed in accordance with the site safety plan.

#### 14. Analyses

##### a. General

All samples taken pursuant to this work plan will have performed on them the analytical tests and corresponding quality assurance/quality control (QA/QC) specified in this section.

Analyses that require extraction will utilize only approved methodology.

##### b. Containers

###### Screening

As a minimum, the following screening tests will be performed on all container samples.

Flashpoint (closed-cup method)

Free cyanide

Sulfide presence

Volatile organic compounds (by flame ionization detector)

Oxidizers

Water Solubility

Ph (if liquid or other physical state that is water soluble)

Hexane solubility

Any sample for which these tests indicate the presence of free cyanide, sulfides, oxidizers, volatile organic compounds (VOCs), flashpoint below 140°F, pH above 12.0 or below 2.0, or greater than 10% solubility in hexane, will be said to have failed the screening tests, and combined with other compatible wastes for off-site treatment or disposal as hazardous waste at a RCRA facility. Additional analyses of these samples will be performed to the extent required by the facility to which the waste is being sent.

Samples which do not qualify as hazardous waste in accordance with the above-outlined procedure, will either be considered to contain hazardous materials and treated in the same manner as materials that have failed the screening tests, or, subjected to additional laboratory testing based on the physical state of the sample or container characteristics, as outlined below.



## Composite

### Lab-Pack Containers

Lab-Pack Containers are any non-empty container less than 1 gallon in size.

All lab-packed materials will be assumed to be hazardous waste and treated in the same manner as materials which have failed the screening tests. These materials will be combined with other compatible wastes and treated or disposed off-site at a RCRA facility. Additional analyses of these samples will be performed to the extent required by the facility to which it is being sent.

### Container with Liquid

Containers with Liquid are any non-empty, non-lab-pack containers containing liquid or semi-solid material.

All liquids except rainwater and pondwater will be assumed to be hazardous waste, and treated in the same manner as materials which failed the screening tests. No drum excavated will be assumed to contain rainwater or pondwater. Only those found upright in vegetated areas can be considered to contain rainwater. Only those removed from ponds will be considered to contain pondwater.

### Powders and Resins

Powders and Resins are any solid material inside a non-empty container which can be sampled without the use of hammers, chisels or other non-destructive means.

Each sample will be analyzed by an off-site laboratory for VOCs by EPA method 8240, and for all priority pollutant metals by EPA method 1310 (after use of applicable, approved extraction method). Any sample for which test results indicate the presence of a volatile organic or priority pollutant metal will be considered hazardous waste and treated in the same manner as those which have failed the screening tests.

In addition, composites of up to five (5) compatible samples will be analyzed for cyanide by EPA method 9010, mercury by EPA method 245.2, and semi-volatile organics, pesticides and Polychlorinated Biphenyls (PCBs) by EPA methods 8270 and 8080, as applicable.

Samples selected to make up specific composites will be based on compatibility test results. All samples which form a composite

will be considered hazardous if test results indicate the presence of mercury, a semi-volatile, pesticide or PCB, and will be treated in the same manner as those materials which failed the screening tests, or, the contractor may test individual samples from the composite for the same test which resulted in the composite being determined hazardous. If the test of the individual sample does not indicate the presence of the compound(s) detected in the composite analysis, then the material may be disposed off-site in a manner allowed by regulation.

#### Solid Amorphous Material

Solid Amorphous Material is any solid material not meeting the definition of a powder or resin above, such as completely dried paint or glue, and coagulated or reacted polymer materials.

Composites of up to five (5) compatible samples will be analyzed by an off-site laboratory for VOCs by EPA method 8240, priority pollutant metals by EPA method 1310 (after use of applicable, appropriate extraction method), cyanide by EPA method 9010, mercury by EPA method 7471, and semi-volatile organics, pesticides, and PCBs by EPA method 8270 and 8080, as applicable.

Samples selected to make up specific composites will be based on compatibility test results. All samples which form a composite will be considered hazardous if test results indicate the presence of a volatile organic, priority pollutant metal, mercury, cyanide, semi-volatile, pesticide, or PCB, and will be treated in the same manner as those materials that fail the screening tests, or, the contractor may test individual samples from the composite for the same test which resulted in the composite being determined hazardous. If the test of the individual sample does not indicate the presence of the compound(s) detected in the composite analysis, then the material may be disposed off-site in a manner allowed by regulation.

#### c. Trench, Excavation, and Surficial Contamination

All samples taken while excavating and trenching, and those of contamination at the surface of the ground, will have the following tests performed on them according to the EPA method specified: volatile organics by 8240, semi-volatile organics by 8270, pesticides and PCBs by 8080, priority metals by general EPA methods pertaining to AA or ICP as found in SW-846, and EP toxicity by 1310. Cyanide by 9010 will be performed on no less than the most contaminated half of samples, and mercury by 7471 will be performed on no less than the most contaminated quarter of samples, those most contaminated being samples which results of required testing in this section indicate contain the widest array of different chemicals.

d. Visibly Contaminated Soil

Soil in this category will be subjected to all testing specified part "c." immediately preceding except that cyanide and mercury tests need not be performed if not required for purposes of disposal.

e. QA/QC

All test results and QA/QC will be reported on appropriate forms consistent with those in section one of EPA Publication SW-846, and delivered to the EPA immediately upon receipt.

QA/QC procedures specified in each method to evaluate the analytical data produced by the test method must be performed, and delivered to the EPA with analytical results.

Specifically, for volatile organic analysis and semivolatile organic analysis, QA/QC consisting of the following will be carried out and presented in a report: chain of custody, sample holding times, calibration data, GC/MS tuning and performance data, surrogate recoveries, blanks, matrix spikes/matrix spike duplicate, (compound identification), and detection limits.

Specifically, for pesticides and PCB analyses, the following QA/QC will be carried out: chain of custody, sample holding time, pesticide instrument performance, calibration data, blanks, surrogate recovery, matrix spike/matrix spike duplicate, (compound identification), and detection limits.

Specifically, for metals and cyanide analyses, chain of custody, calibration data, interference check sample analysis, laboratory control sample analysis, (analyte identification), and detection limits.

QA/QC will be performed at a minimum frequency as dictated by established protocol.

Specifically, regarding waste or source sampling, a trip blank will be employed one per sample shipment (ice chest) per analytical category enclosed in said shipment. Analytical categories will include volatiles, semivolatiles, PCB/pesticides, and metals.

Specifically, regarding soil and sediment samples, one equipment blank per twenty samples will be employed.

Specifically, regarding both soil and sediment samples, and waste or source samples, one collocated or field replicate per twenty samples will be employed.

Specifically, regarding soil and sediment sampling, not less than two background samples per event per medium will be employed.

*Exhibit B*

ACCESS AGREEMENT

This Agreement is entered into between Susquehanna Corporation ("Susquehanna") and the Drinkwater Investment Corporation ("Drinkwater").

WHEREAS, the United States Environmental Protection Agency ("EPA") has indicated its intention to issue an order (the "Order") to Susquehanna pursuant to 42 U.S.C. § 9601, et. seq. for a removal action at the so-called National Fireworks I site in Hanover, Massachusetts;

WHEREAS, Susquehanna expects to undertake a removal action pursuant to the Order without acknowledging any legal liability therefore;

WHEREAS, Susquehanna has submitted a proposed work plan (the "Work Plan") to EPA, with a copy to Drinkwater, which Work Plan will be modified for approval by EPA and is expected to be incorporated into the Order;

WHEREAS, a portion of the National Fireworks I site is owned by Drinkwater;

WHEREAS, Susquehanna will require access to the land owned by Drinkwater to undertake the removal action, including removal activities on Drinkwater property;

WHEREAS, Drinkwater, without acknowledging any legal liability for the removal action, is willing to afford access to Susquehanna to facilitate the removal action;

NOW, THEREFORE, the parties hereby agree as follows:

1. Drinkwater grants the right of continuous access onto and through its land to Susquehanna and its consultants, contractors, and subcontractors agents for the purposes referred to in the Work Plan and/or Order. The right of access shall continue until all removal actions called for under the Work Plan and/or Order have been completed.

2. Susquehanna will provide Drinkwater with at least 48 hours' notice prior to commencing removal action on the Site;

3. The right of access shall include the right to enter the land with all vehicles, boats, equipment, tools or other items necessary to complete the removal action. All such vehicles, boats, equipment, tools or other items placed on the land by Susquehanna, its consultants, contractors, subcontractors, or agents shall remain the property of Susquehanna, its consultants, contractors, subcontractors or agents and shall not become the property of Drinkwater.

4. Drinkwater grants Susquehanna and its consultants, contractors, subcontractors and agents the right to undertake all reasonable steps necessary to accomplish the removal actions referred to in the Work Plan and/or Order, including but not limited to:

a. the taking of such soil or water samples as may be determined by EPA, Susquehanna, or their respective consultants, contractors, subcontractors, or agents to be reasonably necessary;

b. the sampling of any barrels, solids or

liquids located on Drinkwater property as may be determined by EPA, Susquehanna, or their respective consultants, contractors or subcontractors agents to be reasonably necessary;

c. the drilling of holes or installation of monitoring wells;

d. the conducting of magnetometer studies;

e. other actions related to the investigation of surface or subsurface conditions;

f. the undertaking of removal or other response action, including but not limited to:

i) disposal of hazardous or nonhazardous materials;

ii) covering and capping areas of contaminated soil; and

iii) excavation and disposal of contaminated soil.

5. The parties recognize that the removal action necessarily may involve some disruption or damage to Drinkwater's land and vegetation. Susquehanna and its consultants, contractors, subcontractors, and agents agree to undertake removal actions in a manner reasonably designed to cause minimal disruption or damage to Drinkwater's land and vegetation. Drinkwater agrees to indemnify and hold harmless Susquehanna and its consultants, contractors, subcontractors, and agents from any disruption or damage caused by removal actions undertaken in accordance with the Work Plan and/or Order.

6. The execution of this Agreement shall not constitute an acknowledgment or admission of liability by Susquehanna or Drinkwater for the release or threat of release of any hazardous substances, pollutants, contaminants or hazardous materials as those terms are defined under the Comprehensive Environmental Response, Compensation and Liability Act ("CERCLA"), 42 U.S.C. § 9601 et. seq., as amended by the Superfund Amendments and Reauthorization Act of 1986 ("SARA"), or the Massachusetts Oil and Hazardous Material Release Prevention and Response Act, M.G.L. c.21E, nor shall this Agreement create an independent obligation on the part of Susquehanna to Drinkwater, or any other agency or entity to perform any removal action or work. This Agreement shall not be admissible in Court as evidence of any liability or obligation on the part of Susquehanna or Drinkwater.

7. The entry upon Drinkwater's land and subsequent removal action are undertaken pursuant to EPA's authority under CERCLA, 42 U.S.C. § 9601 et. seq.

8. This Agreement is entered into voluntarily and without conditions beyond those expressly contained and agreed to in this Agreement.

9. This Agreement shall be governed by the laws of the United States and the Commonwealth of Massachusetts and shall be enforceable in courts of competent jurisdiction in the Commonwealth of Massachusetts.

SUSQUEHANNA CORPORATION

By: \_\_\_\_\_  
Date

DRINKWATER INVESTMENT CORPORATION

By: Robert A. Lohr Aug 31, 1988  
Date



Exhibit C

ACCESS AGREEMENT

This Agreement is entered into between Susquehanna Corporation ("Susquehanna") and the Town of Hanover, Massachusetts (the "Town").

WHEREAS, the United States Environmental Protection Agency ("EPA") has indicated its intention to issue an order (the "Order") to Susquehanna pursuant to 42 U.S.C. § 9601, et. seq. for a removal action at the so-called National Fireworks I site in Hanover, Massachusetts;

WHEREAS, Susquehanna expects to undertake a removal action pursuant to the Order without acknowledging any legal liability therefore;

WHEREAS, Susquehanna has submitted a proposed work plan (the "Work Plan") to EPA, with a copy to the Town, which Work Plan will be modified for approval by EPA and is expected to be incorporated into the Order;

WHEREAS, a portion of the National Fireworks I site is owned by the Town through its Conservation Commission;

WHEREAS, Susquehanna will require access to the land owned by the Town to undertake the removal action, including removal activities on Town property;

WHEREAS, the Town, without acknowledging any legal liability for the removal action, is willing to afford access to Susquehanna to facilitate the removal action;

NOW, THEREFORE, the parties hereby agree as follows:

1. The Town grants the right of continuous access onto and through its land to Susquehanna and its consultants, contractors, and subcontractors agents for the purposes referred to in the Work Plan and/or Order. The right of access shall continue until all removal actions called for under the Work Plan and/or Order have been completed.

2. Susquehanna will provide the Town with at least 48 hours' notice prior to commencing removal action on the Site;

3. The right of access shall include the right to enter the land with all vehicles, boats, equipment, tools or other items necessary to complete the removal action. All such vehicles, boats, equipment, tools or other items placed on the land by Susquehanna, its consultants, contractors, subcontractors, or agents shall remain the property of Susquehanna, its consultants, contractors, subcontractors or agents and shall not become the property of the Town.

4. The Town grants Susquehanna and its consultants, contractors, subcontractors and agents the right to undertake all reasonable steps necessary to accomplish the removal actions referred to in the Work Plan and/or Order, including but not limited to:

a. the taking of such soil or water samples as may be determined by EPA, Susquehanna, or their respective consultants, contractors, subcontractors, or agents to be reasonably necessary;

b. the sampling of any barrels, solids or

liquids located on the Town property as may be determined by EPA, Susquehanna, or their respective consultants, contractors or subcontractors agents to be reasonably necessary;

c. the drilling of holes or installation of monitoring wells;

d. the conducting of magnetometer studies;

e. other actions related to the investigation of surface or subsurface conditions;

f. the undertaking of removal or other response action, including but not limited to:

i) disposal of hazardous or nonhazardous materials;

ii) covering and capping areas of contaminated soil; and

iii) excavation and disposal of contaminated soil.

5. The parties recognize that the removal action necessarily may involve some disruption or damage to the Town's land and vegetation. Susquehanna and its consultants, contractors, subcontractors, and agents agree to undertake removal actions in a manner reasonably designed to cause minimal disruption or damage to the Town's land and vegetation. The Town agrees to indemnify and hold harmless Susquehanna and its consultants, contractors, subcontractors, and agents from any disruption or damage caused by removal actions undertaken in accordance with the Work Plan and/or Order.

6. The execution of this Agreement shall not

constitute an acknowledgment or admission of liability by Susquehanna or the Town for the release or threat of release of any hazardous substances, pollutants, contaminants or hazardous materials as those terms are defined under the Comprehensive Environmental Response, Compensation and Liability Act ("CERCLA"), 42 U.S.C. § 9601 et. seq., as amended by the Superfund Amendments and Reauthorization Act of 1986 ("SARA"), or the Massachusetts Oil and Hazardous Material Release Prevention and Response Act, M.G.L. c.21E, nor shall this Agreement create an independent obligation on the part of Susquehanna to the Town, or any other agency or entity to perform any removal action or work. This Agreement shall not be admissible in Court as evidence of any liability or obligation on the part of Susquehanna or the Town.

7. The entry upon the Town's land and subsequent removal action are undertaken pursuant to EPA's authority under CERCLA, 42 U.S.C. § 9601 et. seq.

8. This Agreement is entered into voluntarily and without conditions beyond those expressly contained and agreed to in this Agreement.

9. This Agreement shall be governed by the laws of the United States and the Commonwealth of Massachusetts and shall be enforceable in courts of competent jurisdiction in the Commonwealth of Massachusetts.

SUSQUEHANNA CORPORATION

By: Robert L. Rasmussen 9/2/88  
Vice President Date

TOWN OF HANOVER

By: Jean Wood 8/31/98  
Date



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
REGION I

In the Matter of:

NATIONAL FIREWORKS SITE

THE SUSQUEHANNA CORPORATION

Respondent.

Proceeding Under Section 106(a)  
of the Comprehensive Environmental  
Response, Compensation and Liability  
Act of 1980, as amended by the  
Superfund Amendments and  
Reauthorization Act of 1986,  
Pub. L. No. 99-499, 100 Stat. 1613  
(October 17, 1986).

U.S. EPA  
Docket No.

I-89-1005

AMENDMENTS TO  
ADMINISTRATIVE ORDER  
NO. I-89-1002

1. This Amendment is issued by the United States Environmental Protection Agency (EPA) to the Susquehanna Corporation pursuant to Paragraph 41 of the above-reference Order dated December 5, 1988 and the authority vested in the President by Section 106(a) of the Comprehensive Environmental Response, Compensation and Liability Act, 42 U.S.C. § 9601 et seq. (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), Pub. L. No. 99-499, 100 Stat. 1613 (October 17, 1986). This authority was delegated to the Administrator of the United States Environmental Protection Agency on January 23, 1987 by Executive Order 12580, 52 Fed. Reg. 2926 (January 29, 1987), and further delegated to the Regional Administrator, EPA Region I by EPA delegation No. 14-14-C. Except as specified herein, this Amendment does not modify the effective date of the Order.

AMENDMENT

2. The Order is hereby amended in the following manner:

a. The Docket Number shall be I-89-1002.

b. Paragraph 15 shall state:  
EPA has prepared a final Work Plan, a copy of which is attached hereto as Exhibit A and incorporated by reference.

c. Paragraph 20 shall state:  
In order to protect the public health and welfare and the environment, and reduce further release of hazardous substances from the National Fireworks Site, it is necessary and appropriate that a removal action be taken to abate the danger and threat that may be posed by the actual or threatened release of hazardous substances. EPA has determined that such actions as set forth in the accompanying Work Plan appended hereto are consistent with the provisions of the National Contingency Plan set forth at 40 C.F.R. Part 300 as amended.

EFFECTIVE DATE

3. This Amendment shall become effective upon receipt of notice by Susquehanna that this Amendment has been signed by the EPA Regional Administrator.

IT IS SO ORDERED.

BY: Paul K. Deland  
Michael R. Deland  
Regional Administrator  
U.S. Environmental Protection Agency  
JFK Federal Building, Room 2203  
Boston, Massachusetts 02203

DATE: 12-22-81



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
REGION I

In the Matter of:

NATIONAL FIREWORKS SITE

THE SUSQUEHANNA CORPORATION

Respondent.

Proceeding Under Section 106(a)  
of the Comprehensive Environmental  
Response, Compensation and Liability  
Act of 1980, as amended by the  
Superfund Amendments and  
Reauthorization Act of 1986,  
Pub. L. No. 99-499, 100 Stat. 1613  
(October 17, 1986).

U.S. EPA  
Docket No.

I-88-1002

ADMINISTRATIVE ORDER  
FOR REMOVAL ACTION

JURISDICTION

1. This Administrative Order ("Order") is issued pursuant to the authority vested in the President of the United States by Section 106(a) of the Comprehensive Environmental Response, Compensation and Liability Act of 1980 ("CERCLA"), 42 U.S.C. § 9606(a), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), Pub. L. No. 99-499, 100 Stat. 1613 (October 17, 1986). This authority was delegated to the Administrator of the United States

Environmental Protection Agency on January 23, 1987 by Executive Order 12580, 52 Fed. Reg. 2926 (January 29, 1987), and further delegated to the Regional Administrator, EPA Region I by EPA delegation No. 14-14-C. The State of Massachusetts has been given notice of this Order.

#### PARTIES BOUND

2. This Order shall apply to the Respondent the Susquehanna Corporation (Susquehanna) and its agents, officers, employees, receivers, trustees, successors and assigns. No change in ownership or corporate status shall in any way alter Susquehanna's responsibilities under this Order. Susquehanna shall provide a copy of this Order to all contractors, sub-contractors, laboratories, and consultants retained to conduct any portion of the work performed pursuant to this Order within three (3) calendar days of the effective date of such retention. Such contractors, subcontractors, laboratories and consultants shall perform all work in conformance with the terms and conditions of this Order.

#### FINDINGS OF FACT

3. The National Fireworks Site (the Site) is located on approximately 200 acres of land, situated in the Town of Hanover, Massachusetts. The Site is bounded on the

east and south by Factory Pond, on the west by Winter Street, and on the north by residential areas.

4. The Site has a long history of fireworks and munitions manufacturing. In 1907, the production of fireworks began under the auspices of National Fireworks Company (National Fireworks). Under federal order, National Fireworks began producing munitions at the Site during World War II. In 1947, National Fireworks ceased munitions manufacturing, and in the course of winding up its business, disposed of some of its remaining wastes by burning them in a demolition area in the southern end of the Site. This area was also used as a testing range for magnesium flares and 20mm shells during World War II production of munitions and explosives.
5. Sometime after National Fireworks ceased operations, the Site was purchased by American Potash & Company and later by the Atlantic Research Corporation (Atlantic Research). This company was a government contractor which developed and manufactured various explosives for the United States Army and Navy, including land mines and lead azide, RDX (cyclonite) and TNT (trinitrotoluene)-based materials. During the time Atlantic Research operated the Site, various entities

arranged for disposal of hazardous wastes at the Site. Specifically, between 1962 and 1967, the Massachusetts Institute of Technology (MIT) arranged for disposal at the Site of drums containing trichloroethylene, toluene, xylene, benzene and other hazardous substances.

6. In October of 1967, Atlantic Research Corporation merged with Susquehanna, a Delaware corporation, with Susquehanna being the surviving corporation. Susquehanna is engaged through subsidiaries in the manufacture of a variety of building materials and other products. Munitions and explosives manufacturing continued at the Site under the auspices of Atlantic Research, which was then operating as a subsidiary of Susquehanna. In the late 1960's, Atlantic Research ceased the munitions and explosives manufacturing operations at the Site.
7. In December 1972, approximately 130 acres of the Site property (mostly in the vicinity of Factory Pond) was purchased by the Town of Hanover. The Town of Hanover is the present owner. The remaining acres comprising the Site for the most part were retained by Susquehanna until May 1983, when the property was purchased by

Drinkwater Investment Corporation. Drinkwater Investment Corporation is the present owner.

8. EPA became involved with the Site in December 1983 following notification from the Hanover Conservation Commission concerning potential hazardous waste contamination at the Site. A Remedial Site Assessment was conducted in July 1986 to determine the extent of the on site contamination and to assess the potential impact to the surrounding environment. Surface water, sediment and soil samples collected on and adjacent to the Site revealed the presence of hazardous substances, including but not limited to, trichloroethylene, benzene, and toluene.
9. The Site was referred to EPA's Oil and Hazardous Materials Section (OHM) in December, 1987. A Site visit was performed in January 1988, but assessment was limited by snow cover. As partially buried drums were noted at that time, OHM returned to the Site in March, 1988. Test results of a surface water sample taken from a pool of water near the so-called MIT Waste Pit on the Site indicate the presence of trichlorofluoromethane, trichloroethylene, and 1,1,2-trichloro-1,2,2-trifluoroethane in concentrations as high as 270 parts per billion (ppb), 97 ppb, and 23,000 ppb,

respectively. Results of tests performed on a sample taken from a partially buried drum no more than ten (10) feet from the water body indicates the presence of trichloroethylene at a concentration of 1,800 parts per million (ppm). In addition, water samples taken from the so-called MIT Waste Pit indicate the presence of trichloroethylene.

10. In May 1988 EPA sent notices to Susquehanna, MIT, Drinkwater Investment Corporation, and the Town of Hanover to advise them that they were considered "Potentially Responsible Parties" in connection with hazardous waste contamination at the Site.
11. On July 11, 1988, Susquehanna, MIT and the Town of Hanover conducted an investigation at the Site to review EPA's findings. Susquehanna arranged to have two former Atlantic Research employees join the Site visit.
12. On July 20, 1988, Susquehanna, without acknowledging any legal liability, submitted a Proposed Scope of Work for reconnaissance on a removal action at the Site.
13. After refinements of the Proposed Scope of Work by EPA, Susquehanna conducted a comprehensive reconnaissance of the Site, including magnetometer studies of certain

areas designated by EPA and testing of the contents of barrels.

14. Upon completion of the reconnaissance work and submission of results to EPA, Susquehanna submitted a Revised Scope of Work to EPA on October 14, 1988. While continuing to deny legal liability, Susquehanna agreed to undertake certain removal actions and cooperate with Drinkwater Investment Corporation and the Town of Hanover with respect to other potential removal actions.
15. EPA has prepared a final Scope of Work, a copy of which is attached as Exhibit A.
16. Drinkwater Investment Corporation and the Town of Hanover have executed Access Agreements with Susquehanna to afford Susquehanna access to the Site for removal actions. Those Access Agreements are attached hereto, respectively, as Exhibits B and C.
17. Endangerment. Samples taken by EPA's Oil and Hazardous Material Section reveal the presence at the Site of the hazardous substances identified in Paragraph 9 herein. The barrels found on Site are partially buried and visual observation clearly reveals that their

structural integrity has deteriorated. The fact that trichloroethylene from a deteriorated drum was found in surface water indicates that a release of a hazardous substance into the environment has occurred. In addition, the close proximity of the drum to the surface water presents a threat of continued or additional release of hazardous substances into the soil, surface water and groundwater on or about the Site. Moreover, the Site is located in an open area which is readily accessible to trespassers. Thus, the potential for human exposure exists.

#### DETERMINATIONS

18. On the basis of the findings of fact cited herein, EPA has determined that:

- a. Chemicals found on the Site are "hazardous substances" within the meaning of Section 101(14) of CERCLA, 42 U.S.C. § 9601(14).
- b. The past, present, or potential future migration of hazardous substances at or from the Site constitutes an actual or substantial threat of a "release" as that term is defined by Section 101(22) of CERCLA, 42 U.S.C. § 9601(22).



- c. The actual releases or threatened releases of hazardous substances from the Site may be an imminent and substantial endangerment to the public health or welfare or the environment within the meaning of Section 106(a) CERCLA, 42 U.S.C. § 9606(a).
  - d. The property comprising the Site is a "facility" within the meaning of Section 101(9) of CERCLA, 42 U.S.C. § 9601(9).
  - e. Respondent Susquehanna is a "person" within the meaning of Section 101(21) of CERCLA, 42 U.S.C. § 9601(21).
  - f. Respondent Susquehanna was the owner of a facility at the time of disposal of hazardous substances and is therefore a potentially responsible party pursuant to Section 107(a)(2) of CERCLA, 42 U.S.C. § 9607(a)(2).
19. In order to protect the public health and welfare and the environment, and reduce further release of hazardous substances from the National Fireworks Site, it is necessary and appropriate that a removal action be taken to abate the danger and threat that may be posed by the actual or threatened release of hazardous substances. EPA has

determined that such actions include the implementation of the Work Plan, attached hereto as Exhibit A.

ORDER

Based upon the above Findings of Fact and Determinations it is hereby ordered:

20. Susquehanna shall forthwith retain the services of a qualified and experienced contractor and shall abate forthwith the imminent and substantial threat posed by the hazardous substances in accordance with the terms and conditions of the Work Plan appended hereto as Exhibit A. Such removal activities include, but are not limited to, the sampling, excavation and proper disposal of the drums on the Site. All work pursuant to the Work Plan shall be consistent with the National Contingency Plan (NCP), 40 CFR Part 300, and any amendments thereto.
21. Susquehanna in conjunction with its contractor shall within two working days of receipt of this Order submit the name and address of the contractor required by paragraph 20 and the name and telephone number of the primary contact person for that contractor.

22. EPA will review each plan, drawing, specification, or other document submitted in accordance with paragraphs 20 and 21 above, within 14 days of receipt, and approve, disapprove, or require modifications to, each of them. Upon receipt of EPA approval of the plan, drawing, specification, or other document, the Respondent shall implement it as approved, including all schedules and timetables contained therein.
23. No later than thirty (30) days after the completion of the response activities at the Site, as specified in paragraphs 20 through 22 or in plans or documents developed thereunder, Susquehanna shall submit to EPA a complete written report describing the response activities, including all monitoring data and documentation to verify that the work was performed in accordance with the Work Plan.

#### DESIGNATION OF COORDINATORS

24. Within twenty-four hours of the receipt of this Order the Susquehanna shall designate a coordinator who shall be responsible for administration of all actions called for by this Order, and shall submit his name, address, and telephone number to EPA. The EPA On-Scene Coordinator (OSC) will administer EPA's responsibilities and receive all written matter required by this order. EPA will submit the name, address and telephone number of its OSC to Susquehanna's coordinator.

25. EPA's OSC shall have the authority vested under the National Contingency Plan, 40 C.F.R. Part 300, and any amendments thereto, including, but not limited to, the authority to stop work being performed pursuant to this Order. Absence of the OSC from the Site shall not be cause for stoppage of work by Susquehanna.

#### ACCESS

26. To the extent authorized by law and the Access Agreements attached as Exhibits B and C, Susquehanna shall allow EPA's OSC and other employees, agents, consultants, contractors, and authorized representatives of EPA to enter the Site and freely move about all areas where work is being carried out pursuant to this Order at all reasonable times, including, but not limited to, any time that work is being carried out pursuant to this Order, for the purpose of conducting any activity authorized by CERCLA, including but not limited to inspecting and observing progress in implementing the activities undertaken pursuant to this Order, verifying the data submitted to EPA, and taking samples or split samples. Susquehanna and its contractor(s) shall permit such persons to inspect and copy all records, documents, and other writing pertaining to the work performed under the Order.

27. In the event that Susquehanna encounters any difficulties in gaining access to the Site under the Access Agreements attached as Exhibits B and C, Susquehanna will notify EPA promptly with a complete description of the reasons for the failure to gain access.
28. Nothing herein limits or otherwise affects any right of entry held by EPA pursuant to applicable laws, regulations or permits.

#### RECORD PRESERVATION

29. Until six (6) years after completion of all response actions at the Site, whether or not undertaken pursuant to this Order, Susquehanna shall preserve and retain all records, documents and information of any kind in its possession or in the possession of its officers, divisions, employees, agents, accountants, contractors, attorneys, successors and assigns, that relate in any way to the performance of work at the Site or releases or threatened releases of hazardous substances from the Site. Upon completion of work at the Site and termination of this Order, and upon request of EPA copies of all such records, documents, and information shall be delivered to the On-Scene Coordinator.

SUBMITTAL OF INFORMATION TO EPA

30. Upon request by EPA, Susquehanna shall provide copies to EPA of all records, documents and information generated by Susquehanna and its contractors in the course of performing work at the Site including, but not limited to sampling and analysis records, field sheets and field notes, engineering logs, chain of custody records, contracts, bills of lading, trucking logs and correspondence.
31. Susquehanna's employees, agents or representatives with knowledge of relevant facts concerning the performance of work at the Site shall be made available to EPA upon reasonable notice and at reasonable times and places to provide information concerning the performance of such work.
32. Susquehanna shall submit to EPA the results of all sampling or tests and all other data generated by Susquehanna or its contractors, or on Susquehanna's behalf, in the course of implementing this Order upon receipt of such information by Susquehanna.
33. At the request of EPA, Susquehanna shall allow split and/or duplicate samples collected by Susquehanna pursuant to the implementation of this Order. Susquehanna shall provide EPA reasonable notice prior to any sample collection activity.

CREATION OF DANGER

34. Upon the occurrence of any event during the activities conducted pursuant to this Order that causes or threatens a release of hazardous substances from the Site or an endangerment to human health or the environment, Susquehanna shall notify within twenty-four (24) hours the On-Scene Coordinator or, in the event to his or her unavailability, shall notify within the same twenty-four hour period the EPA Emergency Response Unit, telephone (617) 223-7265. Upon request of EPA, Susquehanna shall forthwith submit a written report setting forth the events that occurred and the measures to be taken to mitigate any harm caused or threatened by the event and to prevent the reoccurrence of such an event.
35. Whether or not a report is made to EPA pursuant to the preceding paragraph, if EPA determines that activities in compliance or noncompliance with this Order have caused or may cause a release of hazardous substances or a threat to human health or the environment, then EPA may:
- a. Order Susquehanna to stop further implementation of this Order for as long as may be needed to abate any such release or threat; or
  - b. Undertake any actions that EPA determines are necessary to abate such release or threat.

OTHER APPLICABLE LAWS

36. All actions required to be taken pursuant to this Order shall be undertaken in accordance with the requirements of all applicable local, state and federal laws and regulations, including laws relating to occupational health and safety.

NOTIFICATION TO LOCAL OFFICIALS

37. Susquehanna shall ensure that local officials, including but not limited to local police and fire department officials, are given reasonable notice of any work undertaken pursuant to this Order prior to the time such work is undertaken.

RESERVATION OF RIGHTS BY EPA

38. EPA expressly reserves all the rights and defenses that it may have, including EPA's right both to disapprove of work performed by Susquehanna and to request or order that Susquehanna perform tasks in addition to those detailed in the Order. In addition, EPA reserves the right to undertake removal actions and/or remedial actions at any time and to perform any and all portions of the work activities which Susquehanna has failed to perform. EPA reserves any and all rights to take any enforcement action pursuant to CERCLA and/or any available legal authority, including the right to



seek injunctive relief, monetary costs, damages or penalties, or punitive damages for any violation of law or of this Order.

DISCLAIMER

39. The United States government, including EPA, shall not be liable for injuries or damages to persons or property resulting from acts or omissions by Susquehanna, its employees, agents or contractors in carrying out activities pursuant to this Order. The United States government and/or EPA shall not be held as a party to any contract entered into by Susquehanna or its agents in carrying out activities pursuant to this Order.

NO PREAUTHORIZED FUNDING

40. Nothing in this Order shall be deemed to constitute any decision on preauthorization of funds under Section 111(a)(2) of CERCLA, 42 U.S.C. § 9611(a)(2), or 40 C.F.R. § 300.25.

AMENDMENTS: INCORPORATION BY REFERENCE

41. This Order may only be amended in writing by signature of the Regional Administrator of EPA, Region I. Amendments involving the Work Plan may be made by verbal direction of the OSC and confirmed by written change order.

42. Any contracts, reports, plans, specifications, schedules, and attachments required by this Order are, upon approval by EPA, incorporated into this Order.

43. No informal advice, guidance, suggestion, or comment by EPA regarding reports, plans, specifications, schedules, and any other writing submitted by Susquehanna will be construed as

relieving the Susquehanna of its obligations to obtain such formal approval as may be required by this Order.

#### PUBLIC ACCESS TO INFORMATION

44. Susquehanna may assert a confidentiality claim, if appropriate, covering part or all of the information required by or requested under this Order pursuant to Section 104(e)(7) of CERCLA, 42 U.S.C. § 9604(e)(7) and 40 C.F.R. 2.203(b). Such an assertion shall be adequately substantiated when made. Analytical data and other data specified in section 104(e)(7)(F) of CERCLA, as amended, shall not be claimed as confidential by Susquehanna. Information determined to be confidential by EPA will be afforded the protection specified in Section 104(e)(7) of CERCLA and 40 C.F.R. Part 2, Subpart B. If no such claim accompanies the information when it is submitted to EPA, it

may be made available to the public by EPA without further notice to Susquehanna.

PENALTIES FOR NON-COMPLIANCE

45. Pursuant to Section 106(b) of CERCLA, 42 U.S.C. § 9606(b), Susquehanna is advised that if, without sufficient cause, it willfully violates or fails or refuses to comply with this Order, Susquehanna may be fined in a civil action brought in federal district court up to twenty-five thousand dollars (\$25,000) for each day in which such violation occurs or such failure to comply continues. In addition, pursuant to Section 107(c) of CERCLA, 42 U.S.C. § 9607(c), failure to comply with this Order, without sufficient cause, may also subject Susquehanna to liability for punitive damages in the amount of three (3) times the amount of any costs incurred by the United States government as result of Susquehanna's failure to take proper action.

EFFECTIVE DATE - OPPORTUNITY TO CONFER

46. This Order is effective on the date of receipt by Susquehanna. Susquehanna may within twenty-four (24) hours after receipt of this Order request a conference with EPA to discuss the correctness of any factual determinations upon which the Order is based, the applicability of this Order to Susquehanna, and the appropriateness of any action Susquehanna is ordered to take. At any conference held

pursuant to Susquehanna's request, Susquehanna may appear in person or by attorney or other representative for the purpose of presenting any objections, defenses or contentions that it may have regarding this Order. If Susquehanna desires such a conference, it may contact Francisco Leal, Assistant Regional Counsel, U.S. EPA, Region I, JFK Federal Building Room 2203, Boston, MA, 02203, (617) 565-3438, within the time set forth above for requesting a conference.

IT IS SO ORDERED. Issued at Boston, Massachusetts this  
5<sup>th</sup> day, of December, 1986.

Paul M. Keough Acting  
Michael R. Deland  
Regional Administrator

## EXHIBIT A

### WORK PLAN

The following is the Work Plan to be employed at the Fireworks - Factory Pond Site and the Fireworks - Winter Street Site Removal Actions.

#### I. INTRODUCTION

The Fireworks-Factory Pond Site and the Fireworks-Winter Street Site are located in the Town of Hanover, Massachusetts (See Figure 1, Site Locus Map), and are commonly referred to cumulatively as the "National Fireworks I Site", the "Fireworks I Site", or the "Fireworks Site." The term "Site" as used in this Work Plan shall mean all such land herein described on which removal activities shall be performed.

The intent of this Work Plan is to mitigate the release or threat of release of hazardous materials into the environment, and prevent exposure of the general public to any such release, by means of proper disposal off-site of all hazardous substances found at the Site.

#### II. DESCRIPTION OF THE SITE

There are five (5) specific Areas of known disposal activity within the Site. They are known as the Landers Drum Area, the Factory Pond Demolition Area, the MIT Waste Pit Area, the Factory and Lily Pond Area, and the Undeveloped Woodland Area. A more precise description of these Areas is provided below, on the appended Plot Plan (See Figure 2), and on specific location maps. (See Figures 3 - 5.)

##### A. Areas

##### 1. Landers Drum Area (Fireworks - Winter Street Site)

This Area is located approximately 200 yards west of the P.A. Landers Co. garage in an isolated wooded area. The boundaries for this Area extend to the edge of the vegetation where the drums lie. (See Figure 3.) An embankment at the north end of the Area contains a number of partially buried drums. There are two piles of partially burned rubber toys. Some powdery chemical spillage is present in one place in the Area. Most drums are found in a pit, apparently manmade, that is now overgrown with young pine and maple trees.

##### 2. Factory Pond Demolition Area (Fireworks - Factory Pond Site)

This Area is defined as the approximately 11 acre parcel of land adjacent to Factory Pond where most of the past waste combustion and detonation occurred. (See Figure 4.) This includes the

location where drums were discarded and detonated in the Pond; the location now used as a target shooting range; and the woods bordering the access roads between property owned by the Drinkwater Investment Corporation and the MIT Waste Pit Area.

The Factory Pond Demolition Area contains 46 visible 55-gallon drums and 63 other metal containers. The drums are scattered over the entire Area described above. Drums are heavily concentrated to the north and south of the cold waste dump area, around the Northern Waste Burn Pit, and in the woods along the southern border of the Area.

A magnetometer survey has been conducted and is appended to this Work Plan. (See Appendix C.) Large anomalies that appear distinct from the surface interference have been identified at both ends of the pit.

### 3. MIT Waste Pit Area (Fireworks - Factory Pond Site)

The MIT Waste Pit Area consists of a clearing, approximately one-half acre in size, and an abutting small pool at the southern end of the Area. (See Figure 5.) This Area includes the original clearing, identified in aerial photos and still present; the small excavated pool between the clearing and the wetland; and the woods immediately surrounding the clearing.

The MIT Waste Pit Area contains 21 visible drums, and 20 smaller containers. Most of the drums are found in a mound at the center of the Site and in the swamp to the west. Scattered drums are located just to the north. The Area contains twenty-one 55-gallon and 20 smaller containers.

A magnetometer survey of the clearing was completed. For a description of the survey and its findings refer to Appendix C. The results indicate more than one anomaly is present.

### 4. Factory and Lily Pond Area - (Fireworks - Factory Pond Site)

The Factory and Lily Pond Area consists of the Factory and Lily Ponds, extending from approximately one-quarter mile along the Drinkwater River upstream of Factory Pond to the outfall of Factory Pond, and includes the two islands in Factory Pond. (See Figures 2 and 4.)

Thirty-four drums and 19 smaller containers are known to be present in Factory and Lily Ponds. The highest concentration of drums is found along the shore to the north of cold waste dump area.

5. Undeveloped Woodland Area (Fireworks - Factory Pond and Winter Street Sites)

The Undeveloped Woodland Area is the area of undeveloped woodlands not included in any of the above-described Areas. The Undeveloped Woodland Area contains 36 visible 55-gallon drums and 44 other metal containers. The drums are scattered over a large area. There are no specific concentrations of drums or containers, but they are typically located close to roads or old bunkers.

III. REMOVAL PROCEDURES

A. General

1. Work Schedule

All work carried out pursuant to this Work Plan shall comply with the work schedule appended hereto. (See Appendix A.)

2. Site Safety Plan

All work carried out pursuant to this Work Plan shall comply with the Safety Plan appended hereto. (See Appendix B.)

3. Site Access

Susquehanna has obtained access agreements from The Drinkwater Investment Corporation and The Town of Hanover, the owners of the properties comprising the Site. These agreements are attached to the Unilateral Order (Docket No. I-89-1002) to which this Work Plan is incorporated. Access to the Site shall be in compliance with Paragraphs 26 and 27 of the Order.

4. Contractor Mobilization

Mobilization shall include construction of staging areas, clearing access routes to the Areas, and the implementation of all necessary security measures.

5. Disposal

All materials disposed off-site pursuant to this Plan shall be in accordance with all applicable regulations. All facilities that shall receive hazardous waste shall be RCRA approved.

6. Restoration

In areas requiring excavation, soil removed shall be replaced in a way that soil from below grade shall be replaced below grade and not left on the surface of the ground. In addition, holes and trenches created shall be filled with soil to the approximate grade existing prior to excavation.

7. Demobilization

Unless approved otherwise by EPA's On-Scene Coordinator (OSC), and to the extent that the Safety Plan is not compromised,

activities shall be completely concluded in one Area before commencement of removal activities at another Area.

**B. Specific**

**1. Command Post Locations**

A command post shall be established at each Area. Figures 6 through 8 (attached herein) show the approximate location of the command post at each of the above-referenced Areas.

**2. Parking**

The contractor shall make arrangements for parking of vehicles as necessary. No personal vehicles shall be permitted near the designated work Areas.

**3. Communications**

On-site communications shall be provided by the contractor. Communications shall consist of fully functional two-way radios. Each radio shall undergo daily tests for proper function prior to use by on-site personnel. In addition, commands issued during an emergency to personnel shall be augmented with warning whistles and/or bullhorns as stipulated in the Safety Plan. Radio contact shall be maintained between operators of heavy equipment, technicians assisting in excavation, the field foreman, and the command post. Off-site communications shall also be provided.

**4. Staging and Storage Areas**

There shall be one (1) storage area and up to two (2) permanent staging areas established for the removal operations. The storage area shall be for the heavy equipment, such as dozers, backhoes, etc. The location of the storage area is shown in Figure 9.

The permanent staging area(s) shall be established near the Landers gravel pit. One permanent staging area shall be designated for the unidentified or hazardous waste containers collected or excavated from the target Areas. This staging area shall be adjacent to the equipment storage area on G Street east of the Landers Drum Area (refer to Figure 9) and shall be as large as necessary, cleared of all vegetation, bermed, and lined with one thickness of 10 mil polyethylene.

If needed, a second staging area shall be developed for any contaminated soil that may be collected while carrying out this Work Plan. It shall be prepared and secured as specified above, except that two thicknesses of 10 mil polyethylene shall be used.

If empty containers are collected, a separate area shall be designated for them.

Temporary staging areas shall be established at remote locations, i.e., away from Landers' personnel, for the purpose of opening and sampling containers. After sampling and overpacking are



completed, containers shall be brought to the permanent staging area.

5. Security

During operations at each Area, public access shall be prohibited. On-site personnel shall be instructed to discourage curiosity seekers and persons who inadvertently wander into the work area. Caution tape shall surround the entire work area until all operations in that Area are complete.

Heavy equipment, such as a backhoes, dozers, etc., shall be left overnight in the storage area within view of the Landers garage. Precautions shall be taken by the operators to disable the equipment until its next use.

Any area that will have a hole (excavation or trench) left overnight shall be cordoned off with hazard tape, and shall be covered with plywood or other suitable material to prevent injury to unauthorized personnel. Such an area accessible by vehicle shall be blocked by heavy equipment being used on-site. If access can not be completely denied by this means, saw horses affixed with reflective markings shall surround the excavation or trench.

A chain link fence, six (6) feet in height, shall secure the permanent staging area(s). All access points shall be locked during off-hours, and hazardous waste signs shall be posted, at least one per side.

6. Manpower Requirements

The contractor shall provide all personnel required to carry out this Work Plan.

7. Equipment Requirements

The contractor shall provide all equipment necessary to carry out this Work Plan. All equipment shall be decontaminated in accordance with the specifications set forth in the Safety Plan.

8. Removal of Drums from Water

Containers in water that have been determined to be open shall be removed through use of the row boat and/or men in waders. Drums that are sealed, or believed to be sealed, and can be accessed by heavy equipment, shall be removed by heavy equipment. Any practical effort to eliminate or reduce the possibility of release shall be made, including overpacking of drums underwater.

9. Overnight Containment

Any soil, whether in an excavation, trench, or stockpile, to be left overnight which contains an exposed drum and/or which is emitting unidentified total organic vapors above 5 parts per million at breathing height when standing upon or adjacent to the soil shall be covered with one thickness of 10 mil polyethylene

for the purpose of reducing or eliminating migration of vapors and minimizing precipitation infiltration.

#### 10. Excavation

##### Start-up procedures

a. An access road shall be cleared to the known drum deposit using hand tools and/or heavy equipment. The approach shall be determined in the field such that the entire drum deposit is in front of the vehicle, i.e., equipment shall not be driving over partially buried drums. A line shall be cleared perpendicular to the deposit relative to the direction, from which the equipment has approached the deposit.

b. A temporary staging/sampling area shall be established either by means of clearing and grubbing or, immediately outside the vegetated area surrounding the drum deposit. It shall be bermed and lined with two thicknesses of 10 mil polyethylene. Ample bags of sorbent material shall be located at this area. Aisles shall be maintained such that every container can be accessed by personnel.

c. The work area shall be cordoned off with hazard caution tape.

d. Empty containers and other debris shall be removed to a designated area, or otherwise taken out of the way of drum removal operations.

e. Containers requiring sampling in accordance with this Work Plan shall be transported to the temporary staging area for sampling. Drums shall be overpacked prior to transport if leaking, or if potential for leaking is deemed imminent by the OSC.

##### Barrel extrusion

a. Barrels shall be excavated starting with those partially buried and visible on the surface. Before proceeding beyond the line cleared (as described above), the excavator or backhoe (hereinafter, excavator) shall dig into the soil in front of the excavator to a depth not less than three feet to assure it will not drive upon drums buried just below the surface, or any other shallow subsurface feature that may not support the weight of the vehicle.

b. Personnel directly involved with excavation shall adhere to the following guidelines:

- i. Two laborers in level B shall assist in clearing away any overburden, assist in attaching lifting slings and/or assist in overpacking. Heavy equipment will lift drums and move them to a pick-

up point for transportation to the temporary staging area. The contractor shall avoid contamination of the tires/undercarriage of the transport vehicle to minimize the spread of contaminants throughout the Area. Where heavy equipment cannot be used, laborers using shovels shall dig out the drums until a chain or sling can be securely attached. Two laborers in the excavation shall operate as a team.

- ii. The equipment operators involved in the removal of barrels shall have air supplied to them from cylinders secured to their vehicles.

c. Overpack drums shall be present adjacent to the excavation to immediately contain leaking drums, or those for which the potential to leak is deemed imminent by the OSC.

d. All equipment shall be decontaminated by steam cleaning or flushing with high pressure water before leaving the Site.

#### Contaminated Soil

All soil that is visibly contaminated, or is observed to have been contaminated with container contents as a result of this operation, shall be excavated and stockpiled or placed in a drum.

#### 11. Opening Containers

Unless approved otherwise by the OSC, and to the extent that OSHA regulations are followed, opening of sealed containers shall be done in the temporary staging area using the excavator affixed with a non-sparking spike. All open containers shall be covered with polyethylene before leaving the Site for the evening.

#### 12. Sampling

##### General

a. All containers that do not meet the criteria of an empty container as specified in 40 CFR 261.7 shall be sampled.

b. Sample jars shall be that (those) prescribed by the analytical method to be performed on the sample contained therein.

c. The analyses procedures to be performed on samples taken are set forth in Section 15 below.

##### Containers

a. All container sampling shall be carried out in the temporary staging area.

b. Solid material shall be considered any material that can not be poured from the container nor can be sampled using the

method prescribed for liquids. Solids shall be scooped, chiseled, cut, or otherwise removed from the container using non-sparking tools, unless another method is approved by the OSC. If the tools used are not disposable, they shall be decontaminated by wiping thoroughly with a clean cloth to remove all visible material. Disposable tools shall be used to sample only one container. These tools shall be disposed of in the same fashion as the sampled material.

c. Liquid material shall be removed from its container in the following fashion. A glass tube of a length greater than the maximum depth of the container being sampled shall be carefully inserted into the container until the bottom of the container or solid layer is encountered. The tube shall then be capped to create a vacuum, and withdrawn from the container. The vacuum shall be broken, and the material held in the tube allowed to pour into the appropriate sampling container. This process shall be repeated until the required amount of sample has been obtained. A new and clean glass tube shall be used for every container. When sampling is complete, tubing shall be disposed of in the same fashion as the sampled material. Samples to be taken from containers sufficiently small to be picked up by a single person, such as a five-gallon bucket, may be poured directly into the sample container.

d. If a liquid sample can be seen to have more than one layer, or phase, a sufficient quantity of each layer shall be collected to allow all required analyses to be performed on each layer.

e. If a solid layer is present below the liquid in the container of a thickness of more than one inch, the liquid phase shall be poured off into another container to permit sampling of the solid layer.

#### Trenches

Sampling in trenches is specified below under Section 13 of this Work Plan, titled "Magnetic Anomaly Investigation".

#### Drum Excavations

Samples shall be taken from the bottom of every excavation, at a frequency of not less than one per two-hundred-fifty square feet of excavation, but in no case be less than two per Area, and not less than one per discreet excavation in any Area (a discreet excavation not being every individual drum, but rather, a group of drums at one location within the Area). Safety precautions pertaining to depth of excavation as specified in the Magnetic Anomaly Investigation Section of this Work Plan shall be observed.

### Surficial Contamination

The powdery chemical spillage and partially burned rubber toys found at the Site during the reconnaissance performed by representatives of Goldman Environmental Consultants (GEC) shall be sampled.

### 12. Documentation

a. Each container discovered shall be designated and/or coded to meet the specifications of this Work Plan.

b. All jars of sample taken from a specific container shall be labelled exactly as the container.

c. The chain of custody of samples shall be maintained. All sample containers shall be labelled at the time the sample is taken. Any sample removed from the sampling area (the temporary staging area) without an identifying alphanumeric designation shall be considered without chain of custody. Chain-of-custody stickers shall be affixed to all sample jars before said samples leave the Site, or before being left overnight at the Site. Any sample for which this is not done shall be considered without chain of custody. Chain-of-custody forms shall be completed prior to shipping samples off site, and accompany samples at all times during transport. Any sample shipped otherwise shall be considered without chain of custody. Any sample that is without chain of custody for any reason shall be resampled. Analysis performed on samples without proper chain of custody shall be considered invalid, and required to be performed again.

d. Drum investigation data shall be compiled for every container. The physical state of drum contents and characteristic of the container shall be noted for every container so as to conform to the Analyses section of this Work Plan to assure there is no confusion as to the analytical tests that are required. All such information shall be given to the EPA before demobilization.

e. If photographs of the removal activities are taken, a copy of each shall be provided to the EPA before final demobilization.

### 13. Magnetic Anomaly Investigation

#### a. General

As used hereinafter, the terms "source of anomaly" and "source" shall be defined as "any deposit of metal with a mass and density sufficient to account for the anomaly(ies) in the Area".

Trenching shall be employed to reveal the source(es) of magnetic anomalies that are indicated present as a result of the magnetometer survey that has been performed. If containers are present, and such containers, metal or otherwise, do not meet the

criteria for empty containers set forth in 40 CFR 261.7, such containers shall be excavated and handled in accordance with all applicable criteria for non-empty containers set forth in this Work Plan.

b. The Waste Burn Trench

Trenches Perpendicular to the Baseline

The Waste Burn Trench is shown as Area 2 in the magnetometer survey map. (See Appendix C.) It shall be investigated by a series of trenches. The baseline represented on the Area 2 map shall be established in the field. The first trench shall be excavated perpendicular to the baseline through point B for a distance of no less than fifty feet on each side of point B. This shall be hereinafter referred to as the B trench.

- i. If no containers of any kind, or empty containers (as defined in 40 CFR 261.7), are encountered within the last ten feet at either end of this trench, the trench need not be extended additionally.
- ii. If non-empty containers are encountered at either end of a trench, the trench shall be continued until 10 continuous feet are excavated which do not contain such containers.

Parallel Trenches

Parallel trenches shall be excavated on each side of the B trench, each being a distance of eighty feet from the B trench. These trenches shall comply with the requirements set forth above.

- i. If no containers of any kind, or empty containers (as defined in 40 CFR 261.7), are encountered in the first set of parallel trenches, no additional trenches are required.
- ii. If non-empty containers are found in either or both of the parallel trenches, additional trench(es) shall be excavated every forty feet from the trench(es) in which non-empty containers are discovered, until a trench is excavated that does not contain such containers.
- iii. The area between the trenches shall be excavated or trenched to the extent that all non-empty containers are exhumed.

c. The MIT Waste Pit Area

Trenches shall be excavated in this Area after the excavation of the known drum deposit. Trenches excavated shall start at the edge of the completed excavation, and be of a quantity and length sufficient to pass over each distinct anomaly that has been identified in the magnetometer survey and remains uninvestigated.

d. Depth of trenches

All trenches shall be of a depth not less than the maximum extent of the operational limitations of the equipment used, unless bedrock is encountered, groundwater fills the trench with soil as fast as it can be removed, or a source of anomaly is discovered.

The depth of the trench shall be measured from the typical elevation of the area, and not from a local depression or mound. Specifically, measurements in the burning trench area shall not be made from the mounded soil, but rather, from the surrounding grade. The accuracy which can be obtained through use of a standard tape measure shall be sufficient.

e. Soil and Water Sampling

At both Areas requiring trenching, two samples shall be taken from each trench. Samples shall be taken a distance of twenty-five feet from the extreme end of the trench. Samples shall be of either soil or groundwater, whichever is present at the bottom of the trench at that point. However, no less than twenty percent of all samples taken shall be soil. That is, if the bottom of all trenches is groundwater, a sample of soil shall be taken from between six and twelve inches above the water level. These locations shall be selected symmetrically about point B, and spread evenly over the entire trenched area.

As the extent of a trench shall be determined by field conditions using the above criteria, the point of sampling can not be established until the end of the trench is reached. Thus, to minimize the volatilization of certain organic vapors, the sampling point shall be established immediately after the end of the trench has been defined. A standard tape measure shall be sufficiently accurate. Personnel to take samples shall be ready to take samples immediately upon establishing the sample point. In addition, personnel shall adhere to all applicable OSHA regulations.

Either disposable or non-disposable tools may be utilized for sampling. If disposable tools are used, such tools shall be used to sample only one sample location. If non-disposable tools are used, such devices shall be decontaminated.

f. Documentation

A log shall be kept noting soil type, stratification, depth to source of anomaly, description of anomaly, maximum depth of trenches every twenty feet, water table, sample depth, and concentration of organic vapors at the location where the sample is taken. A map shall be drawn noting all sample locations, extent of trenches, and locations of anomaly(ies). Both a copy of the original field log and field map shall be delivered to EPA. Both a typed copy of the field log shall be delivered to the EPA, as well as a final map.

#### 14. Air monitoring

Air monitoring shall be performed in accordance with the Site Safety Plan appended hereto.

#### 15. Analyses

##### a. General

All samples taken pursuant to this Work Plan shall have performed on them the analytical tests and corresponding quality assurance/quality control (QA/QC) specified in this section. Analyses that require extraction shall utilize only approved methodology.

##### b. Containers

##### Screening

The following screening tests shall be performed on all container samples.

Flashpoint (closed-cup method)

Free cyanide

Sulfide presence

Volatile organic compounds (by flame ionization detector and/or photoionization detector in consideration of field conditions and equipment operation parameters)

Oxidizers

Water Solubility

Ph (if liquid or other physical state that is water soluble)

Hexane solubility

Any sample for which these tests indicate the presence of free cyanide, sulfides, oxidizers, volatile organic compounds (VOCs), flashpoint below 140°F, pH above 12.0 or below 2.0, or greater than 10% solubility in hexane, shall have failed the screening tests, and shall be disposed of as hazardous waste at a RCRA facility. Additional analyses of these samples shall be performed to the extent required by the facility to which the waste is being sent.

Samples which do not qualify as hazardous waste in accordance with the limited screening procedure outlined above, shall not be considered non-hazardous. These samples require additional laboratory testing to insure that the material is non-hazardous. Thus, these samples shall be subjected to testing based on the physical state of the sample or container characteristics, as outlined below. The contractor, however, has the option of treating these materials in the same manner as those that have failed the screening tests, in lieu of further analysis.



#### Powders, Resins, and Amorphous Solids

Powders and Resins are any solid material inside a non-empty container which can be sampled without the use of hammers, chisels or other non-destructive means. Solid Amorphous Material is any solid material not meeting the definition of a powder or resin above, such as completely dried paint or glue, and coagulated or reacted polymer materials.

Each sample shall be analyzed by an off-site laboratory for VOCs by EPA method 8240, and for all priority pollutant metals by EPA method 1310 (after use of applicable, approved extraction method). Any sample for which test results indicate the presence of a volatile organic or priority pollutant metal shall be considered hazardous waste and treated in the same manner as those which have failed the screening tests.

Samples that do not indicate the presence of volatile organic compounds or priority pollutants shall either be disposed of as hazardous waste, or analyzed individually or in composites of up to five (5) compatible samples, for cyanide by EPA method 9010, mercury by EPA method 7471, and semi-volatile organics, pesticides and Polychlorinated Biphenyls (PCBs) by EPA methods 8270 and 8080, as applicable. More than five samples may be composited if field circumstances are such that it is practicable to do so, and only upon approval by the OSC. (For example, if six samples need to be analyzed, all six may be made into one composite, rather than analyzing one composite of five samples and the sixth sample individually.)

Samples selected to make up specific composites shall be based on compatibility test results. All samples which form a composite shall be considered hazardous if test results indicate the presence of mercury, a semi-volatile, pesticide or PCB, and shall be treated in the same manner as those materials which failed the screening tests. Alternatively, individual samples may be tested from the composite for the same test which resulted in the composite being determined hazardous. If the test of the individual sample does not indicate the presence of the compound(s) detected in the composite analysis, then the material may be left on site or disposed off-site in a manner allowed by regulation.

#### Container with Liquid

Containers with Liquid are any non-empty, non-lab-pack containers containing liquid or semi-solid material.

All liquids, except rainwater and pondwater, shall either be subjected to the same analysis outlined above, or they may be treated in the same manner as materials which failed the screening tests. No drum excavated shall be assumed to contain rainwater or pondwater. Only drums found in vegetated areas in a position capable of collecting water, and unsealed drums removed

from the ponds, shall be considered to contain rainwater or pondwater.

Lab-Pack Containers

Lab-Pack Containers are any non-empty containers less than 1 gallon in size.

All lab-packed materials shall be combined with other compatible wastes and treated or disposed off-site at a RCRA facility. Additional analyses of these samples shall be performed to the extent required by the facility to which it is being sent.

c. Trench and Excavation

All samples taken while excavating and trenching shall have the following tests performed on them according to the EPA methods specified: volatile organics by 8240, semi-volatile organics by 8270, pesticides and PCBs by 8080, priority metals by general EPA methods pertaining to AA or ICP as found in SW-846 third edition, and EP toxicity by 1310. Compositing, however, may be performed on samples of the same matrix which are taken from a discreet trench. If contamination is determined present in the composite, individual samples shall be analyzed as necessary to determine which will require testing for mercury and cyanide.

Cyanide sampling by method 9010 shall be performed on no less than the most contaminated half of samples, and mercury sampling by method 7471 shall be performed on no less than the most contaminated quarter of samples, those most contaminated being samples which results of required testing in this section indicate contain the widest array of different chemicals.

d. Surficial Contamination

Samples of materials in this category shall be subjected to all testing requirements specified above in part c, with the exception of the partially burned rubber toys, for which mercury and cyanide analysis need not be performed and pesticide data need not be reduced or reported, and the powdery chemical spillage, for which the mercury analysis need not be performed.

e. Visibly Contaminated Soil

Soil in this category shall be subjected to all testing requirements specified above in part c, except that any results of analysis performed on materials spilled which contaminated the soil in question can be considered valid for this contaminated soil.

f. QA/QC

All test results and QA/QC shall be reported on appropriate forms consistent with those in section one of EPA Publication SW-846, and delivered to the EPA immediately upon receipt.

QA/QC procedures specified in each method to evaluate the analytical data produced by the test method shall be performed, and delivered to the EPA with analytical results.

Specifically, for volatile organic analysis and semivolatile organic analysis, QA/QC consisting of the following shall be carried out and presented in a report: chain of custody, sample holding times, calibration data, GC/MS tuning and performance data, surrogate recoveries, blanks, matrix spikes/matrix spike duplicate, (compound identification), and detection limits.

Specifically, for pesticides and PCB analyses, the following QA/QC shall be carried out: chain of custody, sample holding time, pesticide instrument performance, calibration data, blanks, surrogate recovery, matrix spike/matrix spike duplicate, (compound identification), and detection limits.

Specifically, for metals and cyanide analyses, chain of custody, calibration data, interference check sample analysis, laboratory control sample analysis, (analyte identification), and detection limits.

QA/QC shall be performed at a minimum frequency as dictated by established protocol.

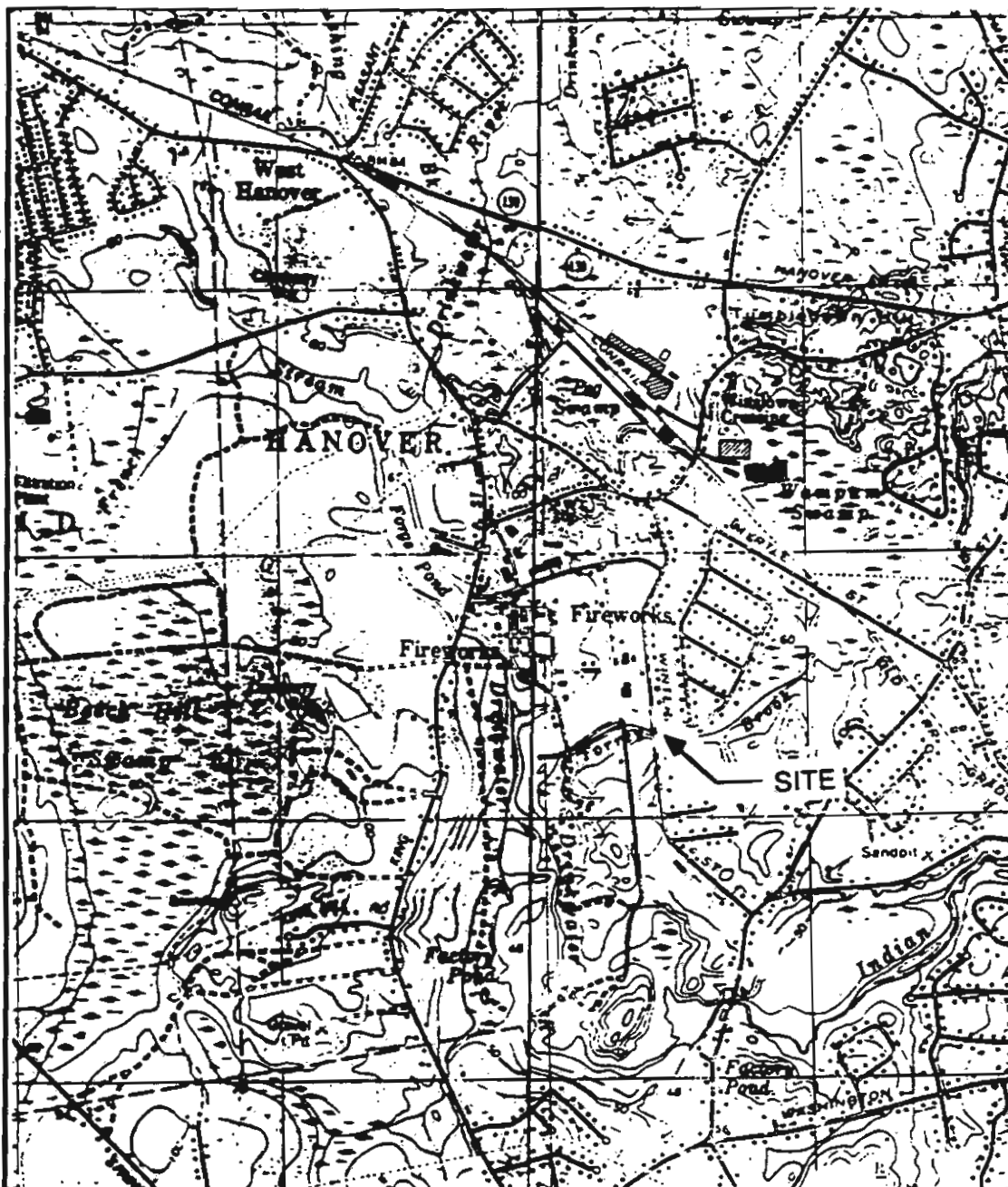
Specifically, regarding waste or source sampling, a trip blank shall be employed one per sample shipment (ice chest) per analytical category enclosed in said shipment. Analytical categories shall include volatiles, semivolatiles, PCB/pesticides, and metals.

Specifically, regarding soil and sediment samples, one equipment blank per twenty samples shall be employed.

Specifically, regarding both soil and sediment samples, and waste or source samples, one collocated or field replicate per twenty samples shall be employed.

Specifically, regarding soil sampling, not less than two background samples per Area shall be employed. These samples shall be surface samples (depth not to exceed three inches) taken at the anticipated limits of the excavation to be performed in the Area, as agreed by the OSC and the respondent's contractor.

Specifically, regarding container and groundwater sampling, no background samples need be collected.



USGS 7.5' Series Topographic Hanover and Whitman Quadrangles

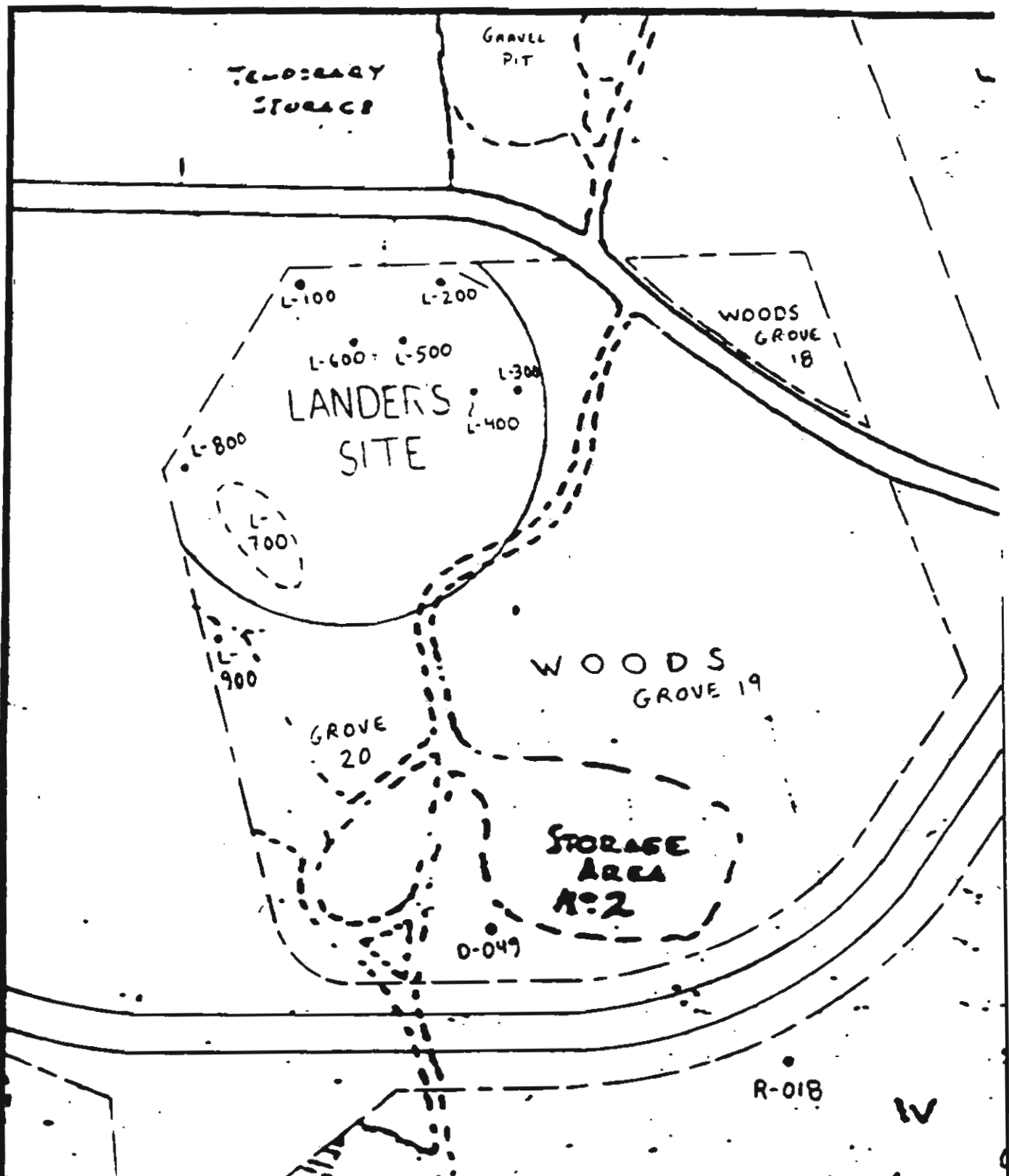
FIGURE 1



SCALE 1" = 0.8 MILE

## SITE LOCUS MAP

NATIONAL FIREWORKS I  
HANOVER, MASSACHUSETTS



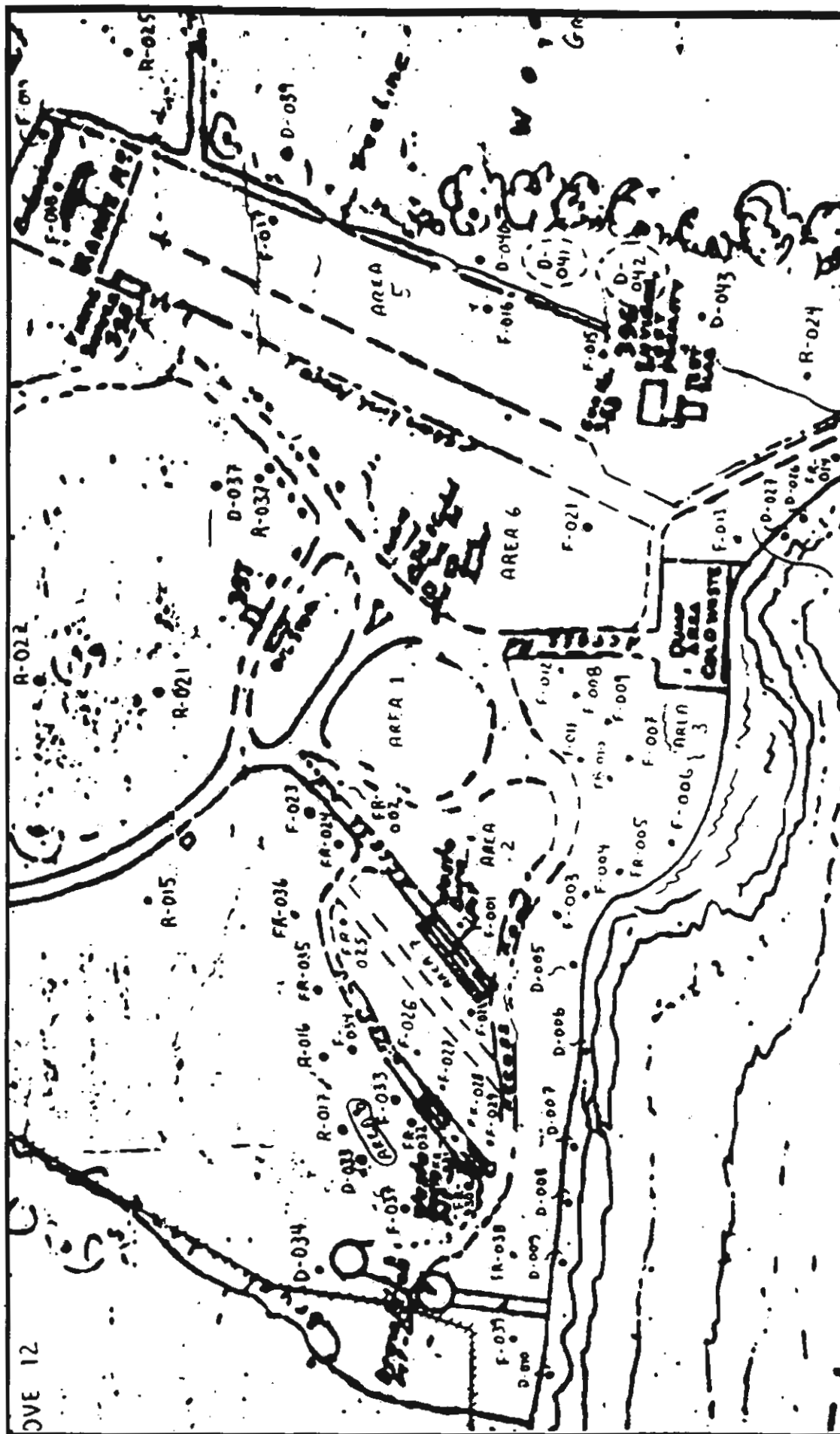
**FIGURE 3**

1"=120'



**SITE PLAN**  
**P. A. LANDERS DRUM SITE**  
**NATIONAL FIREWORKS I**  
**HANOVER, MASSACHUSETTS**

**GEC** Goldman Environmental  
 Consultants, Inc.  
 161 Forbes Road Suite 204  
 Braintree, MA 02184  
 (617) 848-5012



## FIGURE 4

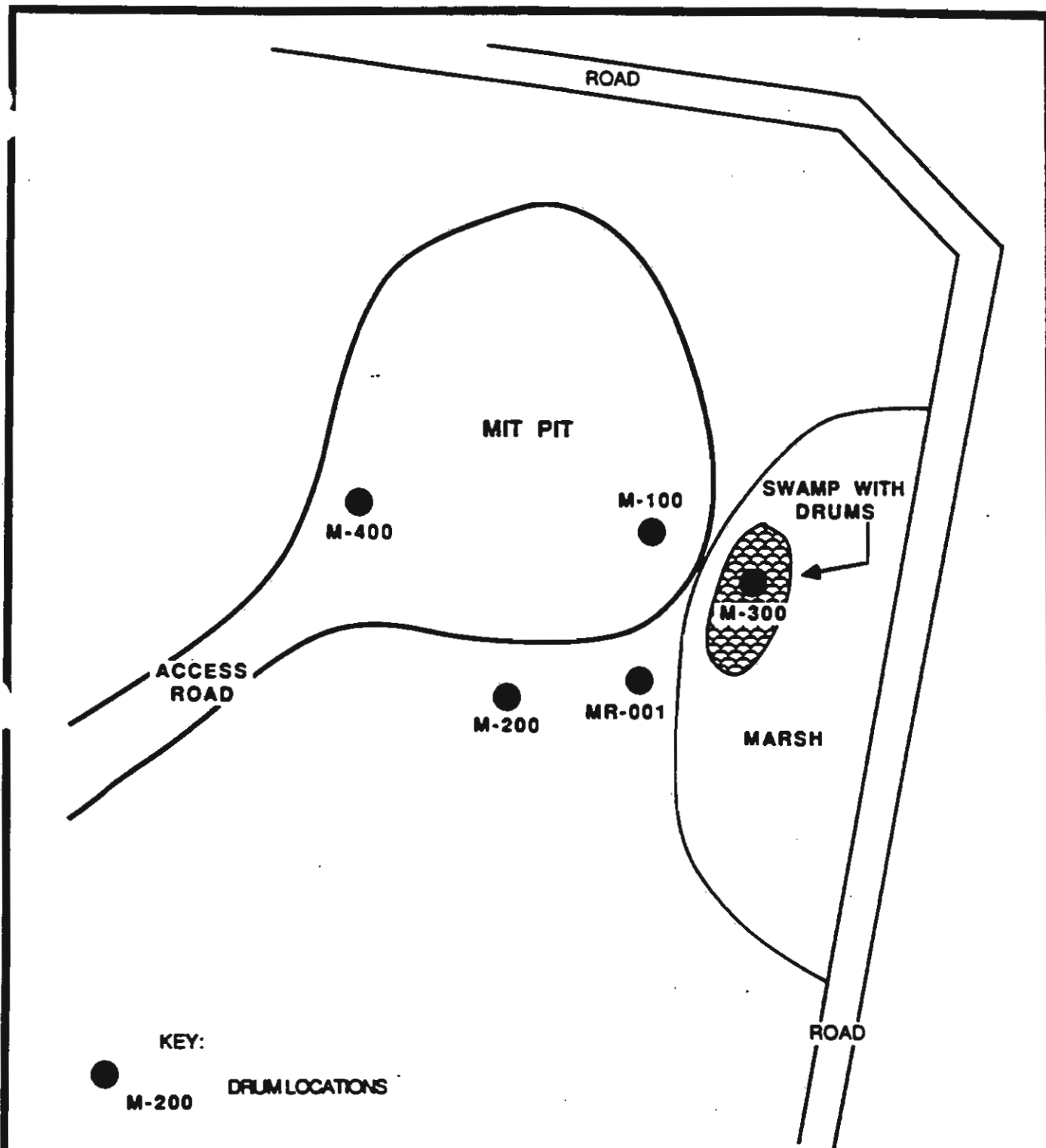
**1"=120'**



**SITE PLAN  
FACTORY POND AREA  
NATIONAL FIREWORKS I  
HANOVER, MASSACHUSETTS**

**GEC**

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Braintree, MA 02184  
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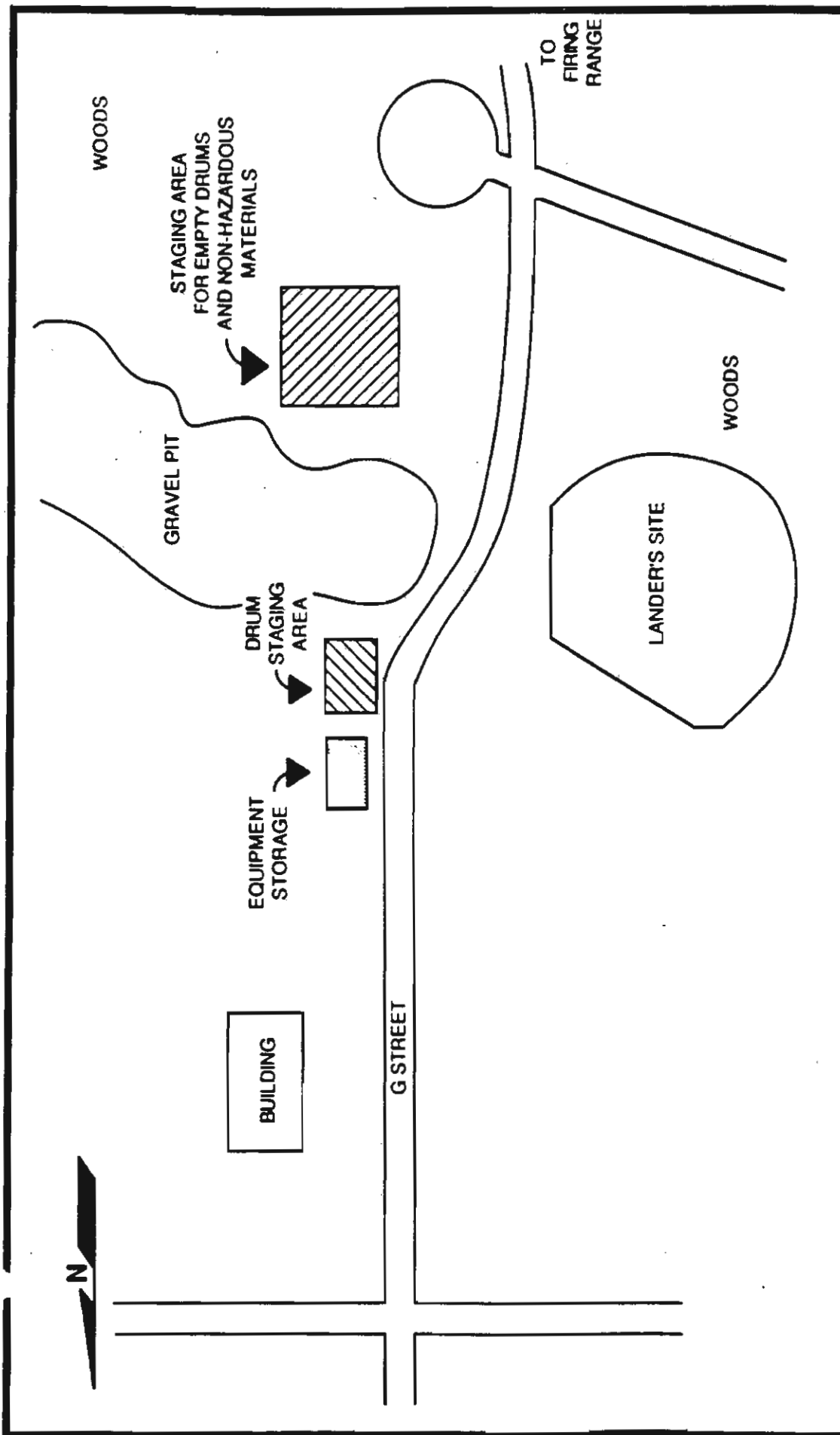


**FIGURE 5**  
(NOT TO SCALE)



**SITE PLAN  
MIT WASTE PIT  
NATIONAL FIREWORKS I  
HANOVER, MASSACHUSETTS**

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161 Forbes Road Suite 204  
Braintree, MA 02184  
(617) 848-5012



**FIGURE 6**

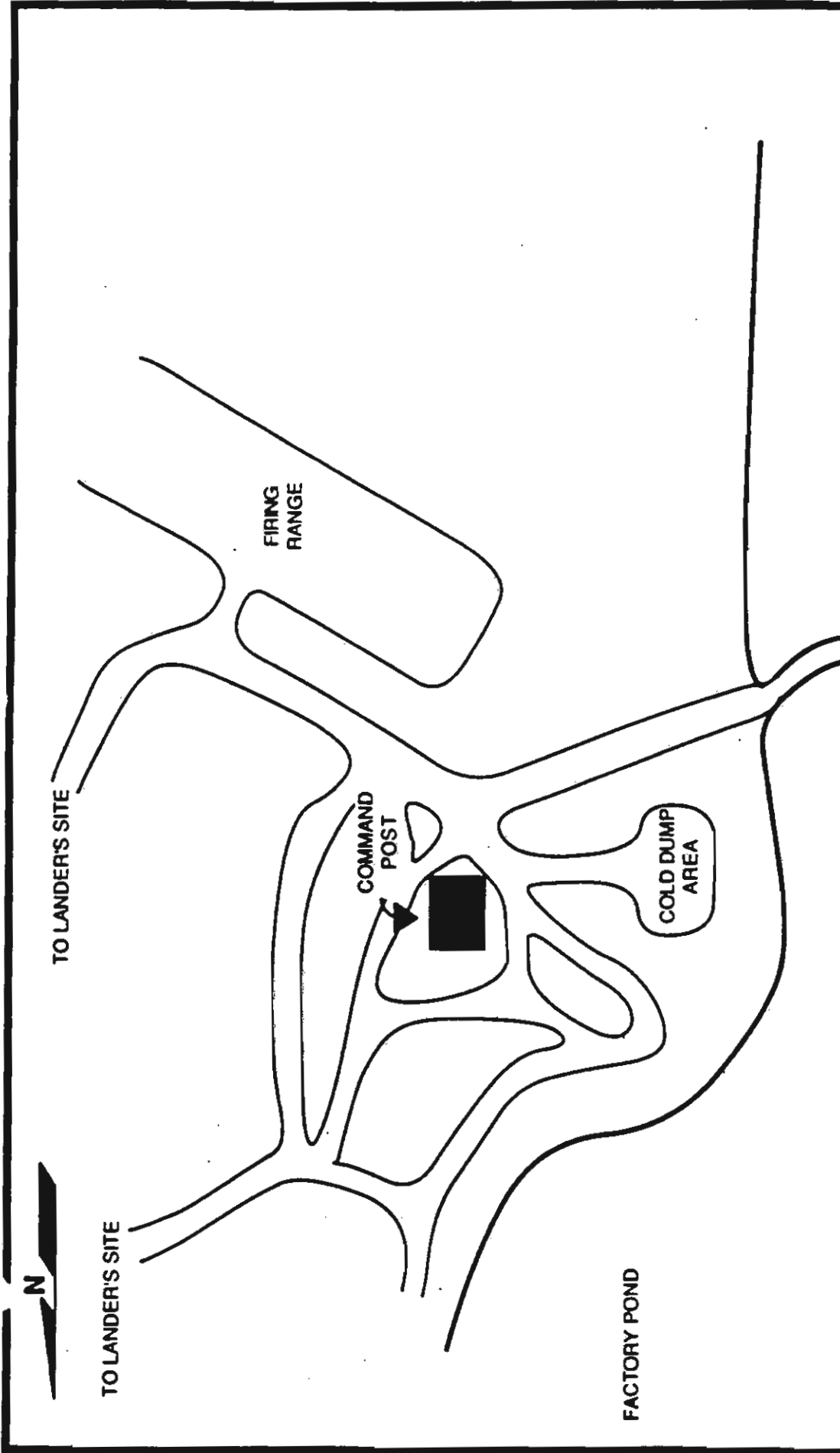
(Not to Scale)

**STAGING AND EQUIPMENT  
STORAGE AREAS  
NATIONAL FIREWORKS I  
HANOVER, MASSACHUSETTS**

**GEC**

Goldman Environmental Consultants, Inc.  
161 Forbes Road Suite 204  
Braintree, MA 02184  
(617) 848-5012





**FIGURE 7**

(Not to Scale)

**COMMAND POST  
FOR FACTORY POND  
NATIONAL FIREWORKS I  
HANOVER, MASSACHUSETTS**

**GEC** Goldman Environmental Consultants, Inc.  
161 Forbes Road Suite 204  
Braintree, MA 02184  
(617) 848-5012

N

TO LANDER'S SITE

G STREET

FIRING  
RANGE

COMMAND  
POST

MIT  
WASTE PIT

TO FACTORY POND

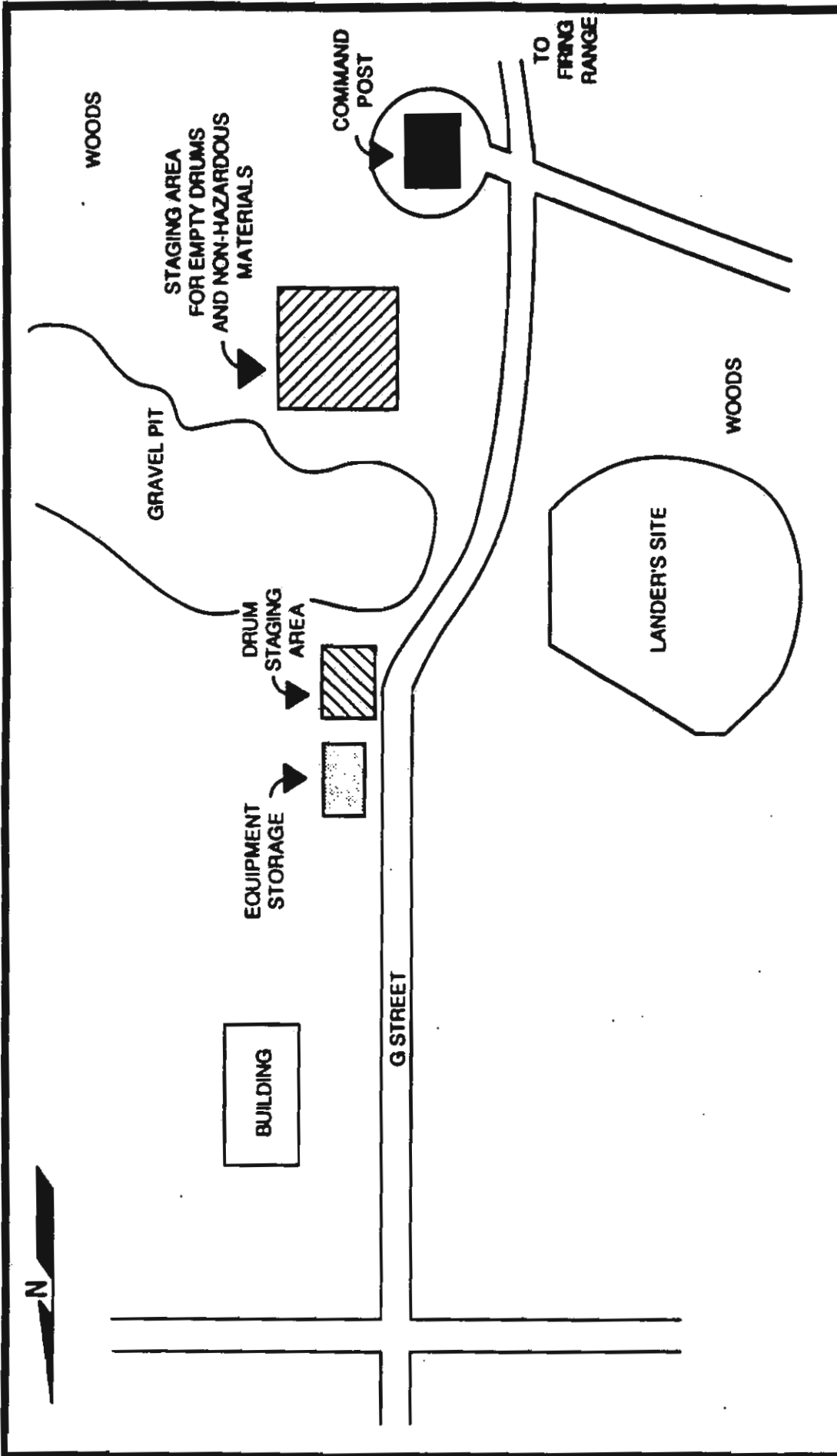
**FIGURE 8**

(Not to Scale)

**COMMAND POST  
FOR MIT WASTE PIT  
NATIONAL FIREWORKS I  
HANOVER, MASSACHUSETTS**

**GEC**

**Goldman Environmental Consultants, Inc.**  
161 Forbes Road Suite 204  
Braintree, MA 02184  
(617) 848-5012



**FIGURE 9**  
(Not to Scale)

**COMMAND POST  
FOR LANDER'S SITE  
NATIONAL FIREWORKS I  
HANOVER, MASSACHUSETTS**

**GEC**

*Goldman Environmental Consultants, Inc.*  
161 Forbes Road Suite 204  
Braintree, MA 02184  
(617) 848-5012

## APPENDIX A

### ESTIMATED TIME FOR COMPLETION OF WORK PLAN

#### FIELD WORK:

- Site Preparation;
- Collect Drums in Woods;
- Collect Drums in Pond;\*
- Prepare and Excavate  
Landers and MIT Area;
- Magnetometer Anomaly  
Investigation and Drum  
Removal;
- Sample Drums;
- Sample Transport;
- Demobilize.

Pre-Disposal Work shall be  
completed by January 31, 1989.

#### OTHER REMOVAL TASKS

- Complete off-site analysis;
- Arrange for Disposal;
- Restoration;
- Final Demobilization.

These Tasks shall be completed  
May 31, 1989.

\* Tasks associated with the removal of drums from Factory Pond may be delayed and performed when the Pond is not frozen, but not later than May 31, 1989.

--Work shall begin on December 16, 1988.

--Removal tasks may be sequenced as desired and performed concurrently to the extent that the Safety Plan is not compromised.

--Work is neither required nor prohibited on weekends or holidays.

--In circumstances where removal tasks specified in the Work Plan will be delayed due to weather conditions, Respondent shall immediately notify EPA's On-Scene Coordinator explaining the cause or causes for such delay. Upon receipt of such notification, EPA will determine whether the delay is appropriately excused and shall so notify Respondent.

**APPENDIX B**

**HEALTH AND SAFETY PLAN  
NATIONAL FIREWORKS I  
HANOVER, MASSACHUSETTS**

**November 28, 1988**

## **I. SITE DESCRIPTION**

### **A. General Information**

#### **1) Site Name and Address**

National Fireworks I  
Circuit Street  
Hanover, MA 02339

#### **2) Directions to Site-**

Route 3 South to Route 53 South to  
Route 139 West to Circuit Street (Left)  
to Winter Street (Left). Entrance across  
from Pat Road.

### **B. Areas Affected**

#### **1) Landers Drum Site**

This site is located approximately 200 yards west of the P. A. Landers Co. garage in an isolated wooded area. The site is defined as an area extending approximately 50 yards from the known drum disposal location, but not extending to the cleared and graded land which surround the site. Refer to Figures 2 and 3 included in the work plan, and attached to this plan.

#### **2) Factory Pond Area**

This land is defined as the land adjacent to Factory Pond where the primary waste combustion and detonation occurred. This includes the area where sodium drums were discarded into the pond, the firing range, the two (2) waste burn pits, and the areas immediately surrounding these locations. Refer to Figures 2 and 4 included in the work plan, and attached to this plan.

#### **3) MIT Waste Pit Area**

This area is located east of the Factory Pond area. It is an area limited to a 50 yard radius from the center of the clearing. This includes the original clearing, the small excavated pool between the clearing and the wetland, and the woods immediately surrounding the clearing. Refer to Figures 2 and 5 included in the work plan, and attached to this plan.

**4) Factory and Lily Ponds, and Undeveloped Woodlands**

These areas are defined as the shoreline of the Factory and Lily ponds to a depth of three feet and all other undeveloped woodlands not defined by the other three sites. The extent of drum locations found in these areas is shown on Figure 2 of the work plan, and attached to this plan.

**5) Undeveloped Woodlands**

The undeveloped woodlands is defined as all the undeveloped woodland areas not defined by the other sites and consisting of space defined under the work plan. Refer to Figure 2 for the extent of drums locations.

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

**D. Hazard Evaluation****1) Explosive**

There is a chance that detonatable explosives still exist on site, since this was at one time a munitions factory. There is also a chance for the presence of lead azide because lead azide was used to explode wastes. Lead azide is a highly explosive shock sensitive substance. Due to the following circumstances, it is believed that this threat is minimal to on-site personnel and the general public during site investigation and remediation:

- a) Ex-employees were consulted regarding disposal methods and stated that all explosives were detonated on-site or underwater using small charges.
- b) The scope of work for this project deals primarily with exposed surface drums.
- c) Lead azide that has been underground for at least twenty years will have been exposed to the moist subsurface conditions and will be wetted. Available literature states that the detonation capability of lead azide is substantially decreased when wet.

d) This is a high traffic area, therefore, it is likely that exposed explosives would have been previously discovered.

However, if explosives are believed to be detected on site, all activity will stop immediately. Ordnance experts will be immediately called to deal with the situation. The ordnance expert will advise the site manager of any immediate precautions such as the need for the construction of a sand bunker around the explosive area or the need to spray water on the critical area.

## 2) Lead Azide

Lead azide is identified as a white powder or needled material. It is highly explosive and detonated by shock waves. Because of its sensitivity to detonation, it is generally used as primary explosive in detonator caps. The properties of this material are as follows: Modest solubility in water; low vapor pressure; photochemically decomposes; surficial decomposition yields a protective layer of oxides.

When packed in bulk, lead azide is moistened to at least 20 % water moisture, and placed in cloth (usually canvas) bags in the quantity 25 pounds, dry weight, of lead azide per bag. Water decreases the explosive capability of lead azide. Each bag is capped with a second bag of the same material and tied securely. Generally, five of these bags are placed in a larger canvas bag which is tied securely. The larger bags should contain no more than 150 pounds of lead azide. These large bags are placed in water tight 55 gallon drums lined with jute or other strong lining material. The large canvas bags should be surrounded by no less than three inches of well packed water saturated sawdust. The jute bag is then sewn to prevent the escape of sawdust.

Lead azide was used extensively at the Fireworks I site. Interviewed employees stated that unused azide and azide in munitions were taken to the Factory Pond for disposal by explosion. This method of disposal was conducted by placing the azide, or munitions, in drums along with detonators. The contents were then submerged to the bottom of the pond and subsequently exploded. Ex-employees stated that if the original charges did not explode, more charges were submerged in the same spot and detonated to explode the azide. It is believed that all the waste azide was successfully disposed in this fashion.



### 3) Hazardous Waste and Toxic Chemicals

Two tables, Table 1 and Table 2 (next two pages), have been generated to depict the hazards associated with all of the chemicals found to date at the Fireworks I site. Table 1 depicts the chemical name, location, and concentration of all monitored chemicals and Table 2 depicts the chemical name, Permissible Exposure Limit (PEL), and hazards associated with the chemicals.

**TABLE 1****CHEMICAL NAME, LOCATION, AND CONCENTRATION  
OF TOXIC CHEMICALS DISCOVERED AT  
NATIONAL FIREWORKS I**

Chemical Name	Location	Concentration
Trichloroethylene	MIT Pit- Drum #M-101 MIT "Swamp"	1,500,000 ppb 97 ppb
Trichlorofluoromethane	MIT "Swamp"	270 ppb
Toluene	MIT "Swamp"	< 50 ppb
Chloroform	MIT Pit- Drum #M-101 Landers Site- Container #L-717	130 ppb 89 ppb
Carbon Tetrachloride	Landers Site- Drum #L-502	330 ppb
Xylenes	Landers Site- Container #L-717	3,200 ppb
Freon	MIT "Swamp"	23,000 ppb
Corrosives	Landers Site- Jar #L-719 E.P.A. Drum w/ pH of 12.5 could not be located	pH of 11
Uranium 238 Thorium 232	Suspected at MIT Pit	Unknown

\* MIT Swamp- This is the swampy area directly to the southwest of the pit. This swamp contains several corroded drums.

**TABLE 2**  
**CHEMICAL NAME, PEL, AND HAZARDS**  
**OF TOXIC CHEMICALS DISCOVERED AT**  
**NATIONAL FIREWORKS I**

Chemical Name	PEL	Hazards
Trichloroethylene	100 ppm 200 ppm ceil	Headache, drowsiness; Carcinogen (Sax,pg. 1045)
Trichlorofluoromethane	1,000 ppm	Nausea, vomiting, diarrhea, cramping; Asthma, bone changes (Sax, pg.693)
Toluene	200 ppm 300 ppm ceil	Headache, nausea, loss of coordination; Anemia, leucopenia (Sax, pg. 1035)
Chloroform	50 ppm 50 ppm ceil	Irritation of mucus mem. and skin, paralysis, death; Damage to liver, heart, and kidneys (Sax pg. 493)
Carbon Tetrachloride	10 ppm 25 ppm cell	Headache, dizziness, nausea, fatigue; Visual disturbances, anemia, jaundice (Sax, pg. 471)
Xylenes	100 ppm	Skin and eye Irritation (Sax, pg. 1094)
Freon	1,000 ppm	Irritation of mucus mem. and skin, paralysis, death; damage to liver, heart, and kidneys (Sax, pg. 493)
Corrosives	N.A.	Acute eye and skin hazard
Uranium 238	10 mR/hr* above back- ground	Kidney damage, acute necrotic arterial lesions; Carcinogen (Sax, pg. 1078)
Thorium 232	10 mR/hr* above back- ground	Dermatitis; Carcinogen (Sax, pg. 1031)

\* mR/hr= milliRoentgen per hour

Sax="Dangerous Properties of Industrial Materials", N. Irving Sax,1979

## **E. Emergency Phone Numbers**

In case of emergency, the telephone at the P. A. Landers building can be used. This building is located to the left when turning off of Winter Street into the Fireworks site. The Site Manager's car is equipped with a mobile phone which can also be utilized.

Hanover Fire Department	(508) 826-2335
Hanover Police Department	(508) 826-2335
DEQE Spill Reporting	(508) 947-1231 x 680
Chemtrec	1-800-424-9300
National Response Center	1-800-424-8802
Hanover Ambulance	(508)826-2335
South Shore Hospital, Weymouth	(508)337-7011

### **Directions to Hospital**

Circuit Street to Route 139N, Route 139N to Route 18N, Route 18N approximately 3 miles, Hospital on right hand side.

## **II. EMERGENCY CONTINGENCY PLAN**

### **A. General Information**

- 1) All site personnel will have OSHA required Haz-Site Investigation Training
- 2) Individuals certified in first aid: Glenn Mitchell - GEC, Inc.  
To be designated - ENSCO
- 3) Onsite Chain of Command: Chain of Command is described in ENSCO's Standard Operating Procedures (SOPs), which are included as part of the work plan.
- 4) The Morning Meeting: A meeting will be held each morning for all site workers to discuss the days work plan and to review pertinent safety procedures.

### **B. Response to an injury**

In case of injury, the site safety officer (to be designated in ENSCO's SOPs) will take control and perform the necessary first aid. The following steps will be taken by the site safety officer:

- 1) Survey the extent of injury.
- 2) Assess the hazards.
- 3) Allocate responsibilities required for proper first aid.
- 4) Decontaminate the victim.
- 5) Have someone call for external help if necessary.
- 6) Remove the victim from the site if possible without further injury to receive medical attention.
- 7) Ensure that all injuries, even minor, are documented.

#### **C. Response to Heat and Cold Stress**

Depending on weather conditions, the site safety officer will address the safety procedures pertaining to heat exhaustion and heat stroke on hot days or frost nip, frost bite, and hypothermia on cold days. The symptoms, treatment, and safety precautions of these afflictions will be discussed in the morning meeting.

#### **D. On-Site Evacuation**

##### **1) Planned Evacuation**

If it is determined that the site must be evacuated for the purpose of non-immediate emergencies, such as the coming of a thunderstorm, then a horn will be blown three times and all workers will go through normal decontamination and meet at the Command Center for a head count. Refer to Figures 3 through 5 for command center locations. These Figures will be found on site with the Health and Safety Plan.

##### **2) Controlled Emergency Evacuation**

In the event that a site must be evacuated and there are health risks involved in a complete decontamination, such as toxic gases released into the air, then it will be necessary to do a shortened decontamination to remove any potential gross contamination. A horn will be blown two times, and the site will be completely evacuated with all workers will meeting at the command center for a head count.

##### **3) Immediate Emergency Evacuation**

In the case of a life threatening circumstance, such as the threat of explosion,

the individual who first notices the situation will give a verbal order for an immediate evacuation. Because of the rapid evacuation, decontamination will take place at the command center subsequent to taking a head count.

#### **E. Warning Systems**

- 1) Walkie Talkies - Field foreman/Command Post
- 2) Car phone and/or radio - Command post
- 3) Air horn- Site safety officer

#### **F. Fire or Explosion**

To reduce the threat of injury from fire and explosion it will be necessary to keep all personnel behind the working end of any heavy equipment when excavating. All employees will be instructed as to what may be explosive. All equipment used to excavate unsampled drums will contain cage protection. As explained above, all personnel will immediately evacuate the site without decontamination if the threat of explosion exists.

### **III. SAFETY GUIDELINES**

#### **A. Protective Clothing**

**Levels of Protection:** As a result of previous investigations performed at the Fireworks site, it has been determined that work will be conducted at Level D protection for all surveillance and investigatory operations. However, it will be necessary to upgrade to Level B under the following circumstances:

- 1) When sampling drums of unknown content.
- 2) When removing drums containing hazardous waste that contaminate the air to a point that canister respirators will not remove contamination. Continuous air monitoring will be used for this determination.
- 3) When readings on the Photovac TIP with a 10.6 eV lamp are greater than 5 ppm in ambient air.

It would be acceptable to downgrade respiratory protection to Level C if the

air contaminants emitting from a drum or container are identified and quantified, and if a canister respirator is available to remove the contamination from the air. Drums will be removed in accordance to the procedures outlined in the work plan.

**Clothing:**

Level D - Cotton coveralls, neoprene boots, surgical gloves, and neoprene gloves.

Level C - Tyvec coveralls, neoprene boots, surgical gloves, Viton gloves, and a full face respirator with organic canisters (GMC-H type).

Level B - Tyvec coveralls, neoprene boots, surgical gloves, Viton gloves, and a positive pressure SCBA.

The site safety officer will make all changes pertaining to levels of protection. When such a decision is made, all personnel will leave the operations area, decontaminate, and then reenter with appropriate respiratory and protective equipment.

**B. Personnel Hygiene**

To enhance the hygiene practices of all employees working at the site, the following rules will be initiated:

- 1) Gravity tap water jug with cup dispenser holding conical cups.
  - 2) No smoking on site.
  - 3) Eating will be restricted to a single location at the command center.
- Decontamination and personnel hygiene will be enforced by the safety officer.

**C. Zones**

Exclusion zones and contamination reduction zones have been established around the two known hazardous waste areas and around all drums that require further investigation. It is believed that the findings of hazardous waste waste in drums to be investigated will be minimal, therefore, the number of exclusion zones will decrease upon further investigations. Diagrams depicting the location of these zones can be found in Figures 10-12. The following media

will be used to delineate these zones:

**Exclusion Zone** - The hot line will be identified by red surveying/ warning tape.

**Contamination Control Line** - This line will be identified with yellow surveying/warning tape.

**Access Points** - Access points for 1) personnel and 2) heavy equipment will be identified with orange road cones.

#### **IV. Personnel Health Guidelines**

##### **A. Air Monitoring**

As a result of investigations performed at the site, it has been determined that the continuous air monitoring shall be performed with a Photovac TIP, which provides instantaneous measurements on the total volatile organic and inorganic ionizable compounds in the air and other gases, during all work activities. The Photovac TIP will be recalibrated each morning, used continuously throughout the day, and recharged at night. A backup Photovac TIP will also be kept on site in case of a malfunction or a battery drain.

A geiger counter will be used to monitor radioactivity at the site. The site of concern is the MIT Pit, however precautions will be taken at all sites. At the MIT Pit, monitoring will be performed at the beginning of the day and every hour thereafter. At all other sites, monitoring with a geiger counter will be performed once a day at the beginning of the day.

A portable Gas Chromatograph will be used at the site for field screening of samples.

##### **B. Site Entry**

Limited to: 1) Contractor Personnel

2) GEC site supervisor

3) EPA site supervisor

4) MIT site supervisor

5) Town of Hanover site supervisor



Entry into each site will always be performed through the pre-established entry points. They are as follows:

The Landers Site - Entry from the south through the woods.

The Factory Pond Site - Entry through the access road.

The MIT Waste Pit - Entry through the road that connects with the Factory Pond Site.

Personnel will always enter the exclusion zones from the same preset point, unless wind conditions are such that the entry point is into the wind. In these case points, the entry will be adjusted.

#### C. Site Departure

Personnel will depart the site through the entry point. There will always be a decontamination station at these points.

#### D. Safety Equipment

The following safety equipment will always be present on site:

- 1) Photovac TIP
- 2) Portable Gas Chromatograph
- 3) Level C protective gear
- 4) Level B protective gear
- 5) First Aid Kit
- 6) Fire Extinguisher

#### V. DECONTAMINATION STATIONS

Decontamination will be established at each access point to the site. The access points will be limited to one location where no large equipment is used, and two spots where large equipment is used. The station will be developed prior to any site operations and workers will be required to decontaminate themselves and the equipment.

Line set up is as follows:

- 1) Two tubs; one filled with soap and water and the other empty. In the bottom of the soap and water tub will be a mat for scrubbing the

bottom of boots. Gloves and boots are completely scrubbed. Then over the empty tub, the boots and gloves are sprayed with distilled water and then methanol. Light equipment, such as stainless steel trowels, shovels, and scraping devices, is also cleaned at this station. It is scrubbed and rinsed in the same manner as gloves and boots then set aside on a clean surface to dry.

- 2) Station for removing boots and outer gloves.
- 3) Station for removal of suits (if necessary).
- 4) Station for removal of masks (if necessary), and then surgical gloves.
- 5) All used clothing will be collected in plastic bags and disposed of properly as a solid waste by the contractor, unless grossly contaminated with waste material, which would be handled as a hazardous waste.

Decontamination solutions for individuals will be as follows:

- 1) Trisodium Phosphate or equivalent detergent in water.
- 2) Methanol.
- 3) Tap water (Distilled water will be used for light equipment).
- \* Decontamination solutions will be retained in 55 gallon drums. One drum will be for soap and water and distilled water rinses and another will be for solvents. These drums will then be sampled and disposed of as determined by the sample results.

No one is to enter the support zone after completing site operations until they have been decontaminated as required.

Heavy equipment will be steam cleaned if it is directly exposed to hazardous waste.

All site personnel have read the above plan and are familiar with it's provisions.

**Name**

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**Signature**

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**FIGURES**

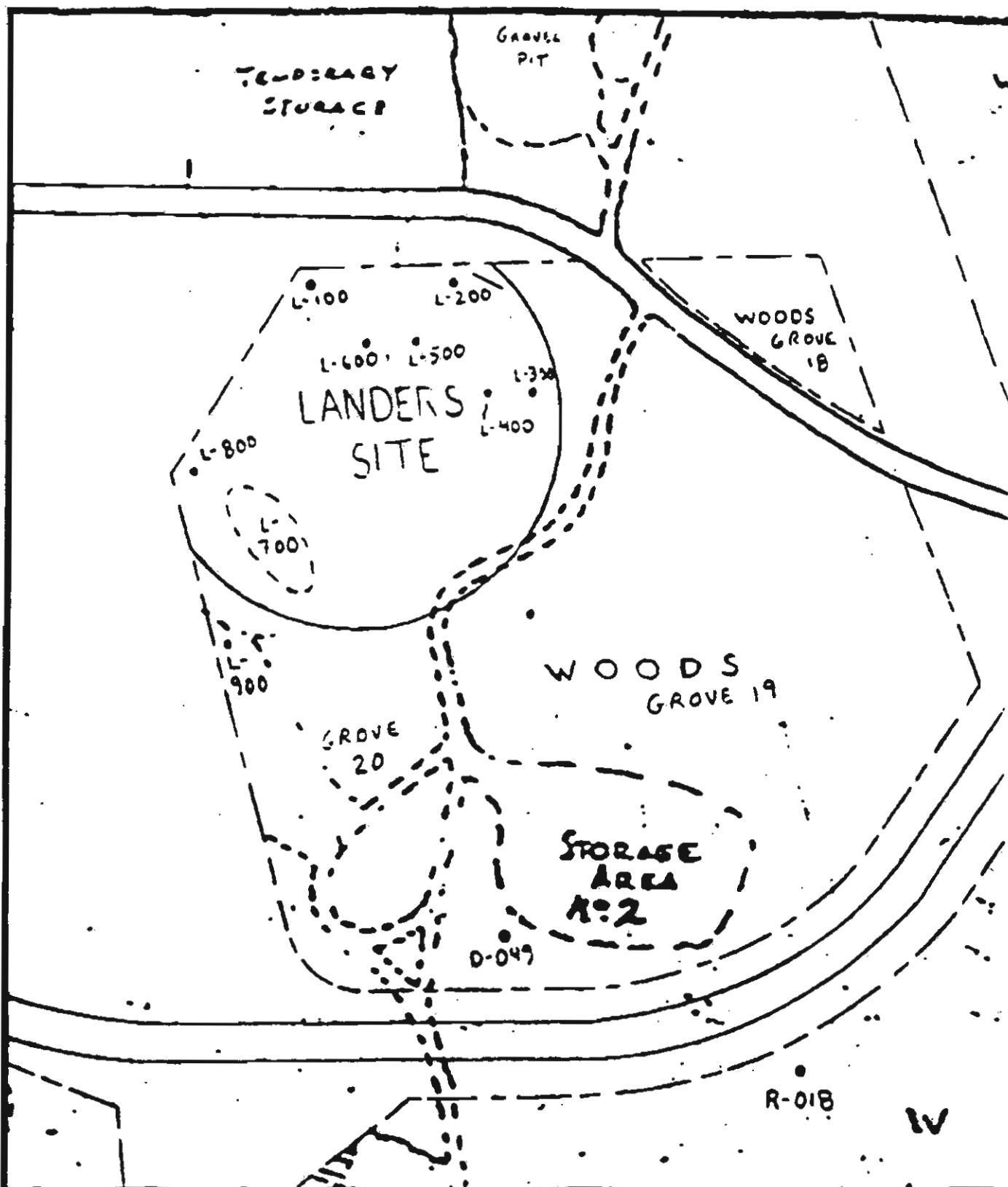


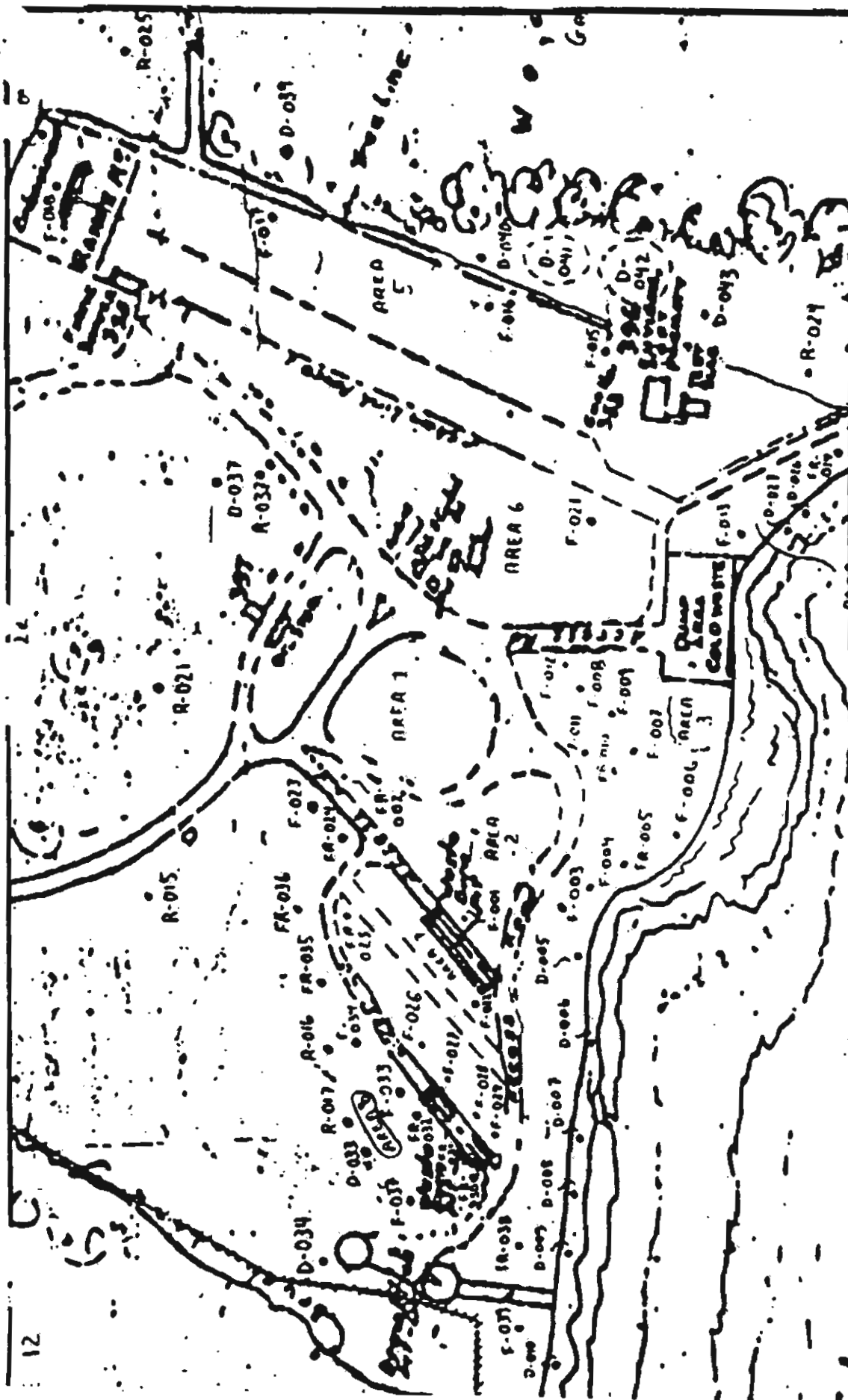
FIGURE 3

1"=120'



SITE PLAN  
P. A. LANDERS DRUM SITE  
NATIONAL FIREWORKS I  
HANOVER, MASSACHUSETTS

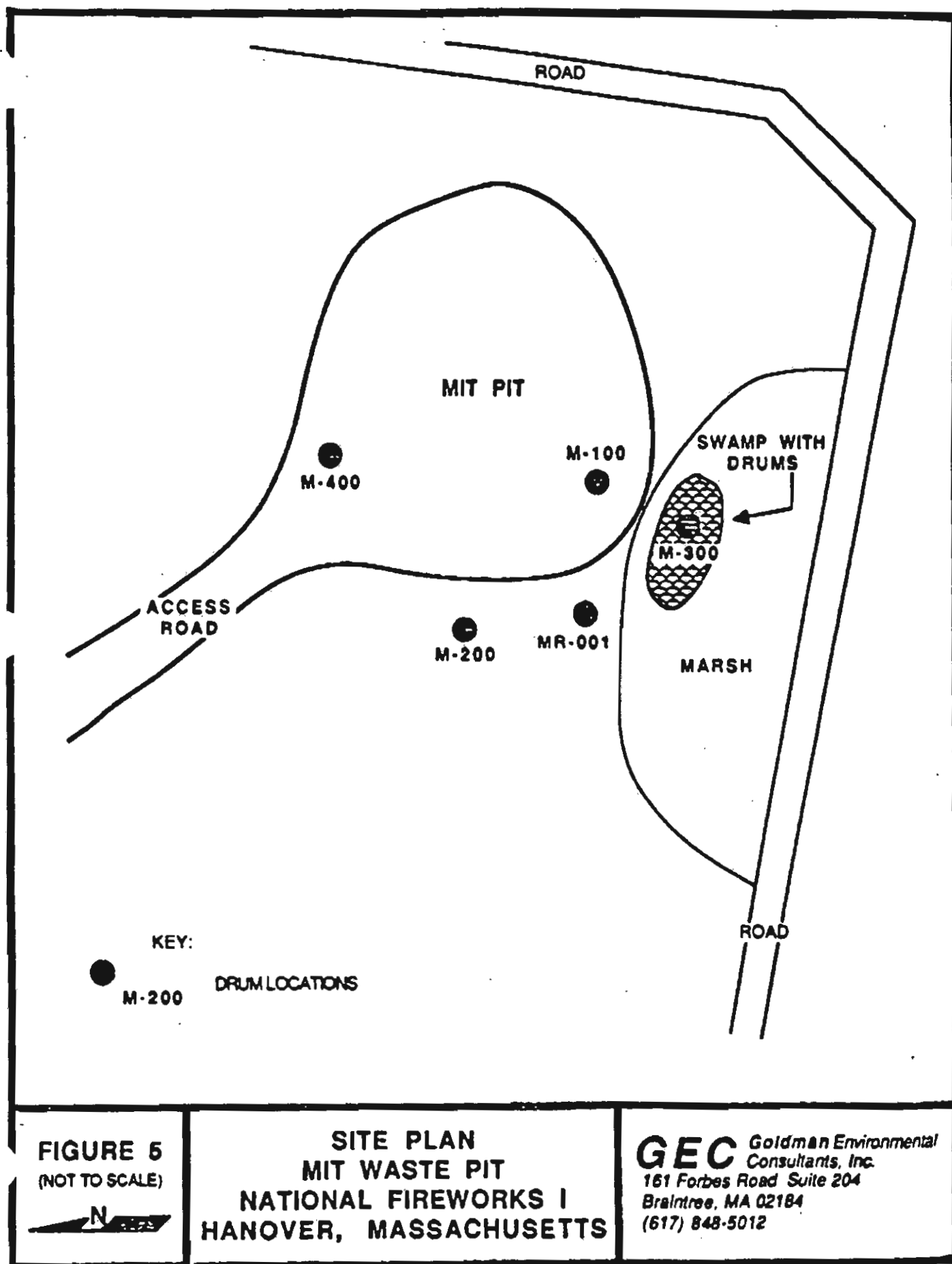
**GEC** Goldman Environmental  
Consultants, Inc.  
161 Forbes Road Suite 204  
Braintree, MA 02184  
(617) 848-5012

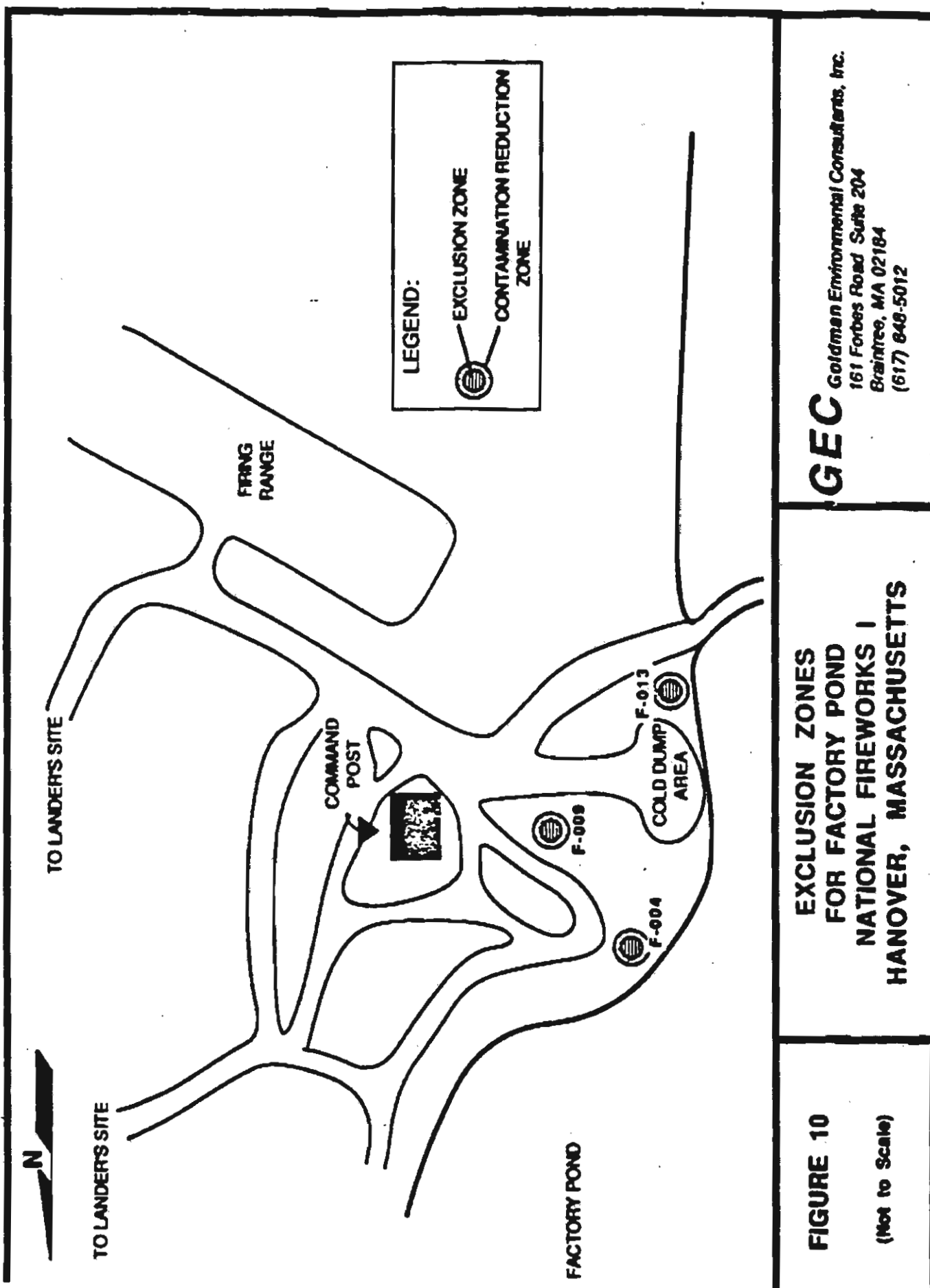


**GEC** Goldman Environmental Consultants, Inc.  
161 Forbes Road Suite 204  
Braintree, MA 02184  
(617) 848-5012

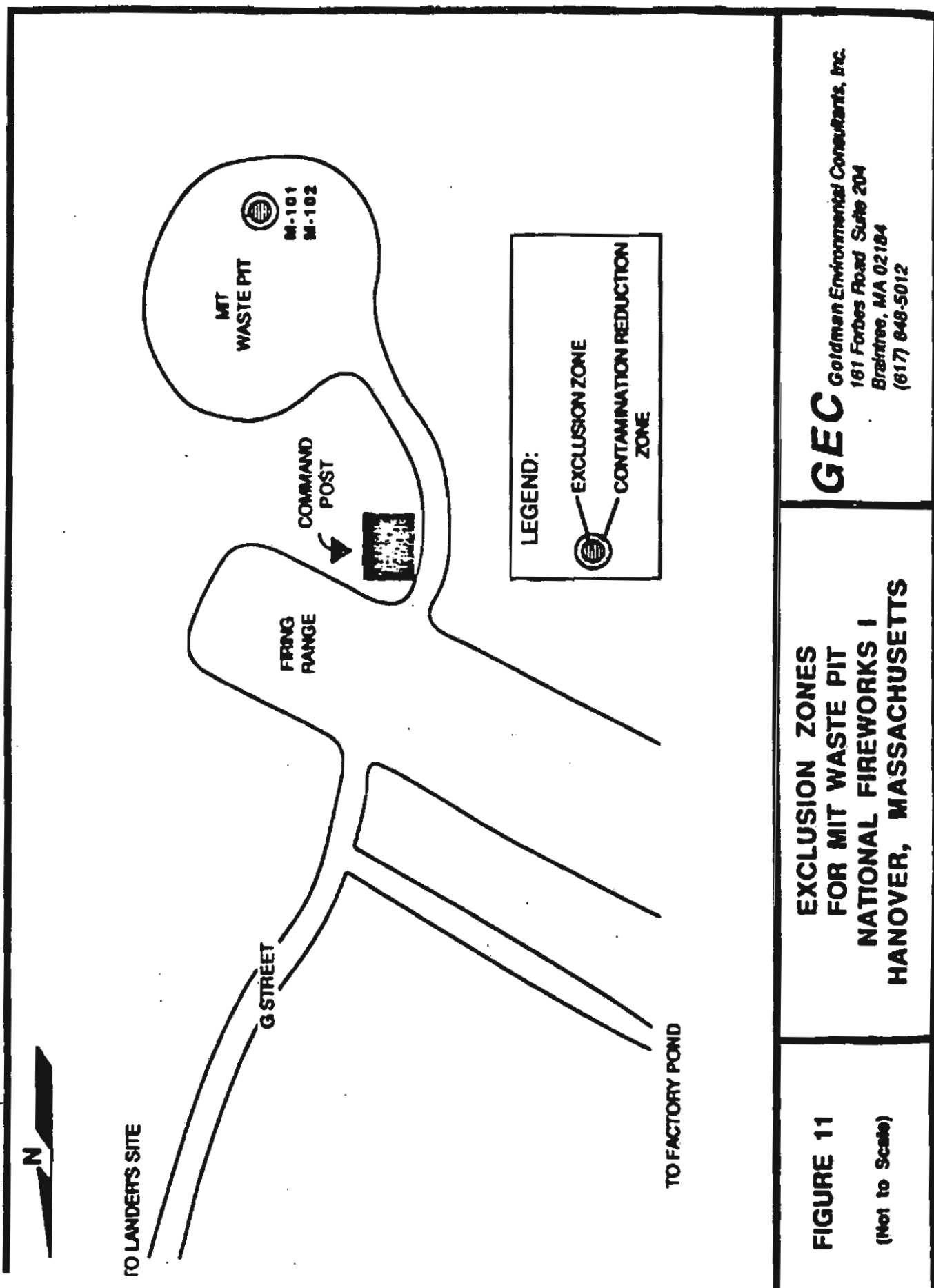
**SITE PLAN  
FACTORY POND AREA  
NATIONAL FIREWORKS I  
HANOVER, MASSACHUSETTS**

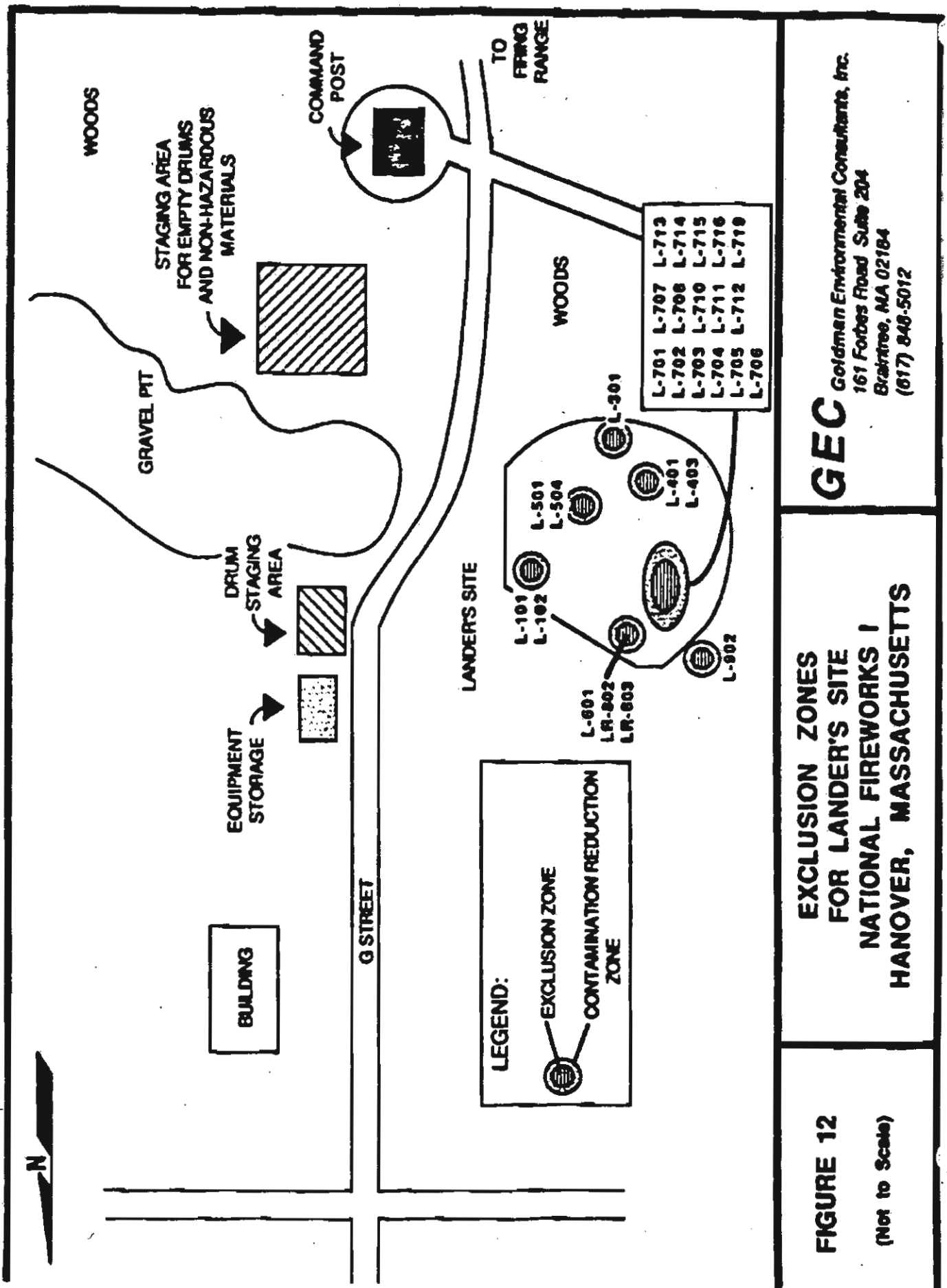
**FIGURE 4**  
1"=120'  
N











**APPENDIX C**

**MAGNETOMETER SURVEY  
REPORT**

**NATIONAL FIREWORKS I  
HANOVER, MASSACHUSETTS**

**September 27, 1988**

**DR. JOHN F. KICK**

**Geophysical & Geological Cons.**

**Box 6, Dunstable, Mass. 0182**

**(617) 649-881**

**MAGNETIC SURVEY  
NATIONAL FIREWORKS I SITE  
HANOVER, MASSACHUSETTS**

**prepared for**

**Goldman Environmental Consultants  
161 Forbes Road  
Braintree, Massachusetts 02184**

**MAGNETIC SURVEY  
NATIONAL FIREWORKS I SITE  
HANOVER, MASSACHUSETTS**

**Introduction**

A magnetic survey was conducted over the MIT Waste Pit and Waste Burn Pit areas within the Fireworks I Site in Hanover, Massachusetts by John Kick, Geophysicist. The purpose of the survey was to determine the extent and depth of concentrations of iron that might include iron drums. The information is needed to support investigations of the site being conducted by Goldman Environmental Consultants of Braintree, Massachusetts.

**Magnetic Search Method**

Magnetic search methods involve the detection and measurement of anomalies in the Earth's magnetic field caused by the presence of materials with contrasting magnetic susceptibility. Iron and steel objects for example, generally form high magnetic susceptibility contrasts with usual surrounding materials and therefore produce magnetic anomalies. The amplitude, size, and shape of an anomaly depend on the size, shape, and depth of burial of the object searched for, and its magnetic susceptibility contrast with surrounding materials.

**Magnetic Field Work**

268 measurements of total magnetic field intensity were made at the MIT Waste Pit and Waste Burn Pit on September 13, 1988.

Field equipment included an EG&G Memory-Mag G-856 proton precession magnetometer. The instrument has a resolution of 0.1 gamma. The magnetic field detector is separate from the rest of the instrument and is mounted on an 8 foot staff to provide measurements that are a constant height above the surface of the ground.

A series of magnetic field measurements were made at adjacent base stations at regular time intervals throughout the survey to form the basis of daily variation curves. The base stations were located at sites with typical low gradient "background" magnetic field intensity.

At each of the two areas traverse lines were laid out so that measurements could be made at grid points. The gridded areas are portrayed on the magnetic contour maps of Figure 1.

Each grid is referenced to features on site that were witnessed by Goldman personnel, so that data points can be retrieved.

At the MIT Waste Pit, measurements were made mainly at 10 foot intervals along lines spaced 10 feet apart. Along lines of higher magnetic intensities, measurements were made at 5 foot intervals. In the pond area measurements were made at greater than 10 foot intervals because of obstacles.

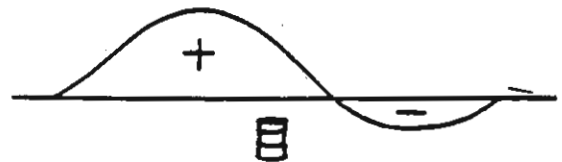
At the Waste Burn Pit measurements were made at 10 foot intervals along traverses normal to the base line. Most of the traverses are 10 feet apart, exceptions being where access was difficult.

### Analysis

Data from the field was reduced by correcting for temporal variations due to extraterrestrial sources, and regional earth field and gradient values. Various considerations involving the site and the data justified the assumption that the base station values could be used directly as reference values. Values were initially read to  $\pm 0.5$  gammas, but such accuracy proved irrelevant considering the large local gradients encountered. Reduced values were contoured with an interval of 100 gammas.

### Interpretation

Anomaly patterns manifested by magnetic contour lines indicate the extent, location and shape of a given source concentration of iron or steel objects. If sufficiently isolated or simple, each anomaly will be seen to have a positive and negative component. The center of any given iron object or cluster of objects causing an anomaly is usually located between the positive and negative peaks, but somewhat closer to the positive as shown in the cartoon below.



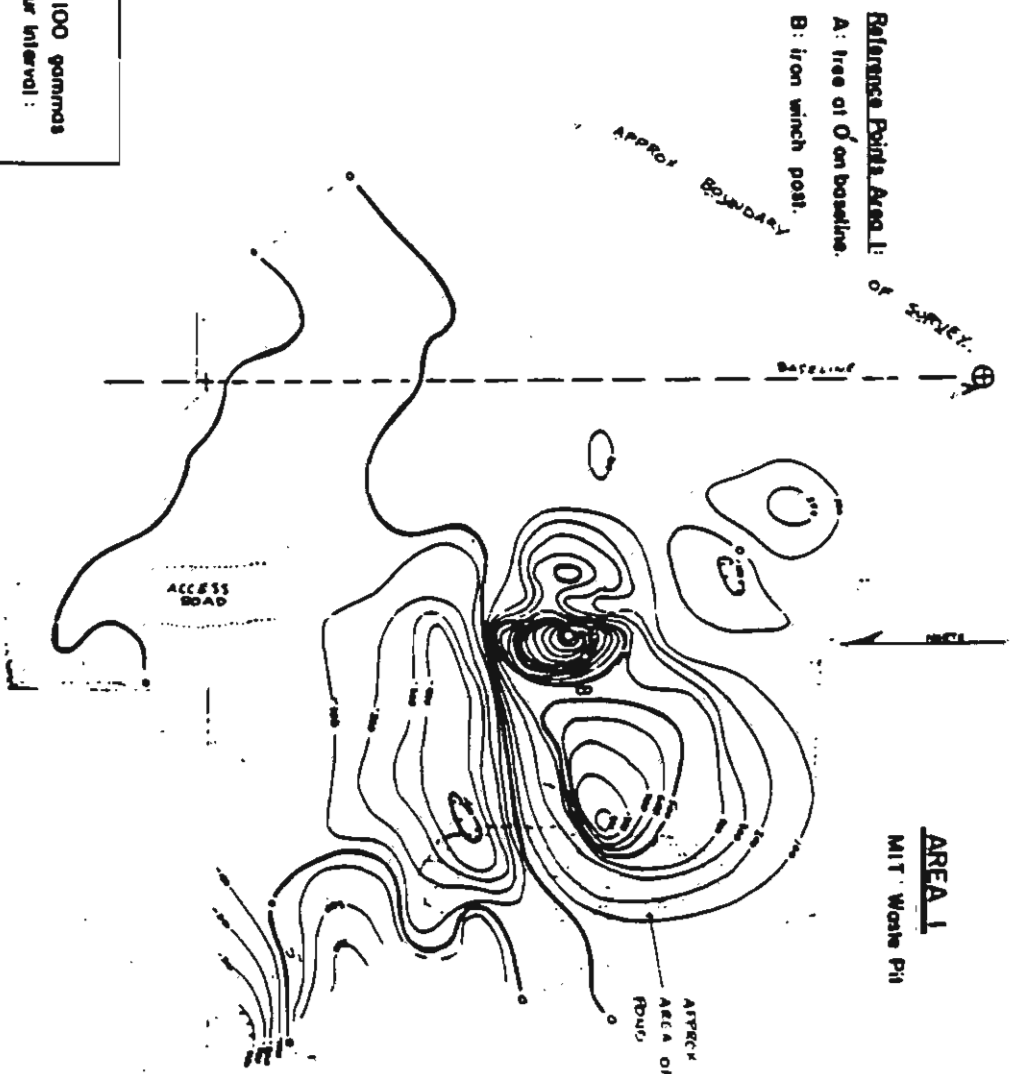
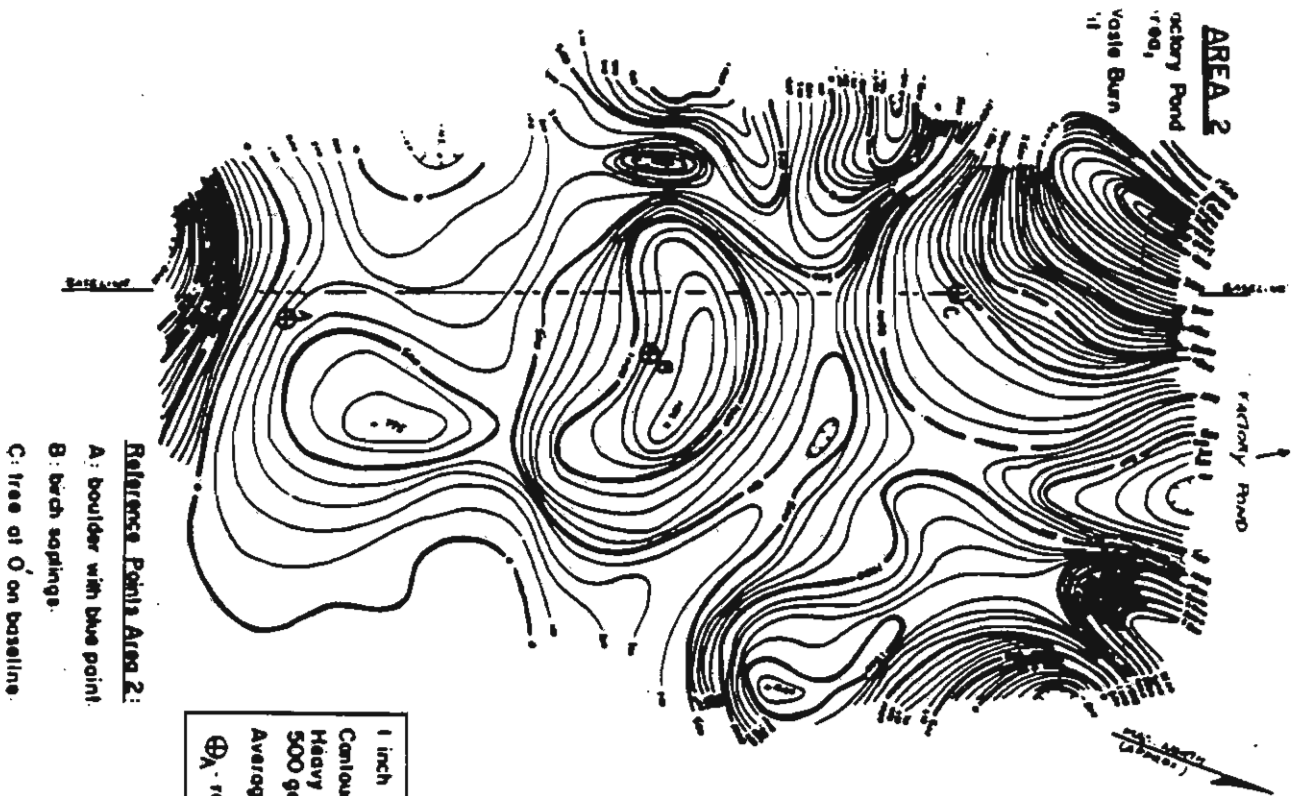
Definition of the nature of the sources and of depth of burial at this site is difficult for reasons including the following. Iron objects of all sorts as well as drums are to be found on the surface as well as below. Drums seen on the site show signs of rusting which would lower their contribution to the anomaly magnitude. Attempts were made to calculate maximum depths using simple formulae.

#### Area 1 - MIT Waste Pit

Over most of this site there is a broad, relatively featureless anomaly due most likely to small disseminated near surface objects; (refuse articles, etc.). One relatively large, complex anomaly is seen in the area near the pond, and a smaller anomaly southeast of the larger. Partly exposed drums are visible in the large anomaly area. An especially sharp portion of the anomaly is associated with the "winch post" apparatus at reference point B. The anomaly indicates a concentration of iron objects, possibly drums, trending east - west, 40 - 50 feet long. Rough estimates give a maximum depth extent of 15 feet.

#### Area 2 - Waste Burn Pit

Area 2 shows a complex of interfering anomalies, some with high amplitude, indicating the presence of many concentrations of iron - steel objects in the subsurface. A large source south of the survey area is partially recorded. The southern portion of the "pit" is relatively quiet, and reveals the presence therefore of a relatively small quantity of iron objects, perhaps the equivalent of 20 drums. Proceeding northward the anomalies increase in amplitude and gradient. Most are only partially recorded by the survey. It appears clear from this work that the pit needs further investigation.



**FIGURE 1**  
**Total Magnetic Field Intensity**  
**National Fireworks**  
**Hanover, Massachusetts**



*Exhibit B*

ACCESS AGREEMENT

This Agreement is entered into between Susquehanna Corporation ("Susquehanna") and the Drinkwater Investment Corporation ("Drinkwater").

WHEREAS, the United States Environmental Protection Agency ("EPA") has indicated its intention to issue an order (the "Order") to Susquehanna pursuant to 42 U.S.C. § 9601, et. seq. for a removal action at the so-called National Fireworks I site in Hanover, Massachusetts;

WHEREAS, Susquehanna expects to undertake a removal action pursuant to the Order without acknowledging any legal liability therefore;

WHEREAS, Susquehanna has submitted a proposed work plan (the "Work Plan") to EPA, with a copy to Drinkwater, which Work Plan will be modified for approval by EPA and is expected to be incorporated into the Order;

WHEREAS, a portion of the National Fireworks I site is owned by Drinkwater;

WHEREAS, Susquehanna will require access to the land owned by Drinkwater to undertake the removal action, including removal activities on Drinkwater property;

WHEREAS, Drinkwater, without acknowledging any legal liability for the removal action, is willing to afford access to Susquehanna to facilitate the removal action;

NOW, THEREFORE, the parties hereby agree as follows:

1. Drinkwater grants the right of continuous access onto and through its land to Susquehanna and its consultants, contractors, and subcontractors agents for the purposes referred to in the Work Plan and/or Order. The right of access shall continue until all removal actions called for under the Work Plan and/or Order have been completed.

2. Susquehanna will provide Drinkwater with at least 48 hours' notice prior to commencing removal action on the Site;

3. The right of access shall include the right to enter the land with all vehicles, boats, equipment, tools or other items necessary to complete the removal action. All such vehicles, boats, equipment, tools or other items placed on the land by Susquehanna, its consultants, contractors, subcontractors, or agents shall remain the property of Susquehanna, its consultants, contractors, subcontractors or agents and shall not become the property of Drinkwater.

4. Drinkwater grants Susquehanna and its consultants, contractors, subcontractors and agents the right to undertake all reasonable steps necessary to accomplish the removal actions referred to in the Work Plan and/or Order, including but not limited to:

a. the taking of such soil or water samples as may be determined by EPA, Susquehanna, or their respective consultants, contractors, subcontractors, or agents to be reasonably necessary;

b. the sampling of any barrels, solids or

liquids located on Drinkwater property as may be determined by EPA, Susquehanna, or their respective consultants, contractors or subcontractors agents to be reasonably necessary;

c. the drilling of holes or installation of monitoring wells;

d. the conducting of magnetometer studies;

e. other actions related to the investigation of surface or subsurface conditions;

f. the undertaking of removal or other response action, including but not limited to:

i) disposal of hazardous or nonhazardous materials;

ii) covering and capping areas of contaminated soil; and

iii) excavation and disposal of contaminated soil.

5. The parties recognize that the removal action necessarily may involve some disruption or damage to Drinkwater's land and vegetation. Susquehanna and its consultants, contractors, subcontractors, and agents agree to undertake removal actions in a manner reasonably designed to cause minimal disruption or damage to Drinkwater's land and vegetation. Drinkwater agrees to indemnify and hold harmless Susquehanna and its consultants, contractors, subcontractors, and agents from any disruption or damage caused by removal actions undertaken in accordance with the Work Plan and/or Order.

6. The execution of this Agreement shall not constitute an acknowledgment or admission of liability by Susquehanna or Drinkwater for the release or threat of release of any hazardous substances, pollutants, contaminants or hazardous materials as those terms are defined under the Comprehensive Environmental Response, Compensation and Liability Act ("CERCLA"), 42 U.S.C. § 9601 et. seq., as amended by the Superfund Amendments and Reauthorization Act of 1986 ("SARA"), or the Massachusetts Oil and Hazardous Material Release Prevention and Response Act, M.G.L. c.21E, nor shall this Agreement create an independent obligation on the part of Susquehanna to Drinkwater, or any other agency or entity to perform any removal action or work. This Agreement shall not be admissible in Court as evidence of any liability or obligation on the part of Susquehanna or Drinkwater.

7. The entry upon Drinkwater's land and subsequent removal action are undertaken pursuant to EPA's authority under CERCLA, 42 U.S.C. § 9601 et. seq.

8. This Agreement is entered into voluntarily and without conditions beyond those expressly contained and agreed to in this Agreement.

9. This Agreement shall be governed by the laws of the United States and the Commonwealth of Massachusetts and shall be enforceable in courts of competent jurisdiction in the Commonwealth of Massachusetts.

SUSQUEHANNA CORPORATION

By: \_\_\_\_\_  
Date

DRINKWATER INVESTMENT CORPORATION

By: Triston C. Lohr Aug 31, 1988  
Date

*Exhibit C*

ACCESS AGREEMENT

This Agreement is entered into between Susquehanna Corporation ("Susquehanna") and the Town of Hanover, Massachusetts (the "Town").

WHEREAS, the United States Environmental Protection Agency ("EPA") has indicated its intention to issue an order (the "Order") to Susquehanna pursuant to 42 U.S.C. § 9601, et. seq. for a removal action at the so-called National Fireworks I site in Hanover, Massachusetts;

WHEREAS, Susquehanna expects to undertake a removal action pursuant to the Order without acknowledging any legal liability therefore;

WHEREAS, Susquehanna has submitted a proposed work plan (the "Work Plan") to EPA, with a copy to the Town, which Work Plan will be modified for approval by EPA and is expected to be incorporated into the Order;

WHEREAS, a portion of the National Fireworks I site is owned by the Town through its Conservation Commission;

WHEREAS, Susquehanna will require access to the land owned by the Town to undertake the removal action, including removal activities on Town property;

WHEREAS, the Town, without acknowledging any legal liability for the removal action, is willing to afford access to Susquehanna to facilitate the removal action;

NOW, THEREFORE, the parties hereby agree as follows:

1. The Town grants the right of continuous access onto and through its land to Susquehanna and its consultants, contractors, and subcontractors agents for the purposes referred to in the Work Plan and/or Order. The right of access shall continue until all removal actions called for under the Work Plan and/or Order have been completed.

2. Susquehanna will provide the Town with at least 48 hours' notice prior to commencing removal action on the Site:

3. The right of access shall include the right to enter the land with all vehicles, boats, equipment, tools or other items necessary to complete the removal action. All such vehicles, boats, equipment, tools or other items placed on the land by Susquehanna, its consultants, contractors, subcontractors, or agents shall remain the property of Susquehanna, its consultants, contractors, subcontractors or agents and shall not become the property of the Town.

4. The Town grants Susquehanna and its consultants, contractors, subcontractors and agents the right to undertake all reasonable steps necessary to accomplish the removal actions referred to in the Work Plan and/or Order, including but not limited to:

a. the taking of such soil or water samples as may be determined by EPA, Susquehanna, or their respective consultants, contractors, subcontractors, or agents to be reasonably necessary;

b. the sampling of any barrels, solids or

liquids located on the Town property as may be determined by EPA, Susquehanna, or their respective consultants, contractors or subcontractors agents to be reasonably necessary;

c. the drilling of holes or installation of monitoring wells;

d. the conducting of magnetometer studies;

e. other actions related to the investigation of surface or subsurface conditions;

f. the undertaking of removal or other response action, including but not limited to:

i) disposal of hazardous or nonhazardous materials;

ii) covering and capping areas of contaminated soil; and

iii) excavation and disposal of contaminated soil.

5. The parties recognize that the removal action necessarily may involve some disruption or damage to the Town's land and vegetation. Susquehanna and its consultants, contractors, subcontractors, and agents agree to undertake removal actions in a manner reasonably designed to cause minimal disruption or damage to the Town's land and vegetation. The Town agrees to indemnify and hold harmless Susquehanna and its consultants, contractors, subcontractors, and agents from any disruption or damage caused by removal actions undertaken in accordance with the Work Plan and/or Order.

6. The execution of this Agreement shall not



constitute an acknowledgment or admission of liability by Susquehanna or the Town for the release or threat of release of any hazardous substances, pollutants, contaminants or hazardous materials as those terms are defined under the Comprehensive Environmental Response, Compensation and Liability Act ("CERCLA"), 42 U.S.C. § 9601 et. seq., as amended by the Superfund Amendments and Reauthorization Act of 1986 ("SARA"), or the Massachusetts Oil and Hazardous Material Release Prevention and Response Act, M.G.L. c.21E, nor shall this Agreement create an independent obligation on the part of Susquehanna to the Town, or any other agency or entity to perform any removal action or work. This Agreement shall not be admissible in Court as evidence of any liability or obligation on the part of Susquehanna or the Town.

7. The entry upon the Town's land and subsequent removal action are undertaken pursuant to EPA's authority under CERCLA, 42 U.S.C. § 9601 et. seq.

8. This Agreement is entered into voluntarily and without conditions beyond those expressly contained and agreed to in this Agreement.

9. This Agreement shall be governed by the laws of the United States and the Commonwealth of Massachusetts and shall be enforceable in courts of competent jurisdiction in the Commonwealth of Massachusetts.

SUSQUEHANNA CORPORATION

By: Robert L. Rasmussen  
Vice President

9/2/88

Date

TOWN OF HANOVER

By: John A. Wood

8/31/88

Date

# **I. SITE ACTIVITY OVERVIEW**

## **NATIONAL FIREWORKS I**

### **HANOVER, MASSACHUSETTS**

#### **1. Surveying**

August 30 - September 2, 1988

- \* Surveyed location of new road and developed areas.
- \* Updated site plan to show new developments.

#### **2. Reconnaissance**

September 6 - September 23, 1988

- \* Purpose
  - a) Determine extent of discarded drums and other debris.
  - b) Determine the nature of any contents in drums.
  - c) Collect appropriate information to prepare a removal work plan.
  - d) Collect appropriate information to develop a site safety plan.
- \* Conducted extensive search of the 240 acre parcel of property including Factory and Lily Ponds to identify location of all drums. Drum locations shown on Figure 1. Many locations depict more than one (1) drum.
- \* Made determination as to status of each drum; i.e. empty, containing material, or unknown.
- \* Logged and mapped the location of each drum.
- \* Performed sampling for screening purposes.

#### **3. Magnetic Survey**

September 13, 1988

- \* Purpose
  - To determine the extent and depth of iron deposits that could include iron drums.
- \* Locations
  - a) MIT Pit.
    - Result: Principle anomaly found at the known drum deposit area. Two (2) other small anomalies.
  - b) Waste Burn Pit 1 at Factory Pond.
    - Result: Anomalies found throughout entire burn pit. Later determined to be a result of scrap metal deposition and iron shards.

#### **4. Contractor Mobilization**

December 19 - 23, 1988

- \* Constructed drum staging areas.
- \* Cleared access routes to drum sites and trench areas.
- \* Set up command center.

#### **5. Site Remediation**

See site activity summaries for each site on the following pages. Remediation was performed at the following sites on the dates shown. Figure 2 shows the location of all removed drums and containers.

a) Undeveloped Woodlands: December 22-23, 1988

b) Factory Pond Demolition Area: December 22, 1988, January 10-12 and 16, 1989

c) Landers Drum Site: January 2 - 16, 1989

d) MIT Pit: January 17 - 20, 1989

e) Factory and Lily Ponds: Not yet conducted.

#### **6. Disposal**

- \* ENSCO is transporting and disposing of 54 overpacks, two (2) 55 gallon drums, and one (1) 5 gallon bucket. All drums will be incinerated.
- \* GEC is presently in negotiation for the disposal of the stockpile and the vessel located at the Landers Site and the stockpile located at the MIT Pit.

## II. LANDERS DRUM SITE ACTIVITY SUMMARY

### NATIONAL FIREWORKS I HANOVER, MASSACHUSETTS

#### 1. Site Description

This site is located approximately 200 yards west of the P. A. Landers Co. garage in an isolated wooded area. Waste at the location appeared to be limited to raw materials, trash and by-products associated with the manufacture of neoprene rubber toys. The boundaries for this area are confined to a pit that is believed to be man made. Two other areas associated with the Landers site are areas in the front (east of pit) and at the edge of the clearing near the command post. See Figure 1 for a site location.

#### 2. Pre-Entry Sampling

- \* Sampled five (5) drums and two (2) containers for screening purposes. The two (2) containers were found to contain hazardous wastes.

#### 3. Developed access to site

- \* Cut trees for access road and access to drum concentrations.
- \* Constructed a road.

#### 4. Site Remediation

##### a) Drum Removal Summary

- \* The following chart summarizes the number of drums located during the reconnaissance phase of the project, and summarizes the actual number of drums, containers, and materials removed.

	<u>Reconnaissance</u>	<u>Actual Removal</u>
Empty Drums	66	183
Empty Containers	33	not counted
Drums with Residue	7	31
Containers with Residue	1	41
Lab Containers with Residue	1	6
Unknown Drums	23	N/A
Unknown Containers	2	N/A
Bulk Solids	0	1- 55 g drum 6- overpacks
Bulk Latex	0	3- overpacks
Stockpile	N/A	12 cubic yards
Vessel (750 gallons)	1	1

b) Materials removed from the Landers site were placed in the following containers for storage and disposal:

a) Overpacks	47
b) 55 gallon drums	2
c) 5 gallon buckets	2*
d) Stockpile	1**

\* The contents of one 5 gallon bucket were mixed with like material in larger drums. The material from lab containers placed in another 5 gallon bucket was depleted during sampling.

\*\* GEC is presently in negotiation for the disposal of the stockpile.

c) Drums, containers, and materials were removed from the Landers site from the following discreet areas (See Figure 3):

1. North Wall
2. Northwest Wall
3. Southwest Wall
4. Next to Rubber Doll Pile
5. Southeast Wall
6. Edge of Clearing
7. Front Area

#### 5. Site sampling

- \* Samples were collected from each discreet excavation area, the stockpile, and two background points as shown on Figure 4.
- \* Nine (9) Environmental Samples were collected (all soil or solids) in accordance with the Work Plan, plus one (1) sample of the stockpile. The vessel was sampled at a later date and results are not yet available.
- \* Sample results are summarized on pages 1-4 of the Environmental Sampling Data tables (Attachment 1).

#### 6. Restoration

- \* Site restoration conducted sufficient to reduce hazards involved with open pits and excavations.

### III. FACTORY POND SITE ACTIVITY SUMMARY

NATIONAL FIREWORKS I  
HANOVER, MASSACHUSETTS

#### 1. Site Description

This area is the approximately 11 acre parcel of land adjacent to Factory Pond where most of the past waste combustion and detonation occurred. This includes the area where drums were discarded and detonated in the Pond; the area now used as a target shooting range; and the woods bordering the access roads between the Drinkwater Investment property and the MIT Waste Pit. See Figure 1 for a site location.

#### 2. Pre-Entry Sampling

- \* Sampled 3 drums and 3 containers for screening purposes. No Drums or containers were found to contain hazardous wastes.

#### 3. Developed Access to Drum Sites and Trench Site

- \* Cut trees for access to drum locations and Waste Burn Pit 1.

#### 4. Site Remediation

- a) Drums, containers, and materials were removed from the Factory Pond site from the following discreet areas (See Figure 5):

1. F-009: North of cold waste dump.
2. F-011: 10 yards north of F-009.
3. F-013: South of cold waste dump.
4. F-023: near entrance to site.
5. F-026: Next to Waste Burn Pit 2.
6. F-027: Next to Waste Burn Pit 2.

b) Drum Removal Summary

- \* The following chart summarizes the number of drums located during the reconnaissance phase of the project, and summarizes the actual number of drums, containers, and materials removed.

	<u>Reconnaissance</u>	<u>Actual Removal</u>
Empty Drums	42	0
Empty Containers	60	0
Drums with Residue	6	8
Containers with Residue	2	4
Lab Containers with Residue	0	1
Unknown Drums	5	N/A
Unknown Containers	0	N/A

c) Materials removed from the Factory Pond Demolition site were placed in the following containers for storage and disposal:

- |                            |   |
|----------------------------|---|
| a) Overpacks               | 9 |
| b) Wrapped in Polyethylene | 1 |

- \* The material wrapped in polyethylene was added to a salvage drum containing similar and compatible material.
- \* The contents of the lab container was depleted during sampling.

#### **5. Site sampling**

- \* Samples collected from: a) Trenches (two per trench- one soil and one groundwater), b) Area F-009 (soil), and c) Two (2) background points (soil), as shown on Figure 6. Area F-009 is the only area in which excavation was performed.
- \* Nine (9) Environmental Samples were collected in accordance with the Work Plan; Six (6) soil and three (3) groundwater.
- \* Sample results are summarized on pages 5-6 of the Environmental Sampling Data tables (Attachment 1).

#### **6. Trenches**

- \* Purpose of the trenches was to locate the source of the anomalies found during the magnetic survey.
- \* Three (3) trenches of 100 yards in length were constructed across Waste Burn Pit 1.
- \* No drums located in any of the trenches.
- \* Anomalies were caused by shredded and burned metal and iron containing sediments.



# **IV. MIT PIT SITE ACIVITY SUMMARY**

## **NATIONAL FIREWORKS I**

### **HANOVER, MASSACHUSETTS**

#### **1. Site Description**

The MIT Waste Pit is a one half-acre clearing and adjacent small pool at the southern end of the Site. This area includes the original clearing, identified in aerial photos and still present; the small excavated pool between the clearing and bordering wetland; and the woods immediately surrounding the clearing. A survey of the wetland showed no evidence of excavation, waste destruction or drum disposal. See Figure 1 for a site location.

#### **2. Pre-Entry Sampling**

- \* Sampled 8 drums for screening purposes. One Drum was found to contain Trichloroethylene.

#### **4. Site Remediation**

- a) Drums, containers, and materials were removed from the MIT Pit site from the following discreet areas (See Figure 7):

1. M-100: Excavated area in the middle of the pit.
2. M-200: South of main pit area.
3. M-400: At entrance to the site.

- b) Drum Removal Summary

- \* The following chart summarizes the number of drums located during the reconnaissance phase of the project, and outlines the actual number of drums, containers, and materials removed.

	<u>Reconnaissance</u>	<u>Actual Removal</u>
Empty Drums	12	30
Empty Containers	20	20
Drums with Residue	8*	5*
Containers with Residue	0	0
Lab Containers with Residue	0	0
Unknown Drums	1	N/A
Unknown Containers	0	N/A
Stockpile	N/A	12 cubic yards

- \* Of the eight (8) drums found with residue during the reconnaissance phase, three (3) of them were determined to contain only sand.

c) Materials removed from the MIT Pit site were placed in the following containers for storage and disposal:

- |              |   |
|--------------|---|
| a) Overpacks | 5 |
| b) Stockpile | 1 |

\* GEC is presently in negotiation for the disposal of the stockpile.

## **5. Site sampling**

- \* Samples collected in accordance with the Work Plan were as follows:
  - a) Two from trench (one soil one groundwater)
  - b) Two background samples.
  - c) One (1) excavation bottom soil
  - d) One (1) excavation bottom groundwater.
  - e) Three soil piles (including stockpile) for VOC analysis.
- \* Total: 7 soil samples and 2 groundwater samples as shown on Figure 8.
- \* Sample results are summarized on pages 7-8 of the Environmental Sampling Data tables (Attachment 1).
- \* Extensive sampling by EPA of excavated soil, groundwater, and surface water.

## **6. Trenches**

- \* Purpose of the trench was to locate the source of the anomalies found during the magnetic survey.
- \* One (1) trench of 50 yards in length was constructed to the east of the main excavation.
- \* No drums located in the trench, however, the soil sample collected contained Mercury in exceedence of EP Toxic limits.

## **V. UNDEVELOPED WOODLANDS SITE ACIVITY SUMMARY**

### **NATIONAL FIREWORKS I HANOVER, MASSACHUSETTS**

#### **1. Site Description**

The undeveloped woodlands are all undisturbed areas not part of the three (3) major sites (Landers site, Factory Pond site, and the MIT Pit site)..See Figure 1 for a Site Plan of the National Fireworks I site.

#### **2. Pre-Entry Sampling**

- \* Sampled 1 drum and 5 containers for screening purposes. No drums or containers were found to contain hazardous wastes.

#### **3. Site Remediation**

a) Drums, containers, and materials were removed from the undeveloped woodlands from the following discreet areas (See Figure 2):

1. R-008: In northern area of National Fireworks I site.
2. R-020: Between storm water settling basin and Factory Pond.
3. R-037: East of Factory Pond Demolition site.
4. D-037: East of Factory Pond Demolition site.
5. D-052: In eastern area of National Fireworks I site.

b) Drum Removal Summary

- \* The following chart summarizes the number of drums located during the reconnaissance phase of the project, and outlines the actual number of drums, containers, and materials removed.

	<u>Reconnaissance</u>	<u>Actual Removal</u>
Empty Drums	36	0
Empty Containers	37	0
Drums with Residue	1	1
Containers with Residue	6	6
Lab Containers with Residue	0	0
Unknown Drums	0	N/A
Unknown Containers	0	N/A

c) Materials removed from the undeveloped woodlands were placed in the following containers for storage and disposal:

a) Overpacks	2
b) Wrapped in Polyethylene	2
c) 5 gallon bucket	1

\* The materials wrapped in polyethylene and the 5 gallon bucket were mixed with like and compatible material in larger drums.

#### **4. Site sampling**

\* No environmental samples were collected from the undeveloped woodlands because no excavations were performed.

## **VI. FACTORY AND LILY PONDS ACIVITY SUMMARY**

### **NATIONAL FIREWORKS I HANOVER, MASSACHUSETTS**

#### **1. Site Description**

GEC examined the entire shoreline of Factory and Lily Ponds for the presence of drums and debris. The search extended from approximately one-quarter mile upstream the Drinkwater River to the outfall of Factory Pond. The shorelines of the two islands in Factory Pond were searched, along with accessible wetlands and any area with a depth of less than three feet. A landing was made on the larger of the two islands for an onshore search. See Figure 1 for a location of all drums found.

#### **2. Drum Summary**

- \* The following chart summarizes the number of drums located during the reconnaissance phase of the project. See Figure 2 for the location of drums which need to be removed from the ponds.

	<u>Reconnaissance</u>	<u>Actual Removal</u>
Empty Drums	25	0**
Empty Containers	19	0**
Drums with Residue	5	0**
Containers with Residue	0	0
Lab Containers with Residue	0	0
Unknown Drums	3	N/A
Unknown Containers	0	N/A

- \*\* Drum removal in Factory Pond and Lily Pond to be conducted at a later date.

## Figures

LANDERS BUILDING

FRONT  
AREA

COMMAND  
POST

EDGE OF  
CLEARING

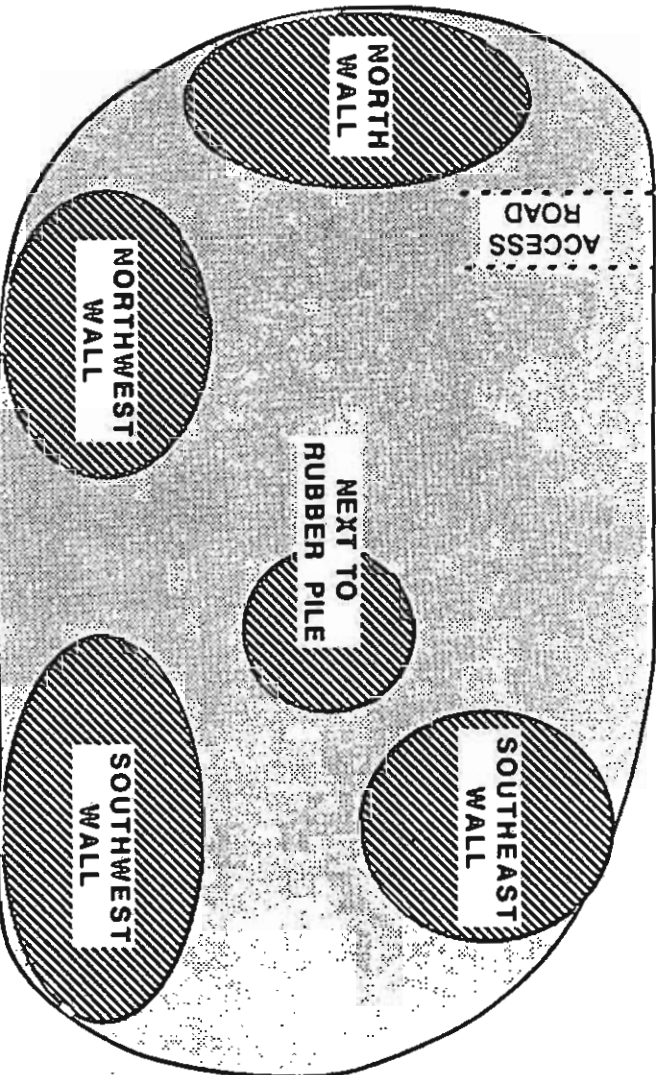
EDGE OF  
LANDERS EXCAVATED  
CLEARING (COMMAND  
POST IS LOCATED IN  
CLEARING)

KEY:

DRUM  
REMOVAL  
LOCATION

WOODED AREA

N



**FIGURE 3**

(NOT TO SCALE)

**DRUM REMOVAL LOCATIONS**

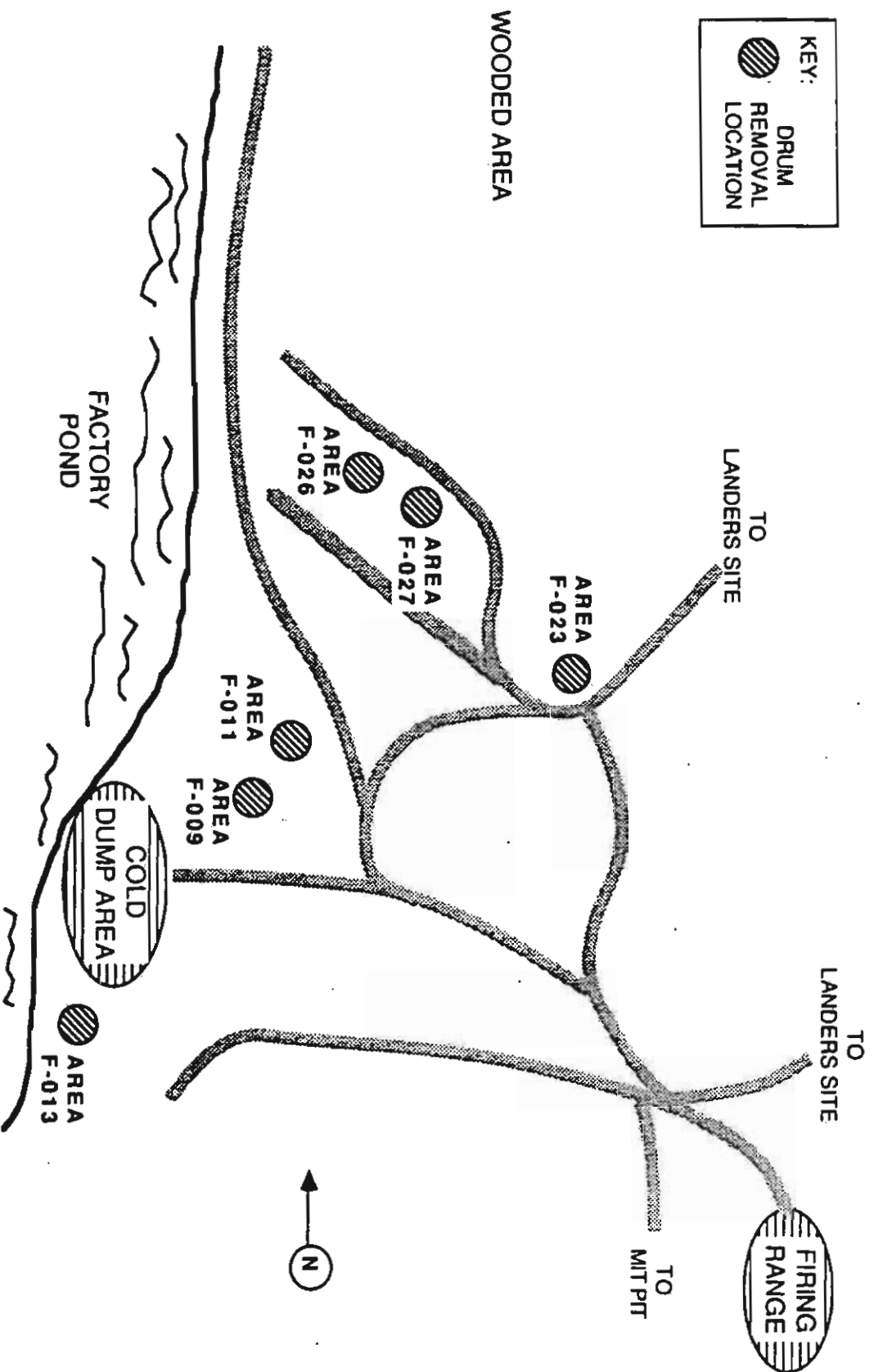
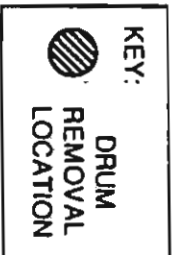
P. A. LANDERS SITE  
NATIONAL FIREWORKS I  
HANOVER, MASSACHUSETTS

**GEC** GOLDMAN ENVIRONMENTAL  
CONSULTANTS, INC.

161 FORBES ROAD SUITE 204  
BRAINTREE, MASSACHUSETTS 02184  
(617) 848-5012 OR 1 (800) 446-2014







**FIGURE 5**

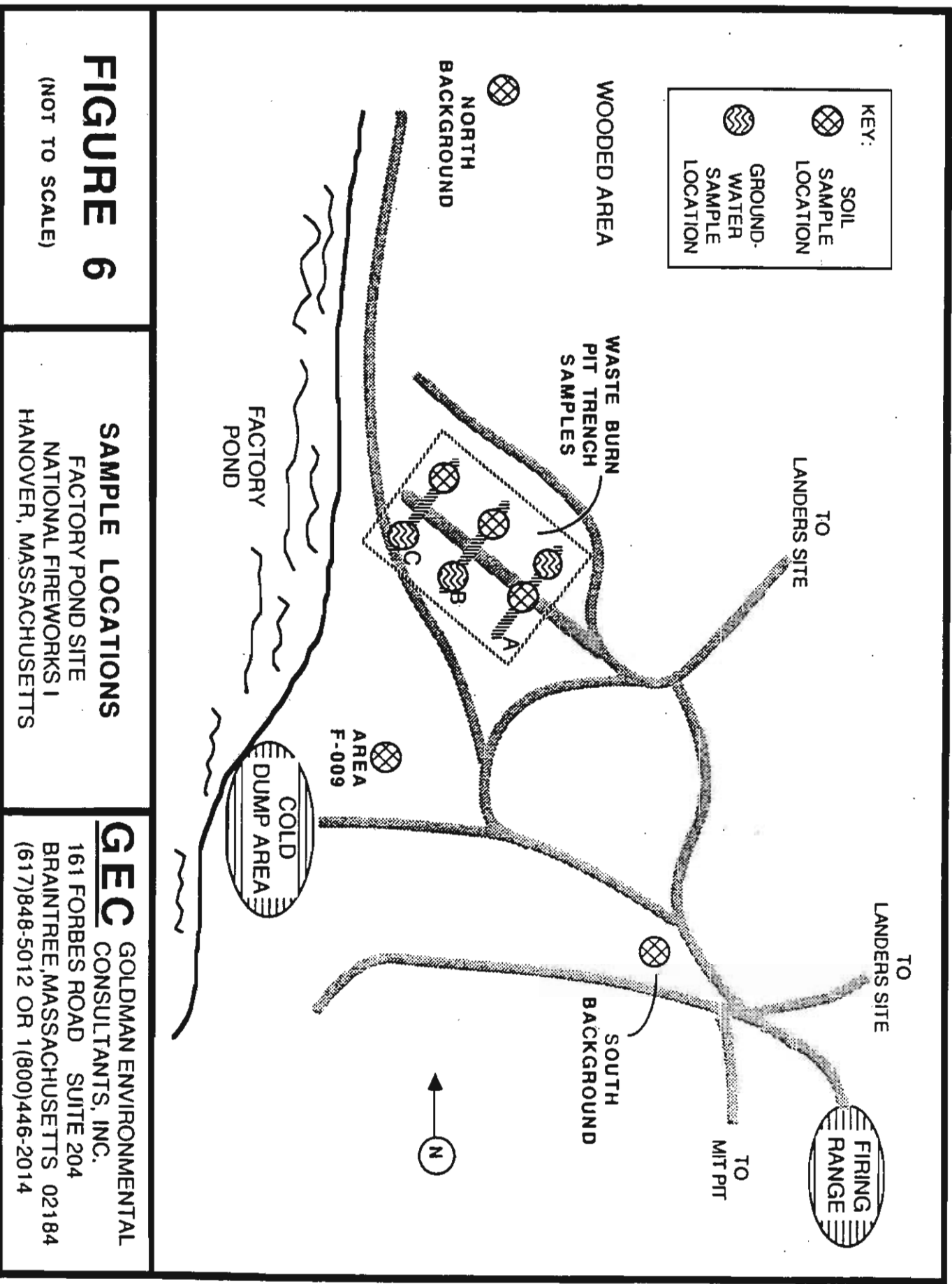
(NOT TO SCALE)

**DRUM REMOVAL LOCATIONS**

FACTORY POND SITE  
NATIONAL FIREWORKS I  
HANOVER, MASSACHUSETTS

**GEC** GOLDMAN ENVIRONMENTAL  
CONSULTANTS, INC.

161 FORBES ROAD SUITE 204  
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(617) 848-5012 OR 1 (800) 446-2014



**FIGURE 6**

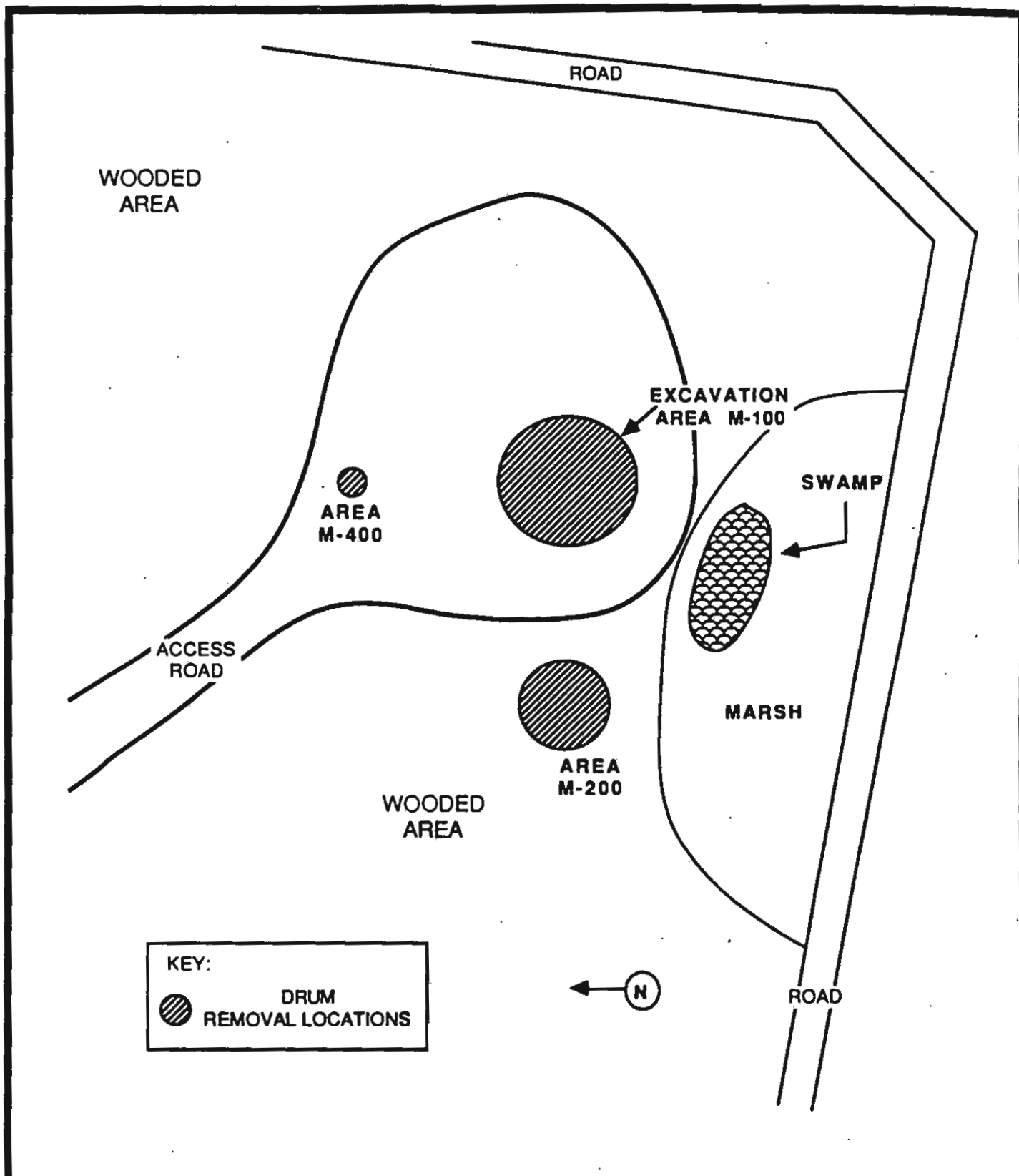
(NOT TO SCALE)

**SAMPLE LOCATIONS**

FACTORY POND SITE  
NATIONAL FIREWORKS I  
HANOVER, MASSACHUSETTS

**GEC** GOLDMAN ENVIRONMENTAL  
CONSULTANTS, INC.

161 FORBES ROAD SUITE 204  
BRAINTREE, MASSACHUSETTS 02184  
(617)848-5012 OR 1(800)446-2014



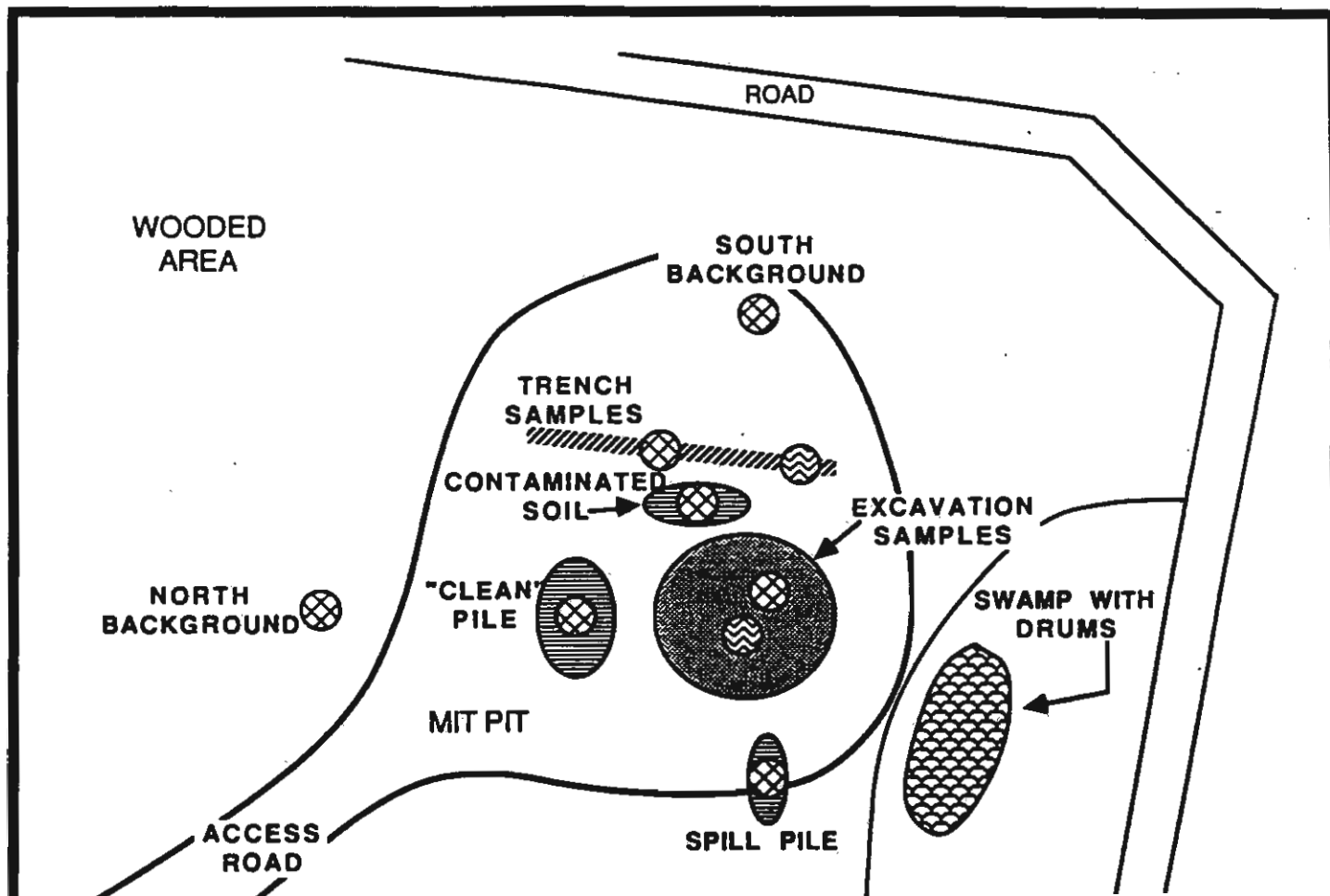
**FIGURE 7**

(NOT TO SCALE)

**DRUM REMOVAL LOCATIONS**  
MIT WASTE PIT  
NATIONAL FIREWORKS I  
HANOVER, MASSACHUSETTS

**GEC** GOLDMAN ENVIRONMENTAL  
CONSULTANTS, INC.

161 FORBES ROAD SUITE 204  
BRAINTREE, MASSACHUSETTS 02184  
(617)848-5012 OR 1(800)446-2014



**Attachment 1**  
**Environmental Sampling Data Summaries**

# ENVIRONMENTAL SAMPLING DATA LANDERS SITE

SAMPLE LOCATION	I. D. #	ACID/BASE/ NEUTRALS (PPB)	VOLATILE ORGANIC COMPOUNDS (PPB)	TPP 13 METALS (PPM)	EP TOX RCRA 8 (PPB)	CYANIDE (PPM)
NORTH BACK-GROUND (SOIL)	BACL-N-04	ND	Methylene Chloride: 26 Trichloroethylene: 180 Tetrachloroethylene: 100 Xylenes: 6.4	Trace	Trace	ND
SOUTH BACK-GROUND (SOIL)	BACL-S-04	ND	Trichloroethylene: 110 Tetrachloroethylene: 26	Trace	Barium: 105	ND
NORTH WALL (SOIL)	LAN1-01-04	ND	Methylene Chloride: 24 Trichloroethylene: 93 Tetrachloroethylene: 56	Zinc: 880	Barium: 105	ND
NORTH-WEST WALL (SOIL)	LAN1-03-04	Fluoranthene 550 Naphthalene 1,400 Phenanthrene 870 Pyrene 600	Methylene Chloride: 240 Trichloroethylene: 1,300 Tetrachloroethylene: 350 Trans-1,2-Dichloroethylene: 53 Benzene: 7.6 Toluene: 20	Copper: 510 Lead: 110	Barium: 290	0.81
TRIP BLANK VOLATILES 1	-	-	ND	-	-	-

**Notes:** 1) PCBs and Pesticides were Non-Detectable (ND) in all samples.

2) Total Priority Pollutant 13 Metals (TPP 13) listed only when found in excess of 100 ppm.

3) EP Toxic RCRA 8 Metals listed only when found in excess of 100 ppb.

# **ENVIRONMENTAL SAMPLING DATA** **LANDERS SITE**

SAMPLE LOCATION	I. D. #	ACID/BASE/ NEUTRALS (PPB)	VOLATILE ORGANIC COMPOUNDS (PPB)	TPP 13 METALS (PPM)	EP TOX RCRA 8 (PPB)	CYANIDE (PPM)
DOLL PILE (RUBBER)	LAN1-02-04	Di-n-butylphthalate: 3,750 Benzyl alcohol: 4,850	Xylenes: 9.0 Vinyl Chloride: 25	Zinc: 31,200	Trace	0.2
NEXT TO DOLL PILE (SOIL)	LAN1-04-04	Acenaphthene: 2,250 Flouranthene: 17,000 Napthalene: 3,200 Benzo(a)anthracene: 7,300 Benzo(a)pyrene: 4,700 Benzo(b)fluoranthene: 4,000 Chrysene: 7,000 Anthracene: 5,300 Benzo(ghi)perylene: 2,700 Fluorene: 2,900 Phenanthrene: 20,000 Dibenzo(a,h)anthracene: 800 Indeno(1,2,3-cd)pyrene: 3,300 Pyrene: 17,000 Dibenzofuran: 3,100	Trichloroethylene: 29 Tetrachloroethylene: 8.5	Chromium: 440 Zinc: 1,710	Barium: 540	6.27

- Notes:**
- 1) PCBs and Pesticides were Non-Detectable (ND) in all samples.
  - 2) Total Priority Pollutant 13 Metals (TPP 13) listed only when found in excess of 100 ppm.
  - 3) EP Toxic RCRA 8 Metals listed only when found in excess of 100 ppb.
  - 4) Duplicate data for the sample next to the doll pile is found on the next page.

# **ENVIRONMENTAL SAMPLING DATA LANDERS SITE**

SAMPLE LOCATION	I. D. #	ACID/BASE/ NEUTRALS (PPB)	VOLATILE ORGANIC COMPOUNDS (PPB)	TPP 13 METALS (PPM)	EP TOX RCRA 8 (PPB)	CYANIDE (PPM)
NEXT TO DOLL PILE (DUPLICATE) (SOIL)	LAN1-04-04 DUP.	Fluoranthene: 2,900 Benzo(a)pyrene: 1,200 Benzo(b)fluoranthene: 940 Chrysene: 1,450 Anthracene: 580 Phenanthrene: 1,650 Pyrene: 2,250	Trichloroethylene: 23	Chromium: 360 Zinc: 660	Barium: 690	6.96
SOUTH-WEST WALL (SOIL)	LAN1-05-04	Fluoranthene: 13,000 Naphthalene: 1,600 Di-n-octylphthalate: 21,000 Benzo(a)pyrene: 34,000 Benzo(b)fluoranthene: 23,000 Chrysene: 17,000 Acenaphthylene: 2,400 Benzo(ghi)perylene: 38,000 Phenanthrene: 9,300 Indeno(1,2,3-cd)pyrene: 42,000 Pyrene: 12,000	Trichloroethylene: 250 Tetrachloroethylene: 75	Zinc: 190	Barium: 360	ND

- Notes:**
- 1) PCBs and Pesticides were Non-Detectable (ND) in all samples.
  - 2) Total Priority Pollutant 13 Metals (TPP 13) listed only when found in excess of 100 ppm.
  - 3) EP Toxic RCRA 8 Metals listed only when found in excess of 100 ppb.



# **ENVIRONMENTAL SAMPLING DATA** **LANDERS SITE**

SAMPLE LOCATION	I. D. #	ACID/BASE/ NEUTRALS (PPB)	VOLATILE ORGANIC COMPOUNDS (PPB)	TPP 13 METALS (PPM)	EP TOX RCRA 8 (PPB)	CYANIDE (PPM)
SOUTH EAST WALL (SOIL)	LAN1-06-04	Hexachlorobenzene: 132,000 Fluoranthene: 500 Hexachlorobutadiene: 2,000 Benzo(a)pyrene: 770 Benzo(b)fluoranthene: 500 Chrysene: 770 Pyrene: 700	Methylene Chloride: 34 Trichloroethylene: 41 Tetrachloroethylene: 140 1,2-Dichloroethylene: 18	Arsenic: 230 Copper: 3,425 Lead: 9,300 Zinc: 350	Barium: 2,340 Lead: 180,000	-
TRIP BLANK FULL SCAN	-	Bis(2-ethylexy)phthalate: 65	ND	Zinc: 44	ND	ND
EQUIPMENT BLANK	-	ND	Trichloroethylene: 8.2 Tetrachloroethylene: 120	Zinc: 40	ND	ND
EDGE OF CLEARING	LAN1-07-04	ND	ND	Lead: 103 Zinc: 1,500	Barium: 320	0.91
STOCKPILE (SOIL)	LAN2-01-04	Hexachlorobenzene: 269,000	Methylene Chloride: 143 Trichloroethylene: 380 Tetrachloroethylene: 120 Toluene: 27	EP TOX: Copper: 0.51 Nickel: 0.34 Zinc: 15.0	Lead: 8220	Cyanide: 26 Sulfide: ND
TRIP BLANK VOLATILES 2	-	-	ND	-	-	-

**Notes:** 1) PCBs and Pesticides were Non-Detectable (ND) in all samples.

2) Total Priority Pollutant 13 Metals (TPP 13) listed only when found in excess of 100 ppm.

3) EP Toxic RCRA 8 Metals listed only when found in excess of 100 ppb.

4) Other Stockpile Characteristics: Flashpoint: >200; No oxidizers; Not water soluble;

Not hexane soluble.

2/23/89

# ENVIRONMENTAL SAMPLING DATA FACTORY POND SITE

SAMPLE LOCATION	I. D. #	ACID/BASE/ NEUTRALS (PPB)	VOLATILE ORGANIC COMPOUNDS (PPB)	TPP 13 METALS (PPM)	EP TOX RCRA 8 (PPB)	CYANIDE (PPM)
NORTH BACK-GROUND (SOIL)	BACKF-N-04	ND	Trichloroethylene: 1,200 Tetrachloroethylene: 120 Toluene: 5.7	Lead: 112	Barium: 403 Lead: 170	ND
SOUTH BACK-GROUND (SOIL)	BACKF-S-04	ND	Trichloroethylene: 510 Tetrachloroethylene: 170 Toluene: 9.0	Copper: 110 Lead: 425 Zinc: 620	Barium: 6,720 Cadmium: 160 Lead: 170	-
TRENCH A (SOIL)	FTA-02-04	Hexachlorobenzene: 1,200 Fluoranthene: 600 Naphthalene: 120 Di-n-butylphthalate: 820 Chrysene: 550 Phenanthrene: 860 Pyrene: 810	Trichloroethylene: 46 Tetrachloroethylene: 8.6	Chromium: 1,390 Copper: 870 Lead: 977 Nickel: 1,170 Zinc: 1,040	Barium: 58,800 Chromium: 190 Lead: 430	0.22
TRENCH A (WATER)	FTA-01-05	ND	ND	Trace	Barium: 150	-
TRIP BLANK VOLATILES 3	-	-	ND	-	-	-

**Notes:** 1) PCBs and Pesticides were Non-Detectable (ND) in all samples.

2) Total Priority Pollutant 13 Metals (TPP 13) listed only when found in excess of 100 ppm.

3) EP Toxic RCRA 8 Metals listed only when found in excess of 100 ppb.

**ENVIRONMENTAL SAMPLING DATA  
FACTORY POND SITE**

SAMPLE LOCATION	I. D. #	ACID/BASE/ NEUTRALS (PPB)	VOLATILE ORGANIC COMPOUNDS (PPB)	TPP 13 METALS (PPM)	EP TOX RCRA 8 (PPB)	CYANIDE (PPM)
TRENCH B (SOIL)	FTB-01-04	ND	Trichloroethylene: 94 Tetrachloroethylene: 16	Trace	Barium: 1,230	-
TRENCH B (WATER)	FTB-02-05	ND	Trichloroethylene: 470 Xylenes: 10 Vinyl Chloride: 66	Copper: 150 Lead: 610 Zinc: 998	Barium: 2,630	-
TRIP BLANK VOLATILES 4	-	-	ND	-	-	-
TRENCH C (SOIL)	FTC-01-04	Hexachlorobenzene: 290 Fluoranthene: 200 Naphthalene: 300 Phenanthrene: 300 Pyrene: 180 Dibenzofuran: 65	1,1-Dichloroethylene: 11 Trichloroethylene: 2,400 Trans-1,2-Dichloroethylene: 140 Vinyl Chloride: 18	Chromium: 270 Copper: 1,950 Lead: 32,200 Zinc: 39,090	Barium: 4,450 Cadmium: 740 Chromium: 250 Lead: 42,000	0.81
TRENCH C (WATER)	FTC-02-05	ND	Trichloroethylene: 510 Trans-1,2-Dichloroethylene: 12 Xylenes: 25 Vinyl Chloride: 240	Zinc: 220	Barium: 170	-
AREA F-009 (SOIL)	FAC1-01-04	Fluoranthene: 440 Chrysene: 440 Phenanthrene: 300 Pyrene: 580	ND	Cadmium: 170 Chromium: 110 Copper: 3,100 Lead: 350 Nickel: 150 Zinc: 14,200	Barium: 4,790 Cadmium: 1,050 Lead: 370	-

**Notes:** 1) PCBs and Pesticides were Non-Detectable (ND) in all samples.

2) Total Priority Pollutant 13 Metals (TPP 13) listed only when found in excess of 100 ppm.

3) EP Toxic RCRA 8 Metals listed only when found in excess of 100 ppb.

# **ENVIRONMENTAL SAMPLING DATA** **MIT PIT SITE**

SAMPLE LOCATION	I. D. #	ACID/BASE/ NEUTRALS (PPB)	VOLATILE ORGANIC COMPOUNDS (PPB)	TPP 13 METALS (PPM)	EP TOX RCRA 8 (PPB)	CYANIDE (PPM)
NORTH BACK-GROUND (SOIL)	BACM-N-04	ND	Trichloroethylene: 1,200 Tetrachloroethylene: 120	Copper: 160 Lead: 170 Mercury: 120	Barium: 270 Lead: 560	ND
SOUTH BACK-GROUND (SOIL)	BACM S-04	ND	ND	Trace	Barium: 130 Lead: 320	-
TRIP BLANK VOLATILES 5	-	-	ND	-	-	-
TRENCH (WATER)	MIT-TR -A-05	ND	Trichloroethylene: 6.1	Copper: 3.2 Lead: 7.3 Mercury: 77.0	Barium: 150 Lead: 400	ND
TRENCH (SOIL)	MIT-TR -B-04	ND	ND	Mercury: 710	Barium: 260 Lead: 580 Mercury: 1,850	ND
EQUIPMENT BLANK	-	ND	ND	ND	Lead: 560	ND

**Notes:** 1) PCBs and Pesticides were Non-Detectable (ND) in all samples.

2) Total Priority Pollutant 13 Metals (TPP 13) listed only when found in excess of 100 ppm.

3) EP Toxic RCRA 8 Metals listed only when found in excess of 100 ppb.

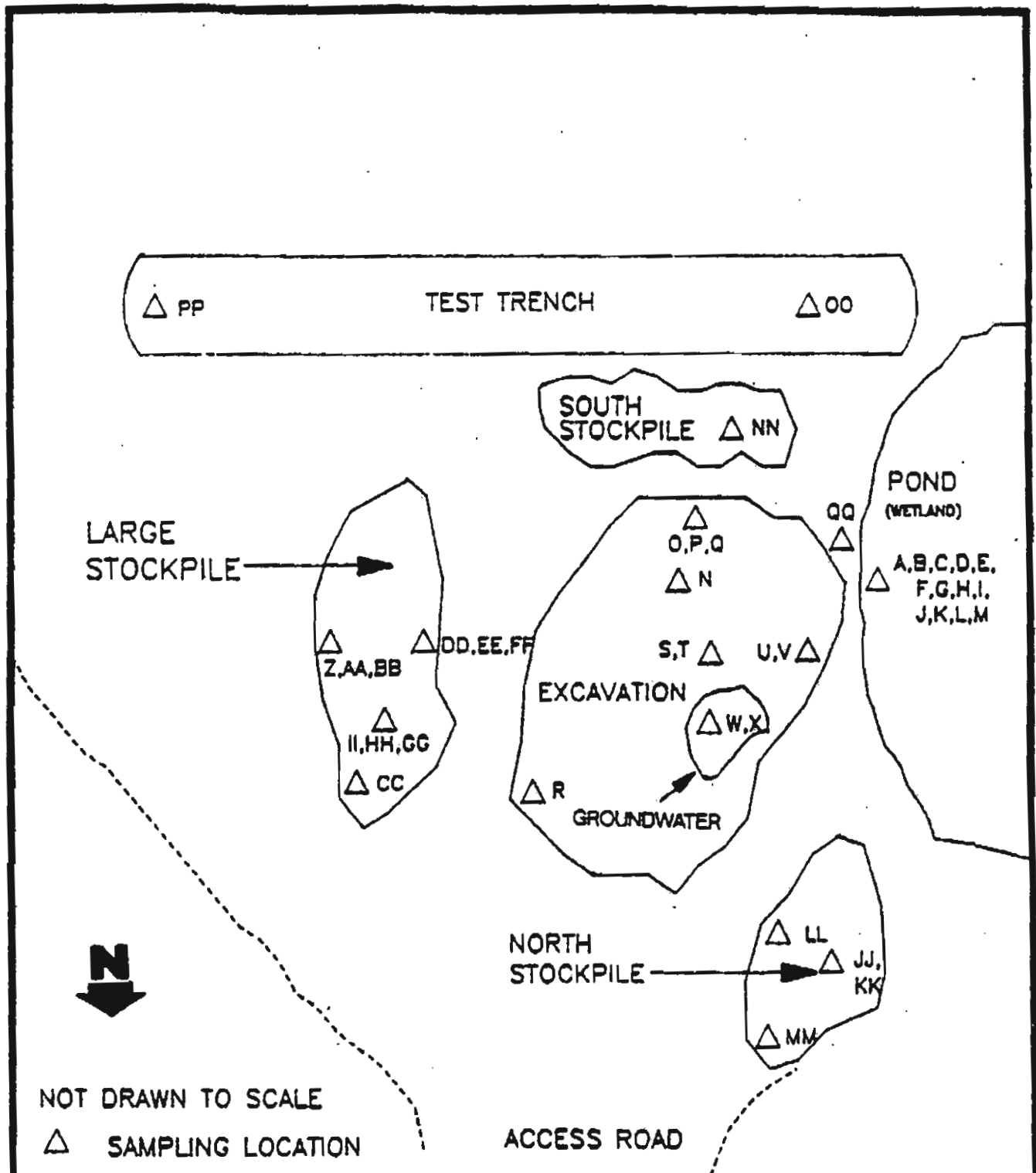
**ENVIRONMENTAL SAMPLING DATA**  
**MIT PIT SITE**

SAMPLE LOCATION	I. D. #	ACID/BASE/ NEUTRALS (PPB)	VOLATILE ORGANIC COMPOUNDS (PPB)	TPP 13 METALS (PPM)	EP TOX RCRA 8 (PPB)	CYANIDE (PPM)
TRIP BLANK FULL SCAN	-	Butyl benzyl phthalate: 30	1,2-Dichloroethylene: 14	Lead: 69	ND	ND
SPIILL PILE	MIT1-03-04	-	Trichloroethylene: 300,000	-	-	-
"CLEAN" PILE	MIT1-05-04	-	Trichloroethylene: 1,000	-	-	-
CONTAMINATED SOIL	MIT1-04-04	-	Trichloroethylene: 27,000	-	-	-
EXCAVATION FLOOR SOIL	MIT1-01-04	ND	Trichloroethylene: 32	Copper: 140 Lead: 110	Barium: 150 Lead: 1,520	ND
EXCAVATION G. WATER	MIT1-02-05	ND	Chloroform: 17 Trichloroethylene: 290,000 Toluene: 9.4 Xylenes: 11	Lead: 9.6 Mercury: 9.8 Cooper: 7.5	Trace	0.010
EXCAVATION G. WATER DUPLICATE	MIT1-02-05 DUP.	Bis(2-ethylexyl) phthalate: 50	Chloroform: 20 Trichloroethylene: 450,000 Toluene: 10 Xylenes: 11	Lead: 9.9 Mercury: 9.8 Cooper: 8.3	Trace	0.006

**Notes:** 1) PCBs and Pesticides were Non-Detectable (ND) in all samples.

2) Total Priority Pollutant 13 Metals (TPP 13) listed only when found in excess of 100 ppm.

3) EP Toxic RCRA 8 Metals listed only when found in excess of 100 ppb.



SAMPLE LOCATION MAP  
FIREWORKS I SITE  
HANOVER, MA  
MIT WASTE PIT

**WESTON**

DRAWN WECHSLER	DATE 2/89	PCS # 2090
APPROVED QWV	DATE 2/16/89	TCD # 01881220

**FIREWORKS - MIT WASTE PIT**

**KEY TO TERMS USED IN**

**SAMPLING DATA REPORT**

ND (not detected) - Indicates that the chemical was tested for, but not found. Used only when the detection limit is in the low part per billion range.

DL (detection limit) Indicates that the chemical is not detected, but the detection limit is higher than the greatest concentration of the chemical found present in other samples.

NR (not reported) Indicates that this chemical is not included on the list of those being reported. Also, Photovac work and chemical specific analysis may only include reporting data for certain compounds.

Dup (duplicate)

Freon - 1,1,2-trichloro-1,2,2-trifluoroethane

TCE - Trichloroethylene

PPM - Parts per million

## FIREWORKS SITE - MIT WASTE PIT AREA - SAMPLE DATA REPORT

Map Designation	Sample No.	Date	Analyst	Location	VOA GC/MS Screen (ppm)	VOA Screen (ppm)	Freon (ppm)	TCE (ppm)	Benzene (ppm)	Toluene (ppm)
A	83857	03/17/88	EPA	POND AT MIT WASTE PIT	X		23	.097	ND	<.05
B	57550	01/17/89	EPA	POND AT MIT WASTE PIT	X	X	16	.109	.008	.020
C	83883	01/16/89	EPA	POND AT MIT WASTE PIT	X	X	12	.091	.008	.020
D	83889	01/19/89	EPA	POND AT MIT WASTE PIT	X	X	14	.080	.008	.020
E	8	01/19/89	TAT	POND AT MIT WASTE PIT		X	NR	.032	ND	<.001
F	57553	01/20/89	EPA	POND AT MIT WASTE PIT	X	X	10	.088	.008	.020
G	57558	01/23/89	EPA	POND AT MIT WASTE PIT	X	X	31	.156	.014	.060
H	77266	01/25/89	EPA	POND AT MIT WASTE PIT	X		36			
I	73687	01/27/89	EPA	POND AT MIT WASTE PIT	X		10			
J	87747	01/30/89	EPA	POND AT MIT WASTE PIT	X		15			
K	78282	01/01/89	EPA	POND AT MIT WASTE PIT	X		25			
L	78292	02/03/89	EPA	POND AT MIT WASTE PIT	X		19			
M	78296	02/10/89	EPA	POND AT MIT WASTE PIT	X					
N	890119.1	01/18/89	GEC	EXCAVATION COMPOSITE	X		NR	27	DL=11	DL=15
O	1	01/19/89	GEC	EXCAVATION SE WALL		X	NR	228	NR	NR
P	2	01/19/89	GEC	EXCAVATION SE WALL		X	NR	21.5	NR	NR
Q	2	01/19/89	GEC	EXCAVATION SE WALL DUP		X	NR	25.4	NR	NR
R	3	01/19/89	GEC	EXCAVATION NE CORNER		X	NR	9.1	NR	NR
S	3	01/18/89	GEC	EXCAVATION BOTTOM		X	NR	7	NR	NR
T	4	01/19/89	EPA	EXCAVATION BOTTOM		X	NR	<.001	ND	ND
U	4	01/18/89	GEC	EXCAVATION U WALL		X	NR	1.3	NR	NR
V	4	01/18/89	GEC	EXCAVATION U WALL DUP		X	NR	.96	NR	NR
W	87792	01/19/89	EPA	GROUNDWATER IN EXCAVATION	X		DL=50	490	DL=50	DL=50
X	3	01/19/89	TAT	GROUNDWATER IN EXCAVATION	X		NR	ND	9	137
Y	3	01/19/89	TAT	GROUNDWATER IN EXC	01/26/89	X	NR	11.5	ND	ND



# FIREWORKS SITE - MIT WASTE PIT AREA - SAMPLE DATA REPORT

Map Designation	Sample No.	Date	Analyst	Location	VOA OC/MS (ppm)	VOA Screen (ppm)	Freon (ppm)	TCE (ppm)	Benzene (ppm)	Toluene (ppm)
Z	83884	01/18/89	EPA	LG STICPL E SIDE	X	ND	ND	ND	ND	ND
AA	6	01/19/89	TAT	LG STICPL E SIDE	X	NR	1.2	ND	ND	ND
BB	6	01/19/89	TAT	LG STICPL E SIDE 1/26/89	X	NR	ND	ND	ND	ND
CC	83885	01/18/89	EPA	LG STICPL W END	X	ND	.260	ND	ND	ND
DD	83886	01/18/89	EPA	LG STICPL W SIDE	X	ND	ND	ND	ND	ND
EE	7	01/19/89	TAT	LG STICPL W SIDE	X	NR	.032	ND	ND	ND
FF	7	01/19/89	TAT	LG STICPL W SIDE 01/26/89	X	ND	ND	ND	ND	ND
GG	83798	01/19/89	EPA	LG STICPL MIDDLE 1/2 DEPTH X		ND	.130	ND	ND	ND
HH	4	01/19/89	GEC	LG STICPL GRAB	X	NR	.009	NR	.013	
II	5	01/18/89	GEC	LG STICPL COMPOSITE	X	NR	.969	NR	NR	
JJ	890119.3	01/18/89	GEC	M STICPL (COM/AN) COMPOS	X	NR	300	OL=22	OL=30	
KK	1	01/18/89	GEC	M STICPL (COM/AN) COMPOS	X	NR	20	NR	NR	
LL	1	01/19/89	TAT	M STICPL E SIDE	X	NR	.016	ND	ND	
MM	2	01/19/89	TAT	M STICPL W END	X	NR	.264	ND	ND	
NN	5	01/19/89	TAT	S STICPL	X	NR	<.001	ND	ND	
OO	57552	01/20/89	EPA	TST TRENCH W SIDE G WATER X		ND	89	ND	ND	
PP	57554	01/20/89	EPA	TST TRENCH E SIDE SOIL	X	ND	ND	ND	ND	
QQ	57556	01/20/89	EPA	SOIL BETWEEN EXC AND POND X		ND	ND	ND	ND	
RR	83888	01/18/89	EPA	DRUM PRODUCT	X		100X			

## FIREWORKS SITE - MIT WASTE PIT-AREA - SAMPLE DATA REPORT

Map Designation	Sample No.	Date	Analyst	Location	VOA GC/MS (ppm)	VOA Screen (ppm)	Freeon (ppm)	TCE (ppm)	Benzene (ppm)	Toluene (ppm)
RR	83888	01/18/89	EPA	DRUM PRODUCT	X			100%		
S	3	01/18/89	GEC	EXCAVATION BOTTOM		X	NR	7	NR	NR
T	4	01/19/89	EPA	EXCAVATION BOTTOM		X	NR	<.001	ND	ND
N	890119.1	01/18/89	GEC	EXCAVATION COMPOSITE	X		NR	27	PL=11	DL=15
R	3	01/19/89	GEC	EXCAVATION NE CORNER		X	NR	9.1	NR	NR
Q	1	01/19/89	GEC	EXCAVATION SE WALL		X	NR	228	NR	NR
P	2	01/19/89	GEC	EXCAVATION SE WALL		X	NR	21.5	NR	NR
Q	2	01/19/89	GEC	EXCAVATION SE WALL DUP		X	NR	25.4	NR	NR
U	4	01/18/89	GEC	EXCAVATION W WALL		X	NR	1.3	NR	NR
V	4	81/18/89	GEC	EXCAVATION W WALL DUP		X	NR	.96	NR	NR
T	3	01/19/89	IAT	CANDYR IN EXC 01/26/89		X	NR	11.5	ND	ND
V	87792	01/19/89	EPA	GROUNDWATER IN EXCAVATION	X		DL=50	490	DL=50	DL=50
X	3	01/19/89	IAT	GROUNDWATER IN EXCAVATION		X	NR	ND	9	137
Z	83884	01/18/89	EPA	LG STICPL E SIDE		X	ND	ND	ND	ND
AA	6	01/19/89	IAT	LG STICPL E SIDE		X	NR	1.2	ND	ND
BB	6	01/19/89	IAT	LG STICPL E SIDE 1/26/89		X	NR	ND	ND	ND
II	5	01/18/89	GEC	LG STICPL COMPOSITE		X	NR	.960	NR	NR
NH	4	01/19/89	GEC	LG STICPL GRAB		X	NR	.009	NR	.013
GG	83796	01/19/89	EPA	LG STICPL MIDDLE 1/2 DEPTH	X		ND	.130	ND	ND
CC	83885	01/18/89	EPA	LG STICPL N END		X	ND	.260	ND	ND
DD	83886	01/18/89	EPA	LG STICPL N SIDE		X	ND	ND	ND	ND
EE	7	01/19/89	IAT	LG STICPL N SIDE		X	NR	.032	ND	ND
FF	7	01/19/89	IAT	LG STICPL W SIDE 01/26/89		X	ND	ND	ND	ND
JJ	890119.3	01/18/89	GEC	N STICPL (COMINAM) COMPOS	X		NR	300	DL=22	DL=30
KK	1	01/18/89	GEC	N STICPL (COMINAM) COMPOS	X		NR	20	NR	NR

02/19/89

# FIREWORKS SITE - MIT WASTE PIT AREA - SAMPLE DATA REPORT

Map Designation	Sample No.	Date	Analyst	Location	VOA GC/MS (ppm)	VOA Screen (ppm)	Freon (ppm)	TCE (ppm)	Benzene (ppm)	Toluene (ppm)
LL	1	01/19/89	TAI	N STRPL E SIDE	X	NR	.016	ND	ND	ND
MM	2	01/19/89	TAI	N STRPL N END	X	NR	.264	ND	ND	ND
A	83857	03/17/88	EPA	POND AT MIT WASTE PIT	X	23	.097	ND	<.05	<.05
B	57550	01/17/89	EPA	POND AT MIT WASTE PIT	X	16	.109	.008	.020	.020
C	83883	01/18/89	EPA	POND AT MIT WASTE PIT	X	12	.091	.008	.020	.020
D	83889	01/19/89	EPA	POND AT MIT WASTE PIT	X	16	.090	.008	.020	.020
E	8	01/19/89	TAI	POND AT MIT WASTE PIT	X	NR	.032	ND	<.001	<.001
F	57553	01/20/89	EPA	POND AT MIT WASTE PIT	X	10	.088	.008	.020	.020
G	57558	01/23/89	EPA	POND AT MIT WASTE PIT	X	31	.154	.014	.060	.060
H	77266	01/25/89	EPA	POND AT MIT WASTE PIT	X	36				
I	73887	01/27/89	EPA	POND AT MIT WASTE PIT	X	10				
J	87747	01/30/89	EPA	POND AT MIT WASTE PIT	X	15				
K	78282	01/01/89	EPA	POND AT MIT WASTE PIT	X	25				
L	78292	02/03/89	EPA	POND AT MIT WASTE PIT	X	19				
M	78296	02/10/89	EPA	POND AT MIT WASTE PIT	X					
NN	5	01/19/89	TAI	S STRPL	X	NR	<.001	ND	ND	ND
OO	57556	01/20/89	EPA	SOIL BETWEEN EXC AND POND	X	NR	ND	ND	ND	ND
PP	57554	01/20/89	EPA	TST TRENCH E SIDE SOIL	X	ND	ND	ND	ND	ND
QQ	57552	01/20/89	EPA	TST TRENCH W SIDE G WATER	X	ND	ND	ND	ND	ND

8-Mar-89

**NATIONAL FIREWORKS SUPERFUND SITE - HANOVER, MASSACHUSETTS  
REMOVAL PROJECT COST SUMMARY  
CONSULTANTS AND CONTRACTORS  
(AUGUST 1988 - MAY 1989)**

TOTAL

<b>RECONNAISSANCE</b>		
	TOPO SURVEY	\$1,600
	SITE SURVEY	\$5,210
	MAG SURVEY	\$1,900
	subtotal	\$8,710
	PRELIMINARY SAMPLING	
	LABOR	\$3,700
	LAB ANALYSIS	\$8,000
	subtotal	\$11,700
<b>WORK PLAN</b>		
	WORK PLAN	\$11,500
	SITE SAFETY PLAN	\$1,810
	RESPONSE TO COMMENTS	\$2,500
	subtotal	\$15,810
<b>CONTRACTOR REMOVAL COSTS</b>		
	SITE OVERHEAD	
	MOBILIZATION	\$8,356
	TRAILER	\$316
	STAGING AREAS	\$3,023
	TRAVEL AND PER DIEM	\$19,010
	DEMOLITION	\$2,308
	DRUM SAMPLING	\$3,940
	DRUM REMOVAL LABOR AND EQUIP.	\$44,694
	BACKHOE	\$3,840
	subtotal	\$85,485
<b>GEC OVERSITE</b>		
	MOBILIZATION	\$800
	SITE WORK	\$8,400
	DATA COMPILATION	\$1,500
	subtotal	\$10,700
<b>GEC SAMPLING</b>		
	LABOR	\$4,450
	EQUIPMENT	\$850
	LAB ANALYSIS	\$27,991
	subtotal	\$33,091
<b>PROJECT MANAGEMENT</b>		
	ADMINISTRATIVE/CLIENT CONSULTATION	\$13,790
	GOVERNMENT LIAISON/NEGOTIATIONS	\$8,100
	subtotal	\$21,890
<b>TOTALS TO DATE</b>		\$187,386
<b>ANTICIPATED COSTS</b>		
	PROJECT MANAGEMENT	
	ADMINISTRATIVE/CLIENT CONSULTATION	\$9,000
	GOVERNMENT LIAISON/NEGOTIATIONS	\$6,000
	subtotal	\$15,000
	POND WORK	\$20,000
	DISPOSAL	
	LABOR	\$3,000
	APPROVALS	\$7,200
	DRUMS	\$41,200
	SOIL	\$17,000
	VESSEL	\$7,000
	subtotal	\$75,400
	SUMMARY REPORT	\$9,000
<b>TOTAL ANTICIPATED COSTS</b>		\$119,400
<b>ESTIMATED GRAND TOTAL</b>		\$306,786

## **APPENDIX C-4**

**Correspondence from Hale and Dorr (Law Firm)**

HALE AND DORR

COUNSELLORS AT LAW

A PARTNERSHIP INCLUDING PROFESSIONAL CORPORATIONS

60 STATE STREET

BOSTON, MASSACHUSETTS 02109

(617) 742-9100

CABLE HAFIS BSH  
TELEX 94-0472  
TELECOPIER  
(617) 367-6133 (617) 742-9108

WASHINGTON OFFICE  
1455 PENNSYLVANIA AVE. N.W.  
WASHINGTON, D.C. 20004  
202-393-0800  
CABLE HAFIS 434  
TELECOPIER 202-393-4437

November 21, 1989

BY HAND

George B. Henderson II  
Assistant United States Attorney  
District of Massachusetts  
1107 J.W. McCormack Post Office & Courthouse  
Boston, MA 02109

Re: National Fireworks Site, Hanover, Massachusetts

Dear Mr. Henderson:

As you are aware, this office represents The Susquehanna Corporation ("Susquehanna") in connection with the National Fireworks site located in Hanover, Massachusetts (the "Site"). This letter serves two purposes. First, it provides you with additional information regarding the United States' extensive involvement at the Site. Second, it demands that the United States contribute its fair share of the removal costs previously incurred by Susquehanna at the Site.

This letter is written to you in your capacity as counsel for the United States Army, Air Force, Navy and Chemical Corps (collectively, the "United States") on behalf of Susquehanna.<sup>1</sup> You have informed us that with the entry of the Department of Justice into this matter, all requests for contribution and settlement demands should be sent to you. As you are aware, prior to your involvement we corresponded and/or talked to various representatives of the Army and Navy, including:

(Army)  
Mr. Robert Nore  
Mr. H.O. Everitt

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<sup>1</sup> If you do not represent all of those entities, please advise us at once which ones you do not represent.

Commander, U.S. Army Engineer Division  
Ms. Maureen McCabe, U.S. Army Engineer Division  
Mr. Robert Batt, U.S. Army Engineer Division

(Navy)  
Ms. Patricia Chalfant, Naval Facilities  
Northern Division

We understand that the Army Corps of Engineers is currently investigating the Site. We would request that you ensure that this letter reaches the appropriate individuals within the various branches of the military.

Susquehanna has previously requested that the United States pay its equitable portion of the costs incurred by Susquehanna in complying with a unilateral Administrative Order (U.S. EPA Docket No. I-89-1008) issued by the Environmental Protection Agency ("EPA") on December 5, 1988 and amended on December 22, 1988. That Order required Susquehanna to conduct a removal action at the Site. As stated in my June 30, 1989 letter to potentially responsible parties, including the Army and Navy, Susquehanna incurred approximately \$350,000.00 in costs for the removal action and is now seeking to recover a portion of its costs from other responsible parties.

The United States was extensively involved in the manufacturing, testing, and disposal of munitions at the Site for nearly three decades. In contrast, Susquehanna was involved at the Site for only a few years. Susquehanna now demands that the United States contribute an amount based on an equitable allocation of the removal costs. See United States v. Monsanto Co., 858 F.2d 160, 168 n.13, 173 n.29 (4th Cir. 1988) (discussing apportionment of liability in contribution cases, and considering degree of involvement by parties in generation, transportation, treatment, storage, and disposal of hazardous substances). Susquehanna demands that the United States pay \$200,000.00 to Susquehanna as its share of the response costs. Susquehanna believes that such amount is equitable and accurately reflects the pervasiveness of the government's involvement at the Site.

After my June 30 letter, you asked that Susquehanna give you additional information concerning the extent of the United States' involvement at the Site. In response, I am enclosing the affidavits of Edmund H. Kent and Byron A. Osborne, both longtime employees at the Site, and the affidavit of Hubert H. Wolfert, who was a superintendent on the site between 1941 and 1947. As you will note, the affidavits detail the extensive involvement of the United States as an operator of the Site and as a "person" which arranged for disposal of hazardous substances. I am also enclosing additional materials which unequivocally demonstrate that the United States (i.e., the Navy) owned facilities at the Site during the heart of weaponry production.

This letter also sets out the legal bases upon which Susquehanna makes this demand. In many of the cases this letter cites, the United States successfully argued on behalf of its agency, the Environmental Protection Agency ("EPA"), that various entities who claimed to have no liability under the Comprehensive Environmental Response, Compensation and Liability Act of 1980 ("CERCLA") were subject to its provisions. It seems incongruous to have to make these arguments to you, as counsel for the United States, as you are well aware of the broadness of CERCLA liability and the liberal construction the statute has been given in the courts.

We are very confident that the United States will be found liable if the United States forces Susquehanna to bring an action under CERCLA to recover its costs. As you are aware, the United States does not have any special status that exempts it from contributing its fair share and is liable under CERCLA to private parties who have undertaken cleanup of facilities for which the United States has responsibility for releases or threatened releases of hazardous substances. See 42 U.S.C. § 9620(a)(1) (Each department, agency, and instrumentality of the United States is subject to and shall comply with CERCLA to the same extent, including liability, as any nongovernmental entity.)

I. THE UNITED STATES OPERATED THE NATIONAL  
FIREWORKS SITE

The United States was an operator of the National Fireworks site during the time of disposal of hazardous



substances.<sup>2</sup> Therefore, it is liable under Section 107(a)(2) of CERCLA.<sup>2</sup>

The United States was extensively involved in the operation of the Site from the early 1940's through the late 1960's, during which time its various contractors<sup>3</sup> manufactured a multitude of munitions for the United States military. The federal government, through the Departments of the Army, Navy, Air Force, and the Chemical Corps, participated routinely in day-to-day operations at the Site. As discussed more fully below, it closely regulated and monitored the flow of explosive materials to and from the Site. Waste explosives and products not meeting specifications were disposed of on-site by burning or detonation, at the United States' direction. Kent Affidavit ¶¶ 10, 11, 13.

The United States was involved in and exercised control over manufacturing operations at the Site. The United States supplied the materials, inspected them, and oversaw manufacture. Kent Affidavit ¶¶ 12, 13; Osborne Affidavit ¶¶ 11, 12. The United States had personnel on the Site at nearly all times, utilizing numerous resident inspectors like Mr. Marshall Hearnault (or "Haynault"), who was stationed at the Site for more than twenty years, Mr. Al Durant (or "Durrant"), who oversaw the manufacture of chemical warfare items, and Navy Lieutenant Commander Peabody. Kent Affidavit ¶¶ 14, 15; Wolfert Affidavit ¶¶ 4-7. The inspectors had the authority to stop production at any time. Kent Affidavit

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<sup>2</sup> Under Section 107(a)(2) of CERCLA, the "covered persons" who may be held liable for response costs include "any person who at the time of disposal of any hazardous substance owned or operated any facility at which . . . hazardous substances were disposed of." 42 U.S.C. § 9607(a)(2). The definition of "person" is very broad, and explicitly includes the United States. 42 U.S.C. § 9601(21).

<sup>3</sup> At different times, the contractor was National Fireworks, Inc., National Fireworks Ordnance Corporation, National Northern Corporation, American Potash and Chemical Company, Atlantic Research Corporation, and The Susquehanna Corporation. Kent Affidavit ¶ 6.

¶ 16. The various government inspectors, numbering as many as twenty on-site at once, were involved in every stage of manufacture. Kent Affidavit ¶ 15; Osborne Affidavit ¶ 11. The United States also stationed a full-time chemist at the Site. Kent Affidavit ¶¶ 10, 15.

United States employees also directed the disposal of off-specification munitions on-site. Kent Affidavit ¶ 16; Osborne Affidavit ¶ 14. Government employees decided what materials should be disposed of, and directed that they be burnt or detonated at areas such as Factory Pond, a large water body located in the southern portion of the Site. Osborne Affidavit ¶¶ 10, 14. In addition, the Army instructed non-Government employees in disposal techniques. Osborne Affidavit ¶ 5.

Finally, the United States carried out the closure of the Site in 1970. Osborne Affidavit ¶¶ 11, 15. An Army demolition team spent weeks disposing of wastes at the Site. Osborne Affidavit ¶ 15.

The United States' role in waste disposal at the Site, in and of itself, is sufficient to establish liability as an operator of the Site. As the United States recently argued in its brief in United States v. Fleet Factors Corp., 17 Chem. Waste Litig. Rptr. 657 (S.D. Ga. 1988) (copy enclosed), actual participation in waste disposal activities, management of a facility, and control of activities constitute sufficient involvement to warrant imposition of CERCLA liability as an operator. Plaintiff's Brief at 23-30, 16 Chem. Waste Litig. Rptr. 340, 341-44. Those activities constitute day-to-day operation of the facility. The court agreed with the United States' argument in Fleet Factors. Although denying the United States summary judgment on liability because certain facts were in dispute, the court indicated that the defendant may be liable as an operator if the facts play out as the United States has asserted. Fleet Factors, 17 Chem. Waste Litig. Rptr. at 662-63.

II. THE UNITED STATES ARRANGED FOR THE DISPOSAL OF  
HAZARDOUS SUBSTANCES AT THE SITE

It is equally clear that the United States is a "covered person" under Section 107(a)(3) of CERCLA, 42 U.S.C. § 9807(a)(3), as a "person who by contract, agreement, or otherwise arranged for disposal or treatment . . . of hazardous substances." The United States' liability under Section 107(a)(3) arises because of several different activities of the government at the Site.

First, the United States directed its contractors to dispose of off-specification munitions at the Site by burning and detonation. Kent Affidavit ¶¶ 13, 16; Osborne Affidavit ¶¶ 14, 15. The United States, through its military inspectors, made the decision what munitions were condemned for on-site disposal, oversaw the disposal, and sent additional personnel to supervise the disposal of wastes. Kent Affidavit ¶ 16. Government personnel witnessed and certified the disposal of government supplied materials and rejected munitions. Osborne Affidavit ¶ 14.

In this case, the United States had the authority to control the handling and disposal of hazardous substances, and in fact exercised that authority. In imposing liability upon persons who arranged for disposal under Section 107(a)(3), courts have focused on who has authority and responsibility to make such decisions. For example, in United States v. NEPACCO, 810 F.2d 728 (8th Cir. 1986), the court found those with actual control over a manufacturing plant's operations liable, stating "[i]t is the authority to control the handling and disposal of hazardous substances that is critical under the statutory scheme." *Id.* at 743. See also United States v. Bliss, 667 F. Supp. 1298, 1306 (E.D. Mo. 1987) (similarly holding individual defendants liable under Section 107(a)(3) because they "had ultimate authority for decisions regarding disposal" and exercised their authority when they met with others to arrange for disposal of waste). The circumstances here are that the United States, in directing that disposal occur, then overseeing and participating in disposal of wastes "made the crucial decision how [hazardous substances] would be disposed of or treated, and by whom." United States v. A & F Materials Co., 582 F. Supp. 852, 845 (S.D. Ill. 1984). The facts in this case and the law dictate that the United States

is liable as a person who arranged for disposal of hazardous substances under Section 107(a)(3) of CERCLA.

Second, by entering into agreements with a series of contractors for munitions manufacture at the Site, with certain knowledge that the process would yield various hazardous substances that must be disposed of, the United States arranged for disposal of hazardous substances within the meaning of CERCLA. As in the recent case United States v. Aceto Agricultural Chemicals Corp., 872 F.2d 1373 (8th Cir. 1989), the United States is liable for harm resulting from the contractors' work because generation of wastes was inherent in the manufacturing process. Id. at 1379. The facts here are much more unfavorable than for the defendants in Aceto, who argued that they should escape liability because they had no authority to control their contractors' operations. See Aceto, 872 F.2d at 1381-82. In this case, the United States had and exercised control of the manufacture of munitions and the disposal of the associated hazardous substances.

Similarly, in United States v. Velsicol Chemical Corp., 28 ERC 1265 (E.D. Tenn. 1988), the court held that defendants, by entering into an agreement with a third party for formulation and packaging of chemicals, knew that the processes called for by the contract would yield hazardous substances. Id. at 1267. The substances were disposed of pursuant to the requirements of the services for which the defendant contracted. Id. at 1268. The result was that the Velsicol defendants were held liable for arranging for disposal of hazardous substances, without any requirement that the defendants themselves possessed the hazardous substances disposed of as a prerequisite to liability. Id. at 1268.<sup>4</sup>

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<sup>4</sup> Several courts have determined that a supplier of useful products containing hazardous substances is not liable under CERCLA as a person who arranges for disposal. E.g., Edward Hines Lumber Co. v. Vulcan Materials Co., 881 F.2d 155 (7th Cir. 1988); Florida Power & Light Co v. Allis-Chalmers Corp., 27 ERC 1558 (S.D. Fla. 1988). Although the United States supplied many of the explosives and other materials sent to the Site to be used in munitions, it was much more than a mere supplier of useful products. Those decisions are not contrary to our assertion that the United States is liable under CERCLA. Similar to the

Since the United States actually oversaw and participated in detonation, burning, and other disposal of wastes, it cannot be more certain that the United States knew that hazardous substances would be contemporaneously produced in the process of making munitions. The United States is liable as one who arranged for disposal under the Aceto/Velcisol line of cases.

### III. THE UNITED STATES IS LIABLE AS A PAST OWNER OF FACILITIES AT THE SITE

The United States, in addition to operating the Site and arranging for disposal of hazardous substances, was the record owner of facilities at the Site. As evidenced by the enclosed copy of a contract between the United States and National Fireworks, executed on January 7, 1943, the United States contractually acquired ownership of facilities at the Site. The United States contracted for the acquisition and installation of plant equipment and facilities to manufacture certain ordnance materials for the war effort. According to the contract's terms, the Navy acquired an interest in all plant facilities, building equipment, fixtures, machines, machine equipment, etc. on the described real property. The contract specifically refers to the facilities as "department-owned facilities" and provides irrefutable evidence of the United States' ownership interest at the Site. Records at the Town of Hanover assessor's office (copy enclosed) refer to the Navy as a past owner of facilities on the Site.

As you are aware, under Section 107(a)(2) of CERCLA, 42 U.S.C. § 9607(a)(2), an owner of a facility at the time of disposal is liable for cleanup costs without regard to ownership of any hazardous substances, placement of the substances on the facility, fault, or causation. See, e.g., New York v. Shore Realty Corp., 759 F.2d 1032, 1044 (2d Cir. 1985); United States v. Conservation Chemical Co., 619 F. Supp. 162, 204 (W.D. Mo. 1985); see also Tanglewood East Homeowners v. Charles-Thomas Inc., 38 ERC 1260, 1262 (5th Cir. 1988). The generation and disposal of wastes was continuous

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distinction stated by the court in Aceto, the United States cannot escape liability because it was proximately involved with the disposal of hazardous substances. See Aceto, 872 F.2d at 1381.

throughout the twenty-five years of munitions manufacture, including the time the United States owned facilities at the Site. Kent Affidavit ¶ 10. Accordingly, the United States is liable as a past owner of those facilities.

#### IV. CONCLUSION

There can be no doubt that the United States bears a large portion of responsibility for the hazardous substances released at the Site and for the removal action required by EPA. As the Department of Justice has argued on innumerable occasions, CERCLA requires that those responsible for releases of hazardous substances pay for the associated cleanup costs. See Dedham Water Co. v. Cumberland Farms Dairy, Inc., 805 F.2d 1074, 1081 (1st Cir. 1986). The United States now must pay its fair share of the cleanup costs at the Site.

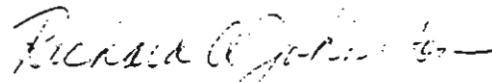
In a prior conversation with us in regard to Susquehanna's petition to perpetuate testimony, you stated that it was your belief that Susquehanna did not have sufficient information regarding the United States' involvement at the Site to fulfill the requirements of Rule 11 of the Federal Rules of Civil Procedure. Since the Court's denial of Susquehanna's petition, we have obtained substantial information from Messrs. Kent, Osborne, and Wolfert about the U.S. Military's involvement in the Site. With the information contained in the Kent, Osborne, and Wolfert Affidavits, Susquehanna is able to satisfy any Rule 11 test. Susquehanna's assertion that the United States is liable under CERCLA, as stated in the information provided to you in this letter, is clearly well grounded in fact and is warranted by existing law. Further, we believe that the facts will be more than sufficient for Susquehanna to prevail on a motion for partial summary judgment regarding the United States' liability at the Site.

November 21, 1989  
Page 10

If you have any questions or would like to discuss  
issues raised in this letter, please contact me.

I request a response by December 5, 1989.

Very truly yours,

A handwritten signature in cursive script, appearing to read "Richard A. Johnston", with a horizontal line extending from the end of the signature.

Richard A. Johnston

Enclosures

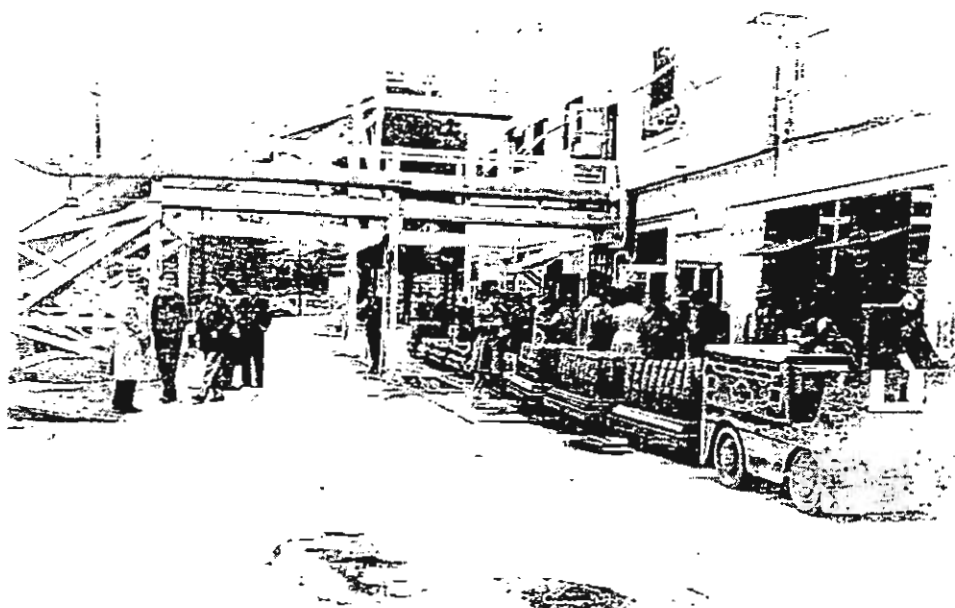
**APPENDIX D**  
**HISTORICAL PHOTOGRAPHS**



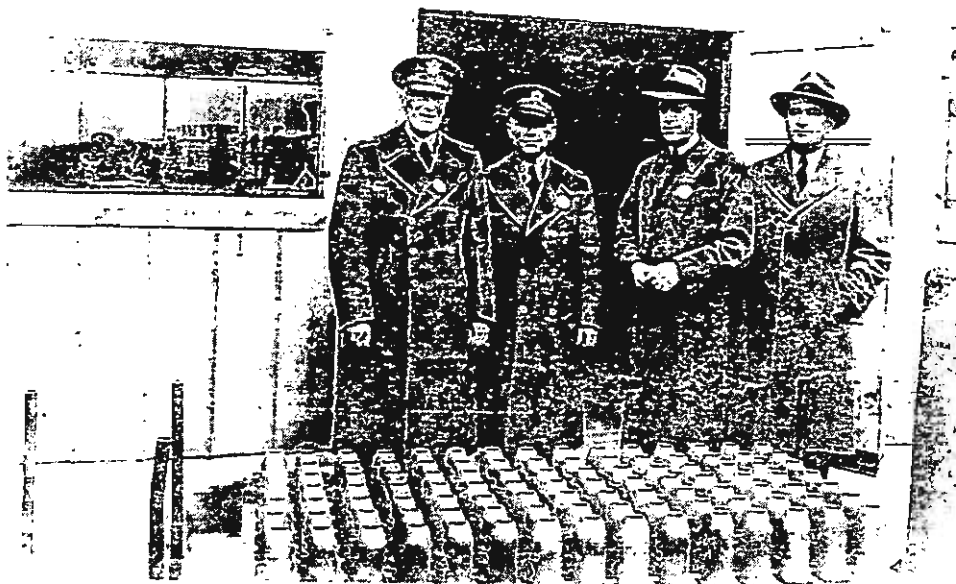
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Document Contains**

**Some Poor Quality**

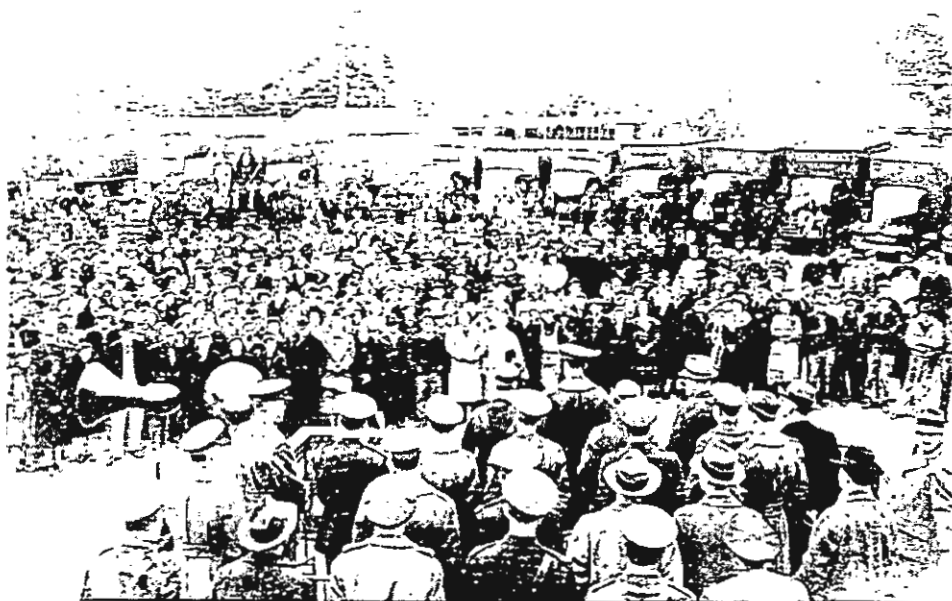
**Originals**



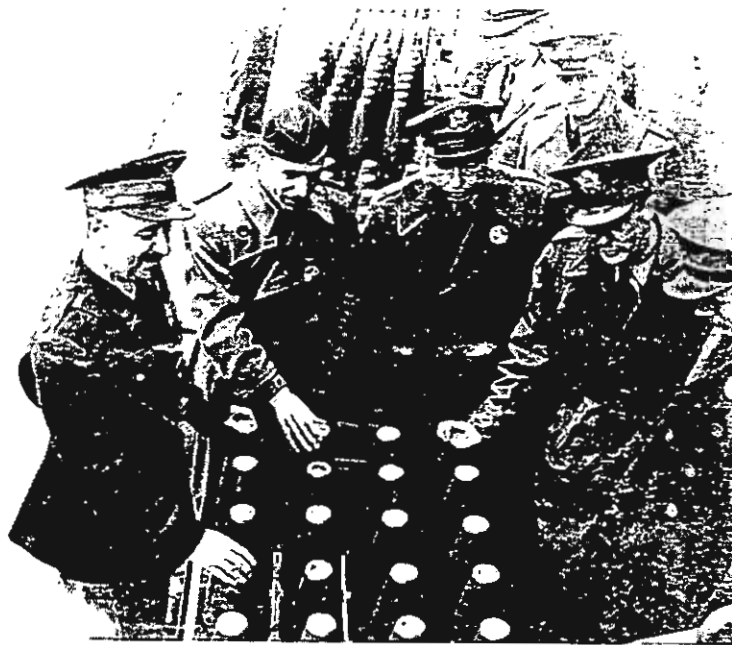
GROUP OF ORDNANCE OFFICERS FROM WASHINGTON, DC VISIT  
NATIONAL FIREWORKS COMPANY, WEST HANOVER, MASSACHUSETTS  
STANDING OUTSIDE THE 155MM SHELL LOADING PLANT  
(NATIONAL ARCHIVES STILL PICTURES BRANCH, RG 111 SIGNAL CORPS,  
SC-12643, NOVEMBER, 1941)



GROUP OF ORDNANCE OFFICERS FROM WASHINGTON, DC VISIT  
NATIONAL FIREWORKS COMPANY  
STANDING BEHIND 37MM SHELLS  
(NATIONAL ARCHIVES STILL PICTURES BRANCH, RG 111 SIGNAL CORPS,  
SC-126248, NOVEMBER 1941)



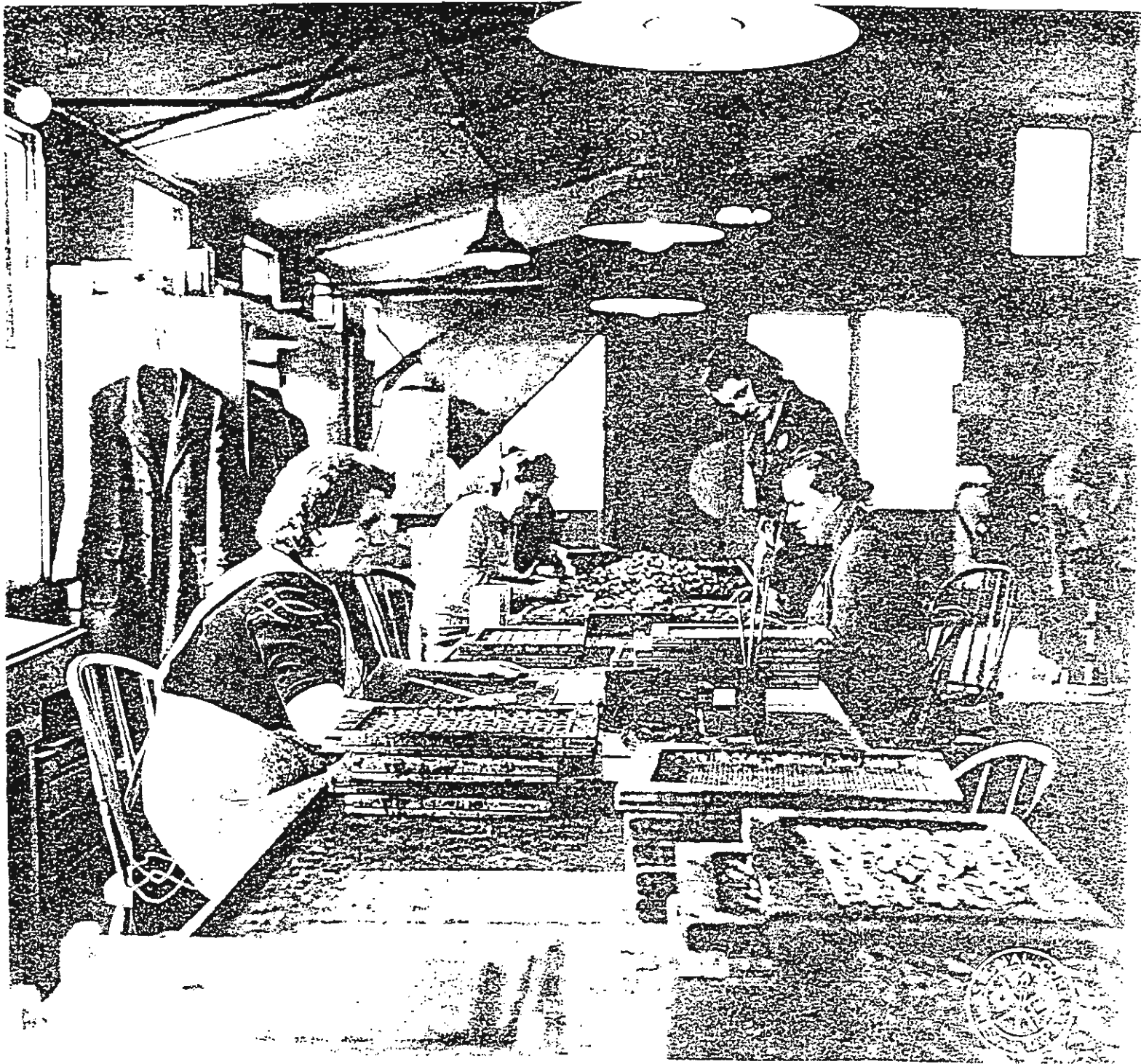
DURING A VISIT BY ORDNANCE OFFICERS FROM WASHINGTON, DC  
LTC A. ROBERT GINSBURGH ADDRESSES A LARGE CROWD  
AT THE NATIONAL FIREWORKS COMPANY  
(NATIONAL ARCHIVES STILL PICTURES BRANCH, RG 111 SIGNAL CORPS  
SC-126244, NOVEMBER 1941)



LTC A. ROBERT GINSBURGH, LT DONALD B. ROBINGSON AND OTHER  
ORDNANCE OFFICERS EXAMINE 155MM SHELL NOSES  
AT NATIONAL FIREWORKS COMPANY  
(NATIONAL ARCHIVES STILL PICTURES BRANCH, RG 111 SIGNAL CORPS  
SC-126249, NOVEMBER 1941)

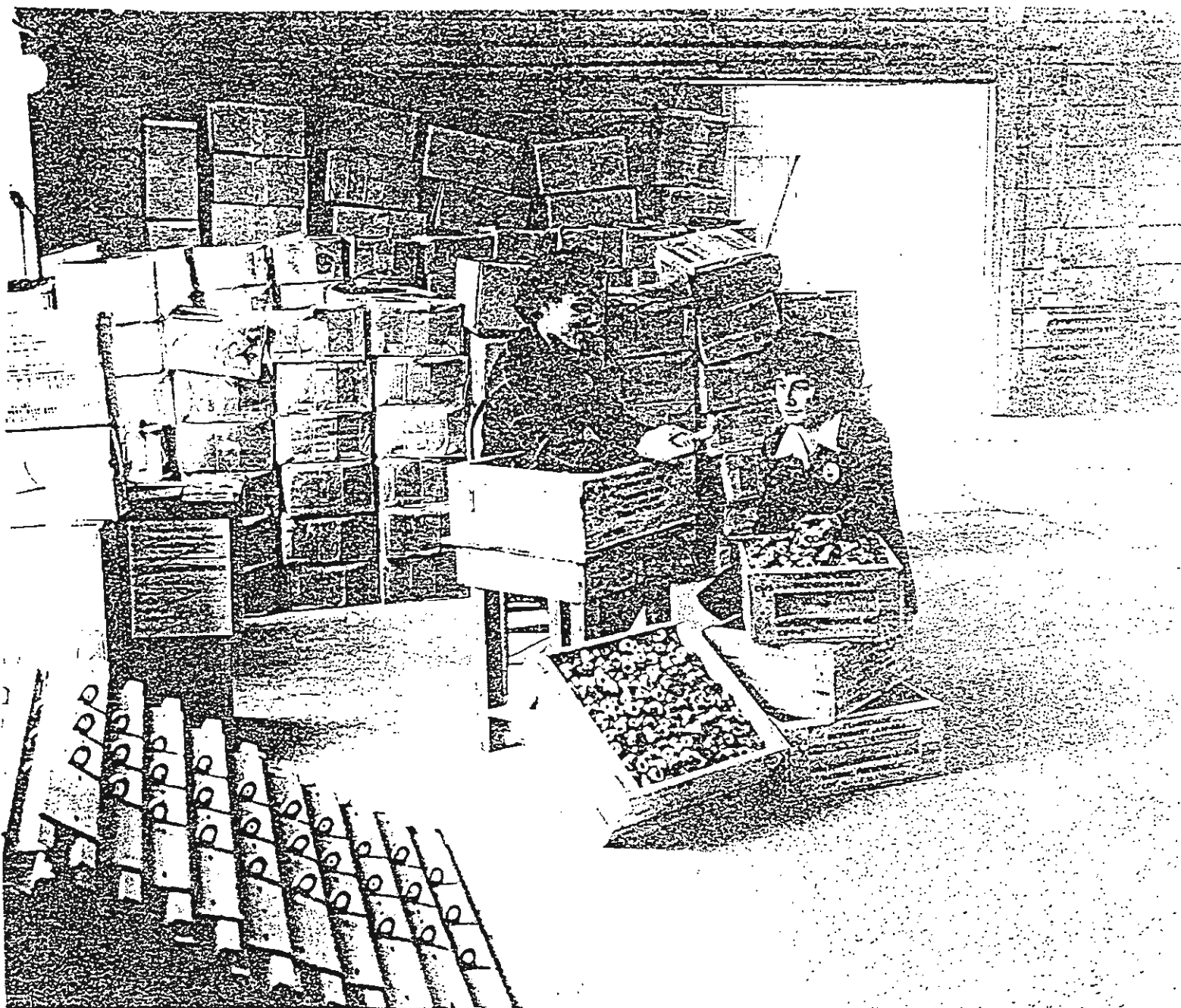


LOADING AN-M50 MAGNESIUM INCENDIARY BOMBS  
WITH AN INCREMENT OF THERMIT  
AT THE NATIONAL FIREWORKS PLANT.  
WEST HANOVER, MASSACHUSETTS



**WORKERS WATERPROOF PRIMER HOLDERS CONTAINING PRIMERS  
PRIOR TO ASSEMBLY WITH AN-M50 INCENDIARY BOMB, WHILE  
CWS INSPECTOR (IN UNIFORM) CHECKS.  
AT NATIONAL FIREWORKS, INC.  
WEST HANOVER, MASSACHUSETTS**



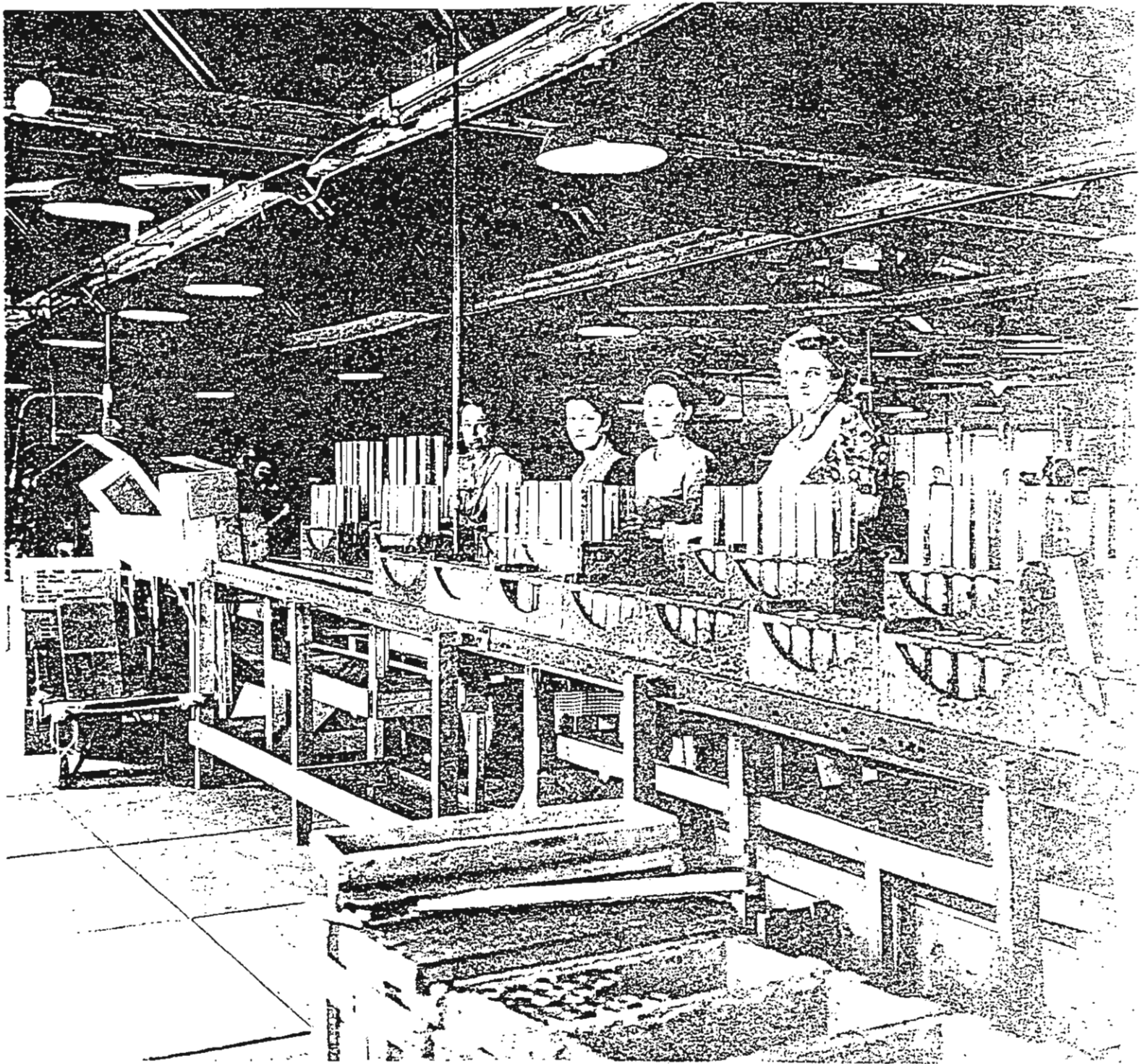


INSPECTING FIRING PIN HOLDERS FOR THE AN-M50  
INCENDIARY BOMB PRIOR TO ASSEMBLY.  
AT NATIONAL FIREWORKS, INC.  
WEST HANOVER, MASSACHUSETTS

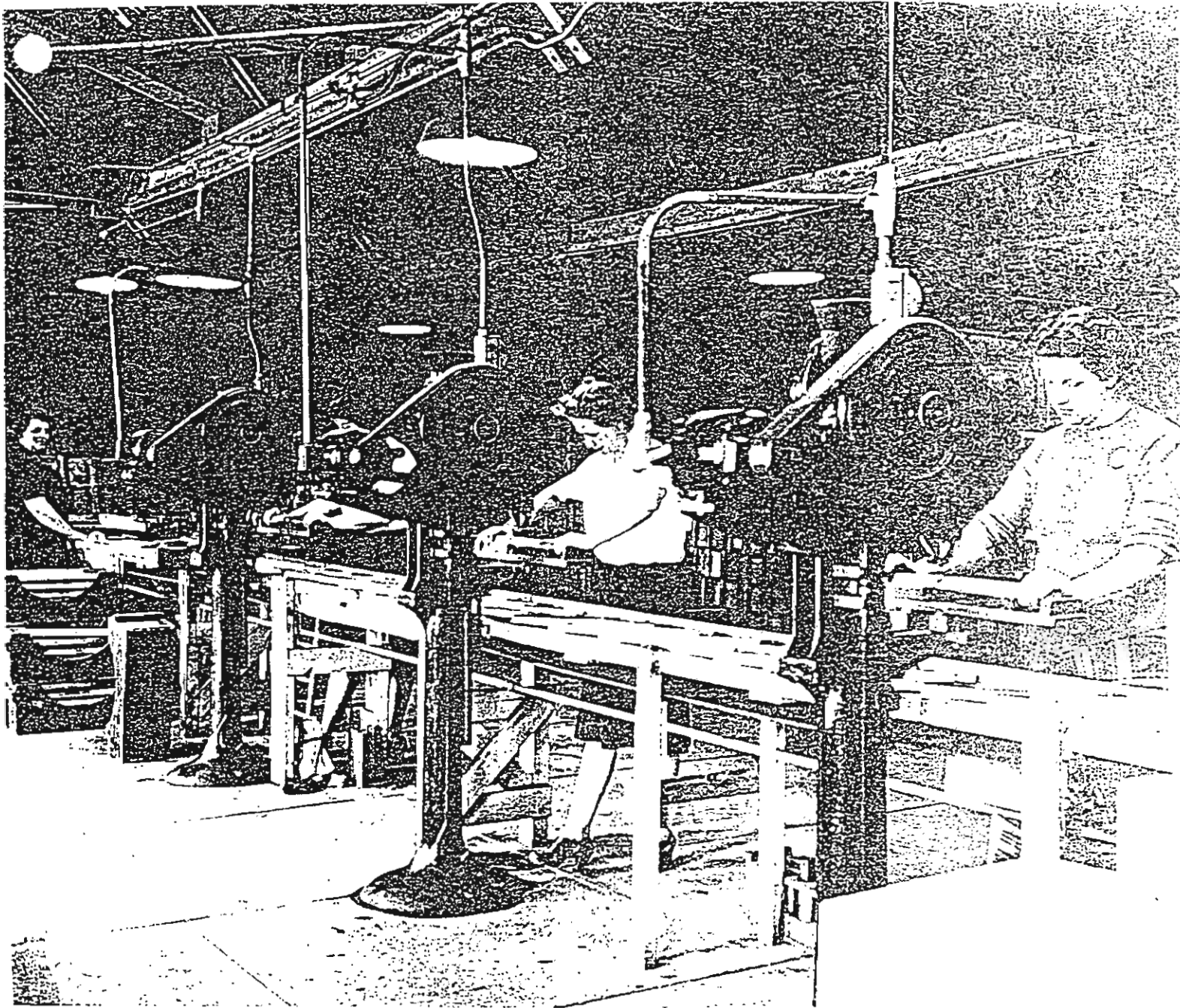




INSERTING FIRING PIN SUPPORT IN THE FIRING PIN HOLDER,  
PRIOR TO FINAL ASSEMBLY OF THE AN-M50 INCENDIARY BOMB.  
AT NATIONAL FIREWORKS, INC.  
WEST HANOVER, MASSACHUSETTS



AN-M50 INCENDIARY BOMBS IN CONSOLIDATION ROOM,  
AFTER BOMB BODY HAS BEEN FILLED. GIRLS ARE  
INSERTING PRIMER HOLDER AND FIRING PIN HOLDER.  
AT NATIONAL FIREWORKS, INC.  
WEST HANOVER, MASSACHUSETTS



**WORKERS RIVET TAIL ON AN-M50 INCENDIARY BOMB  
AT NATIONAL FIREWORKS, INC.  
WEST HANOVER, MASSACHUSETTS**





**THE CWS ADMINISTRATIVE OFFICER INSPECTS  
A CLUSTER OF AN-M50 INCENDIARY BOMBS BEFORE IT IS PACKED.**

**APPENDIX G**

**PRESENT SITE PHOTOGRAPHS**

**The Following  
Document Contains**

**Some Poor Quality**

**Originals**



**PHOTO 1-SOUTH END INDUSTRIAL WAY (LOOKING EAST)**



**PHOTO 2-SOUTH END INDUSTRIAL WAY (LOOKING SOUTH)**



PHOTO 3-OLD AMMUNITION FACILITY BUILDING C-1

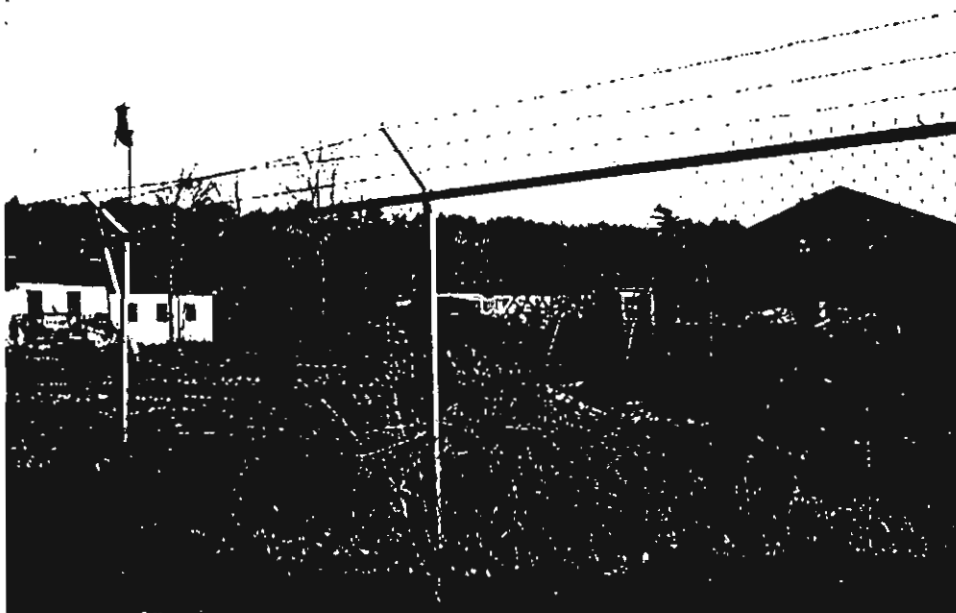


PHOTO 4-JUNKYARD NEAR BUILDING C-1





**PHOTO 5-OLD AMMUNITION FACILITY BUILDING 244, NORTHERN EDGE OF  
PROPERTY**



**PHOTO 6-RUBBISH PILE NORTH OF BUILDING 244**



**PHOTO 7-NEW BUILDING CONSTRUCTED ALONG EAST SIDE OF INDUSTRIAL WAY (SUPERIOR AIR SYSTEMS)**



**PHOTO 8-P.A. LANDERS, INC. BUILDING**



**PHOTO 9-GRAVEL STORAGE AREA WEST OF LANDERS BUILDING**



**PHOTO 10-PREVIOUSLY REMEDIATED SITE BEHIND LANDERS BUILDING  
(LOOKING NORTH FROM NEW ROAD)**



**PHOTO 11-ROADWAY HEADING TOWARDS FIRING RANGE  
(LOOKING SOUTH FROM NEW ROAD IN LANDERS AREA)**



**PHOTO 12-LAKE AND MAGAZINE AREA (LOOKING WEST FROM NEW ROAD  
IN LANDERS AREA)**



**PHOTO 13-TRASH DUMP NEAR LANDERS BUILDING  
(WEST OF LANDERS BUILDING LOOKING NORTHEAST)**



**PHOTO 14-EAST END OF FACTORY POND**

**APPENDIX H**  
**HISTORICAL MAPS/DRAWINGS**

Appendix H Maps are in pocket in back of report.

**APPENDIX I**  
**OEW RISK ASSESSMENT CODE FORM**  
**(NOT USED)**



Preparation of a RAC Form was not considered  
appropriate for this project.

**APPENDIX J**  
**REPORT DISTRIBUTION LIST**

**ORDNANCE AND EXPLOSIVE WASTE  
CHEMICAL WARFARE MATERIALS  
ARCHIVES SEARCH REPORT**

**NATIONAL FIREWORKS SITE**

**WEST HANOVER, MASSACHUSETTS  
PLYMOUTH COUNTY**

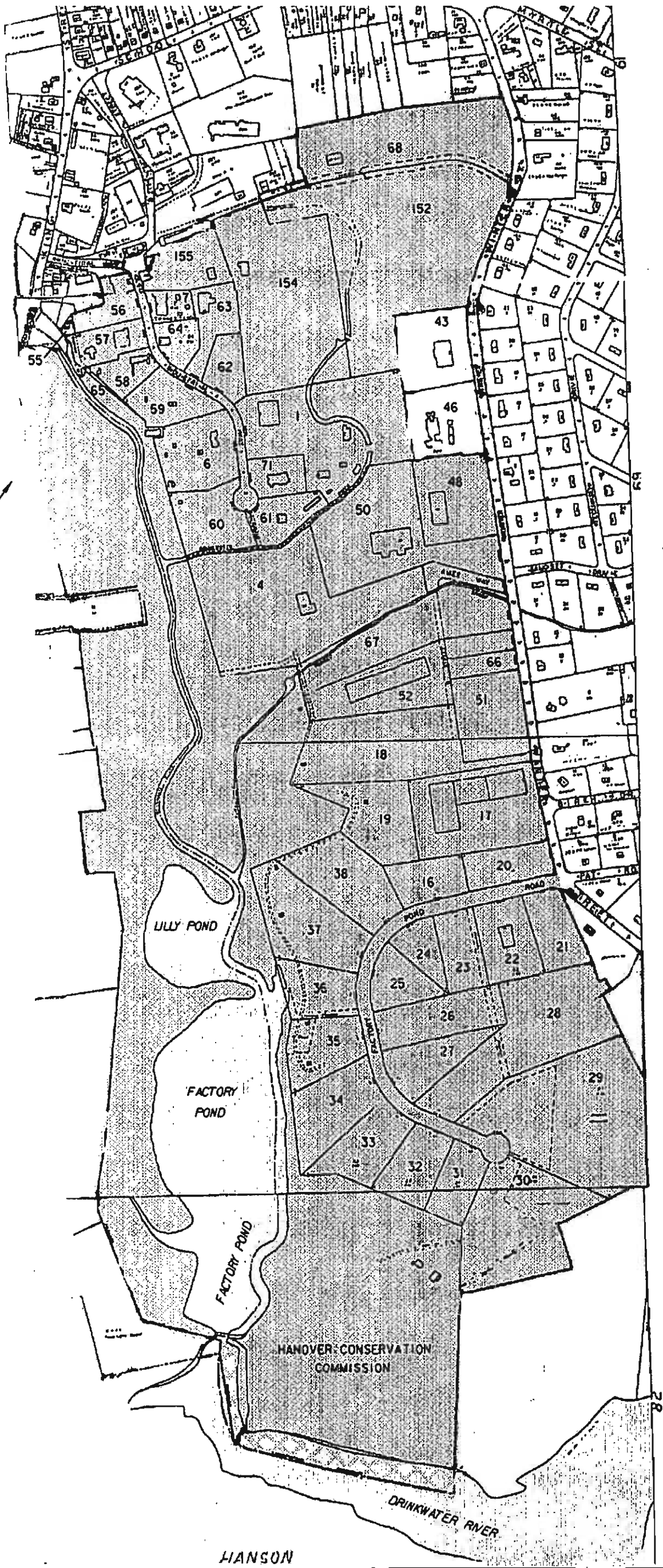
**DERP-FUDS NO. D01MA048900**

**APPENDIX J**

**REPORT DISTRIBUTION LIST**

<u>Addressee</u>	<u>No. Copies</u>
Commander, U.S. Army Engineer Division Huntsville, ATTN: CEHND-ED-SY P.O. Box 1600 Huntsville, Alabama 35807-4301	3
Commander, U.S. Army Engineer Division New England, ATTN: CENED-PD-L 424 Trapelo Road Waltham, Massachusetts 02154-9149	1
Commander, U.S. Chemical Material Destruction Agency ATTN: SFIL-NSM, Bldg.E4585 Aberdeen Proving Ground, Maryland 21010	1
Commander, U.S. Army Chemical & Biological Defense Command ATTN: AMSCB-CIH, Bldg. E5183 Aberdeen Proving Ground, Maryland 21010-5423	1
CELMS-ED-G	1
-ED-H	1
-PD	1
-PM-M	1

FIREWORKS SITE



FIREWORKS SITE

M-1

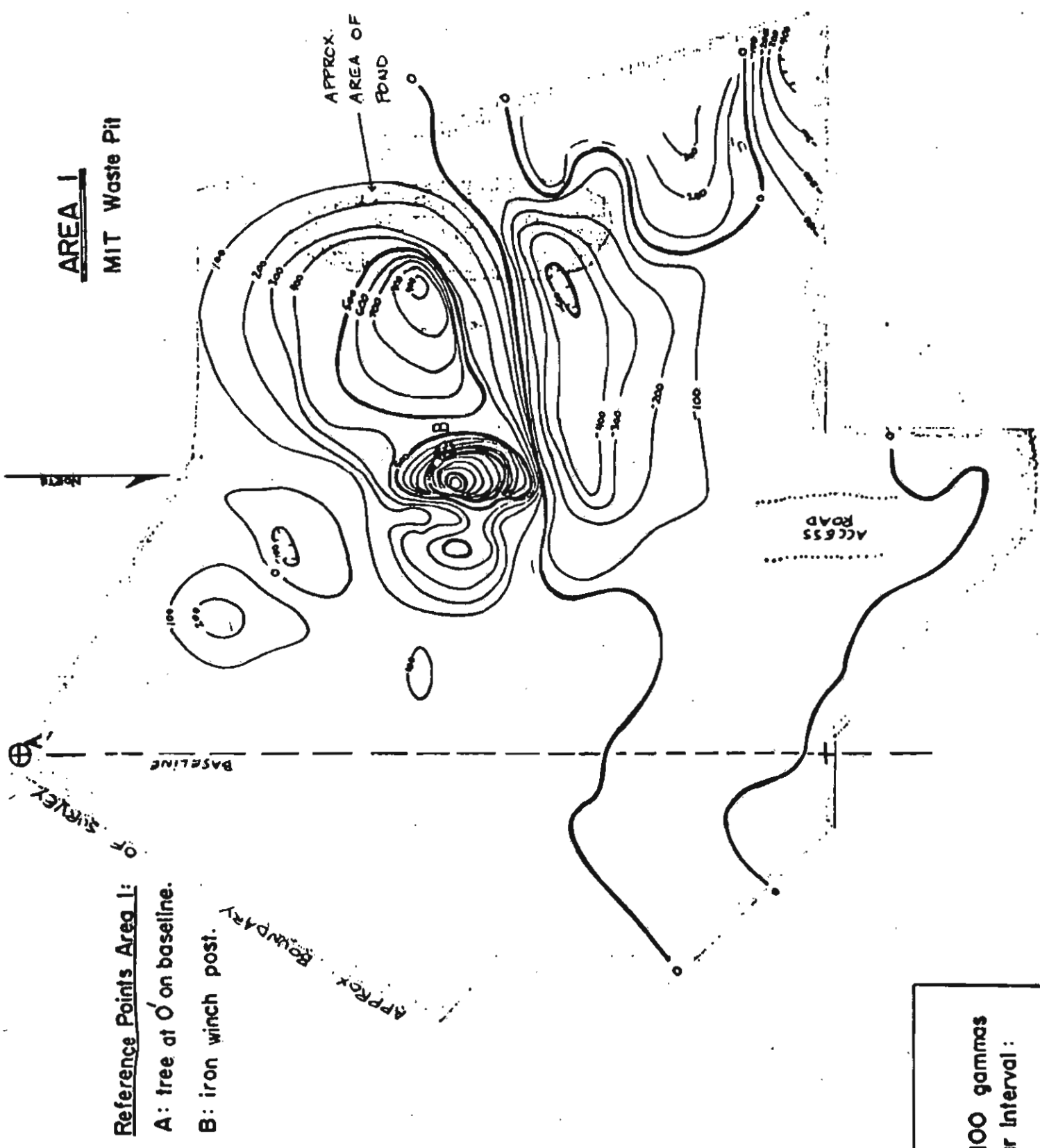
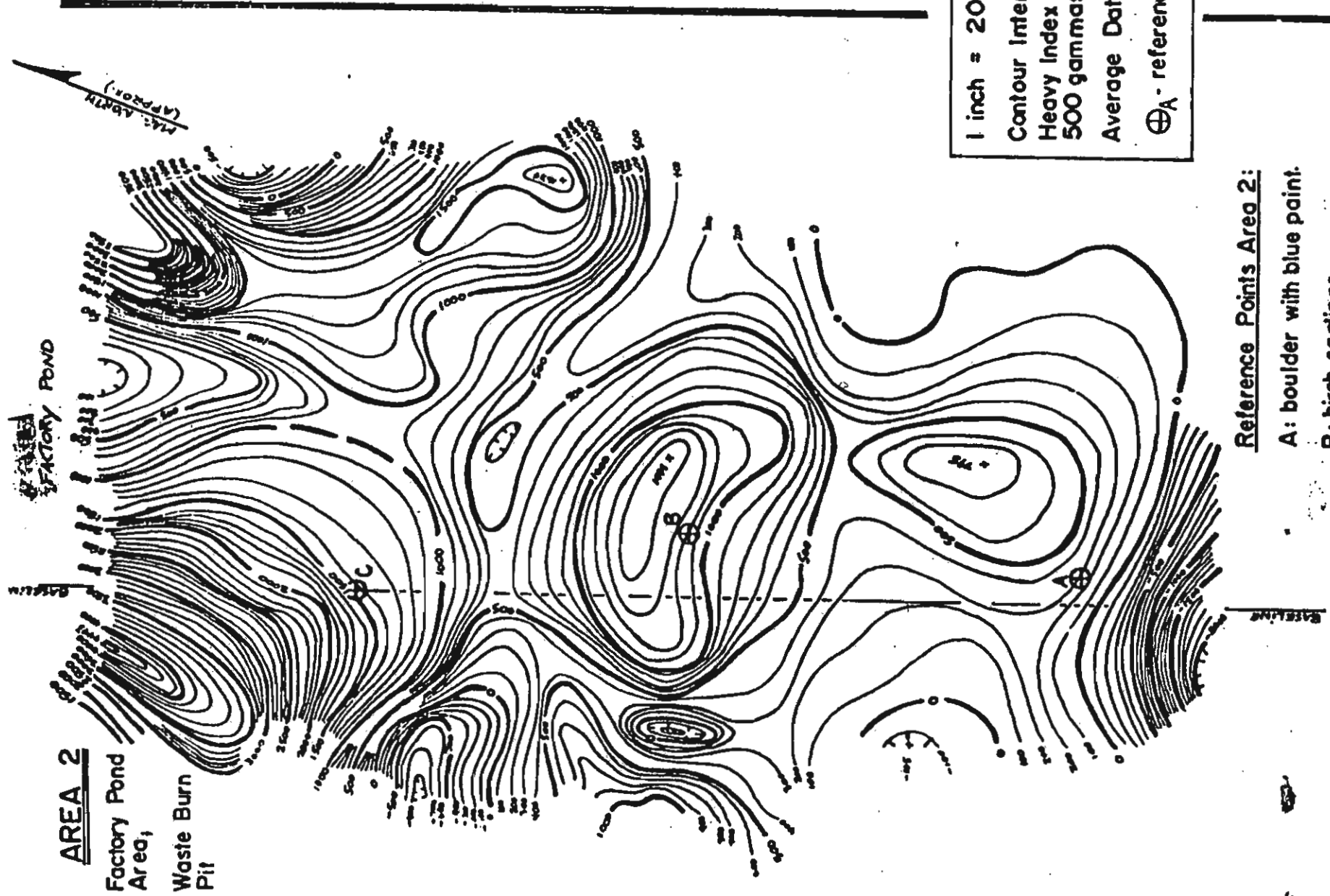
NATIONAL FIREWORKS SITE  
PLYMOUTH COUNTY  
HANOVER, MASSACHUSETTS  
DERP-FUDS# DO1MA048900  
CURRENT SUBDIVISION OF PROPERTY

NOT TO SCALE

PROD. DATE: DEC. 1993

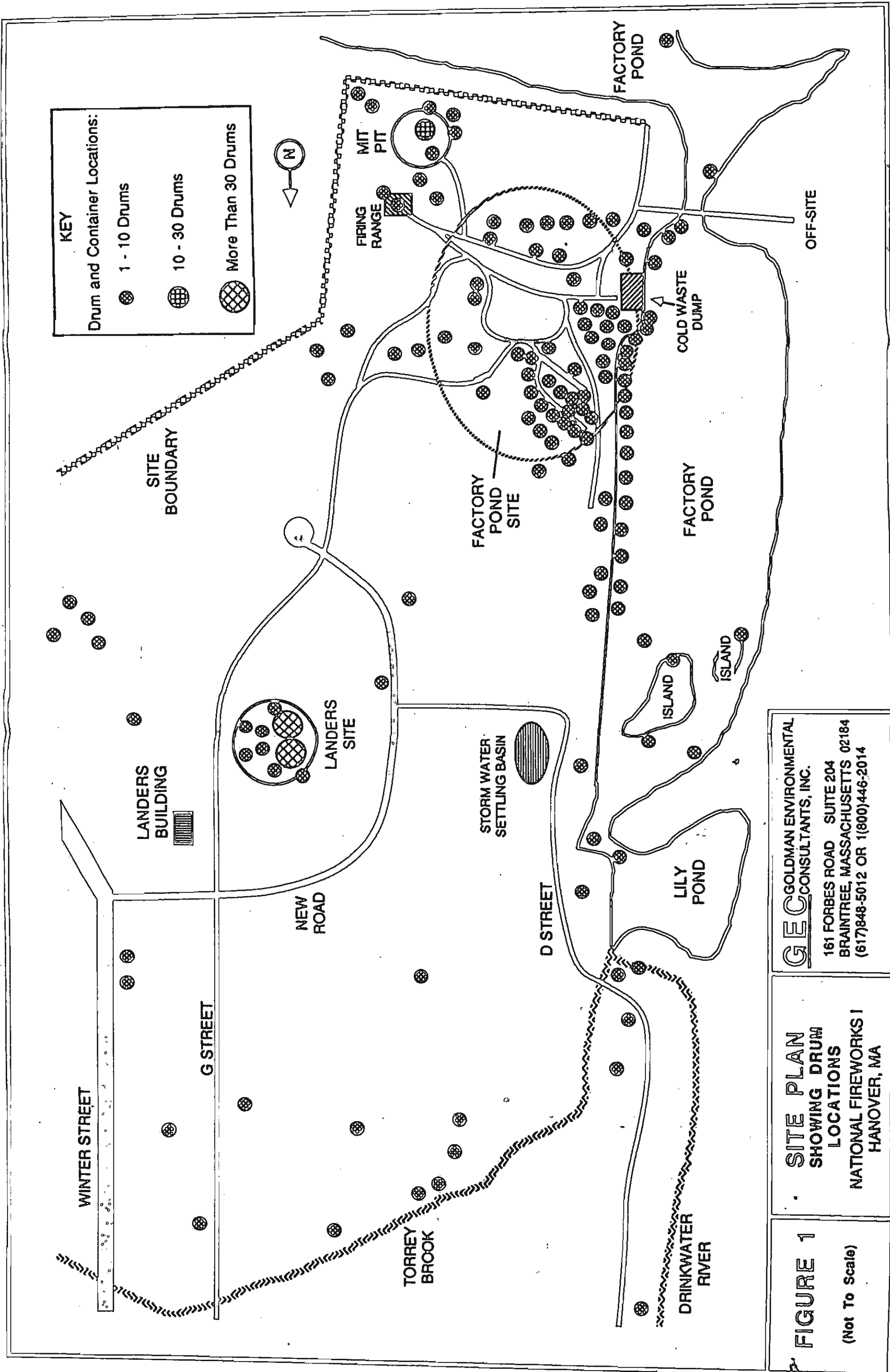
15-FEB-1994 13:33

/SITES/MA/FIREWORKS.DGN - /MAP/FIREWORKS.CIT



1 inch = 20 feet.  
Contour Interval: 100 gammas  
Heavy Index Contour Interval: 500 gammas.  
Average Datum: 54794 gammas.  
⊕<sub>A</sub> - reference point

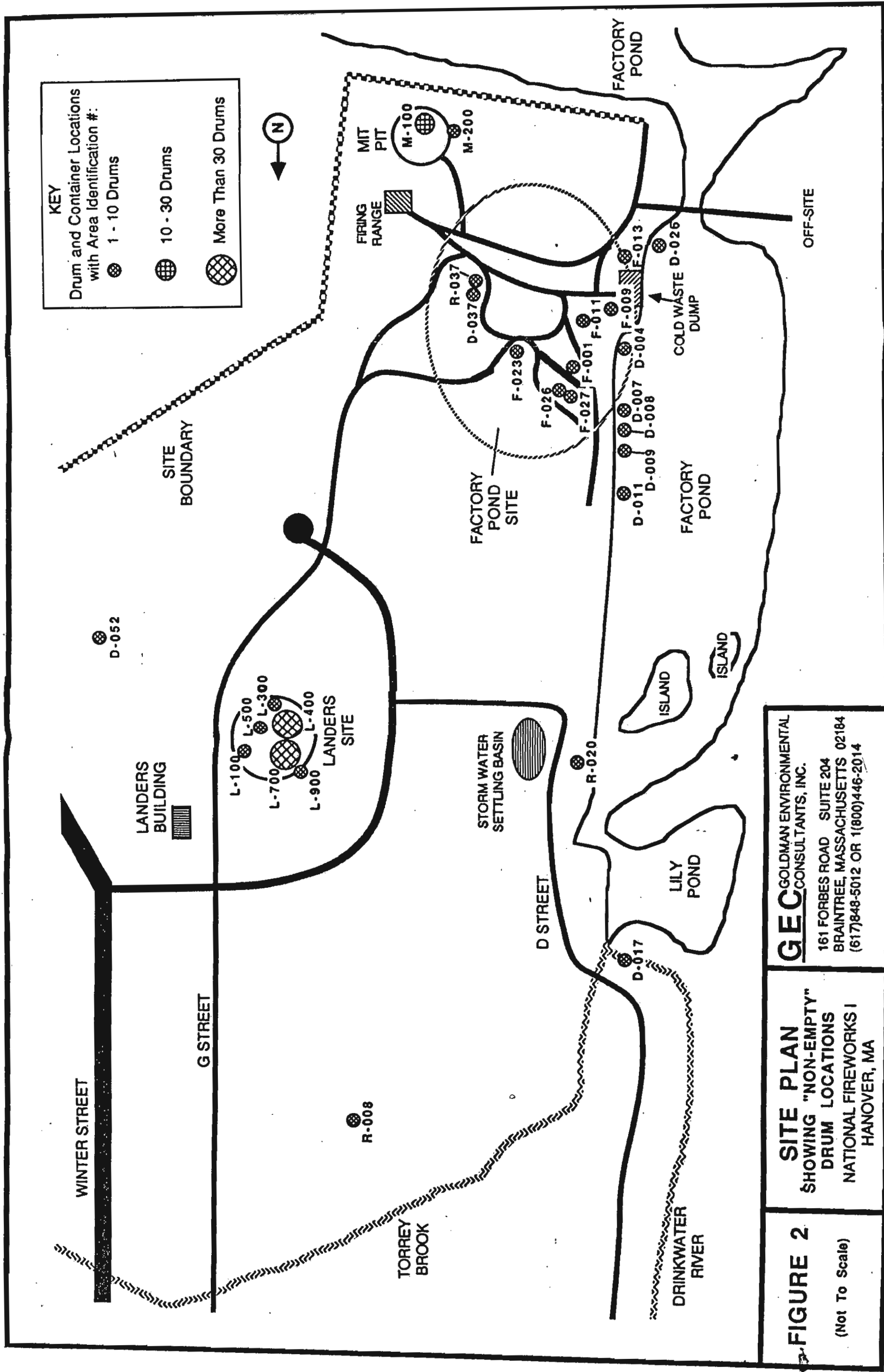
FIGURE 1  
Total Magnetic Field Intensity  
National Fireworks I  
Hanover, Massachusetts



**GEC** GOLDMAN ENVIRONMENTAL CONSULTANTS, INC.  
 161 FORBES ROAD SUITE 204  
 BRAINTREE, MASSACHUSETTS 02184  
 (617)848-5012 OR 1(800)446-2014

**SITE PLAN**  
**SHOWING DRUM**  
**LOCATIONS**  
**NATIONAL FIREWORKS I**  
**HANOVER, MA**

**FIGURE 1**  
 (Not To Scale)



<b>FIGURE 2</b>  (Not To Scale)	<b>SITE PLAN</b> SHOWING "NON-EMPTY" DRUM LOCATIONS NATIONAL FIREWORKS I HANOVER, MA	<b>GEC</b> GOLDMAN ENVIRONMENTAL CONSULTANTS, INC. 161 FORBES ROAD SUITE 204 BRAINTREE, MASSACHUSETTS 02184 (617)848-5012 OR 1(800)446-2014
---------------------------------------	--	---

HANOVER  
4-0000091 FIREWORKS II/SEVIGNY CANDY  
WEST SIDE OF KING ST.

a/o.: 12/31/98  
12:42:52

Site Name : FIREWORKS II/SEVIGNY CANDY  
Address : WEST SIDE OF KING ST.  
Town : HANOVER  
County : PLYMOUTH  
Site Number : 4-0000091  
Related Site No : 4-0000  
E.R.B. Number :  
E.P.A. Number : MAD980909675  
Reg : 4  
Zip : 02339  
Primary Sites Information

Notification Date :  
Release Type : DEF TIER 1B  
Notification Basis :  
Adequately Regulated :  
Hazard or Petrol : HAZARDOUS  
Public Involvement :  
Type of Site : 21E  
RAO CLASS :  
LSP # & Name :  
Notes : \*MCB D01MA0004/D01MA048900  
ACF Info :  
Staff Lead : UNASSIGNED  
Transition Status : L.T.B.I.  
Current Status : P.A.  
First Listed as L.T.B.I. : 01/15/87  
First Listed as Confirmed :  
First Listed as Remedial :  
First Listed as Deleted :  
First Listed as Priority :

#### Secondary Information

Conf. Date :  
Initiated By : EPA Date : 12/01/83

E.R. Staff :  
Reg Class Date :  
L.U.S.T. Eligible :  
M.S.C.A. Site : YES  
Action By : EPA ONLY  
Remedial Codes :  
Referred To :  
List Status : L.T.B.I.  
P.A. Equiv :  
U.T.M. Coord : East  
U.T.M. Coord : North

#### REQUIRED ACTIONS INFORMATION

Required Action Generated on 07/23/93, Due on 08/02/95, Not Currently Closed. Notes: LTBI, Unclass. & Non-Priority W/O Waivers. Transition Requirements.

#### POTENTIALLY RESPONSIBLE PARTY INFORMATION

Identification No : US AR-12  
PRP Name : US ARMY CORPS OF ENGINEERS  
Attention : TONY MACKOS  
Address 1 : 696 VIRGINIA RD  
Address 2 :  
State : MA Zip Code : 01742-2751  
Entity : FEDERAL GOVT  
First :  
MI :  
Title :  
Town : CONCORD  
Phone : (978) 318-8111  
Financial Status :  
Relation : P.R.P.  
LTBI NOR :  
Conf NOR :  
PRP No : 1

HISTORICAL MODIFICATIONS TO THE SITE: 1. On 09/24/98 at 13:36 the field OLD ID was modified from to 4-0000090.

HISTORICAL MODIFICATIONS TO THE SITE: 2. On 09/03/93 at 02:08 the field SITE STAT was modified from UNDETERMINED to PENDING.

HISTORICAL MODIFICATIONS TO THE SITE: 3. On 03/30/93 at 11:50 the field EXPLAIN was modified from \*GC to \*GC D01MA0004?

HISTORICAL MODIFICATIONS TO THE SITE: 4. On 03/30/93 at 11:54 the field EXPLAIN was modified from \*GC D01MA0004? to \*GC D01MA0004/D01MA0489?

HISTORICAL MODIFICATIONS TO THE SITE: 5. On 03/21/90 at 08:41 the field EXPLAIN was modified from to \*GC.

HISTORICAL MODIFICATIONS TO THE SITE: 6. On 03/21/90 at 08:41 the field MSCA SITE was modified from to YES.

HISTORICAL MODIFICATIONS TO THE SITE: 7. On 10/17/89 at 15:06 the field SITE NAME was modified from FIREWORKS II/SEVIGNEY CANDY to FIREWORKS II/SEVIGNY CA

#### LETTERS INFORMATION

Letter Addressee : FIREWORKS II/SEVIGNY CANDY  
Attention :  
Mail Address : WEST SIDE OF KING ST.  
Town : HANOVER  
State : MA Zip : 02339  
Date : 07/23/93  
Type : P.R.P.  
Writer : TRANSITION  
Dept : SAB  
Letter No : 1

Contents :  
Primary Purpose : TR-NP - LTBI, Unclass. & Non-Priority W/O Waivers  
Miscellaneous Purpose : - LTBI TRANSITION LETTER



HANOVER  
4-0000091 FIREWORKS II/SEVIGNY CANDY  
WEST SIDE OF KING ST.

a/o.: 12/31/98  
12:42:52

HANOVER  
4-0000091 FIREWORKS II/SEVIGNY CANDY  
WEST SIDE OF KING ST.

Total Waiver Applications...	0
Total Required Actions...	1
Total Permits...	0
Total Potentially Responsible Parties...	1
Total Response Actions...	0
Total Tier Classifications...	0
Total Letters sent out by the Department...	1
Total Short Term Measures...	0
Total Historical Modifications to the Site...	7

««« END OF REPORT »»»

ALL DATA LISTED ON A LTBI OR CONFIRMED SITE SPECIFIED BY SITE\_ID IN THE SCOPE

**HANOVER****4-0000090 FIREWORKS I  
FORGE POND/INDUSTRIAL PARK**a/o.: 12/31/98  
08:38:32

Site Name :	FIREWORKS I	Site Number.....	4-0000090
Address....	FORGE POND/INDUSTRIAL PARK	Related Site No.:	4-0000
Town.....	HANOVER	E.R.B. Number....	
County.....	PLYMOUTH	E.P.A. Number....	MAD980908842
Zip...:	02339		
Reg.: 4			

Primary Sites Information

Notification Date....  
Release Type..... **TIER 1A**  
Notification Basis....  
Adequately Regulated...  
Hazard or Petrol... **HAZARDOUS**  
Public Involv.:  
Type of Site..... **21E**  
RAO CLASS.....  
LSP # & Name.... **2062 - DAVID G. AUSTIN**  
Notes.... **MCB/D01MAC48900**  
ACF Info....

Staff Lead... **HOBILL**  
Transition Status... **L.T.B.I.**  
Current Status.... **PHASE 1**  
First Listed as L.T.B.I.: **01/15/87**  
First Listed as Confirmed:  
First Listed as Remedial:  
First Listed as Deleted..  
First Listed as Priority:

Secondary Information

Conf. Date.:  
Initiated By.: **EPA** Date.: **12/01/83**

E.R. Staff....  
Reg Class Date:  
L.U.S.T. Eligible.:  
M.S.C.A. Site..... **YES**  
Action By..... **EPA ONLY**  
Remedial Codes....  
Referred To....  
List Status... **L.T.B.I.**  
P.A. Equiv....  
U.T.M. Coord... **East**  
U.T.M. Coord... **North**

**REQUIRED ACTIONS INFORMATION**

Required Action Generated on 07/23/93, Due on 08/02/95, Closed on 10/20/97. Notes: LTBI,Unclass. &amp; Non-Priority W/O Waivers Transition Requirements.

**PERMITS INFORMATION**PERMITS INFORMATION

Permit Number.....	100223	Transmittal Number.....	100223
Permit Category.....	BWSC01	Operable Unit No.....	
Permit Primary Rep..	KERR-01		
Name.....			
Permit Approved.....	03/10/98	Extension.....	N
Denied.....		Transfer.....	N
Effective.....	07/27/98	Major Mod.....	N
Expiration.....	07/27/03	Public Comm.....	
Suspended.....		Permit Call.....	N
Revoked.....		Consent Order Date.....	
Reinstated.....		Specific Conditions.....	N
Appealed By ID.....		Name....	
Appeal Date.....			
Result.....			
LSP ID No.....	2062	Name.....	

**HANOVER**  
**4-0000090 FIREWORKS I**  
**FORGE POND/INDUSTRIAL PARK**

a/o.: 12/31/98  
08:38:32

**PERMITS INFORMATION**

**PERMITS INFORMATION**

Permit Number.....	100223	Transmittal Number.....	100223
Permit Category.....	BWSC17	Operable Unit No.....	
Permit Primary Rep.: Name.....	KERR-01		
Permit Approved.....	03/10/98	Extension.....	N
Denied.....		Transfer.....	N
Effective.....	07/27/98	Major Mod.....	N
Expiration.....	07/27/03	Public Comm.....	
Suspended.....		Permit Call.....	N
Revoked.....		Consent Order Date.....	
Reinstated.....		Specific Conditions.....	N
Appealed By ID.....		Name.....	
Appeal Date.....			
Result.....			
LSP ID No.....		Name.....	

**PERMITS INFORMATION**

**PERMITS INFORMATION**

Permit Number.....	100223	Transmittal Number.....	100223
Permit Category.....	BWSC17	Operable Unit No.....	
Permit Primary Rep.: Name.....	KERR-01		
Permit Approved.....		Extension.....	N
Denied.....		Transfer.....	N
Effective.....		Major Mod.....	N
Expiration.....		Public Comm.....	
Suspended.....		Permit Call.....	N
Revoked.....		Consent Order Date.....	
Reinstated.....		Specific Conditions.....	N
Appealed By ID.....		Name.....	
Appeal Date.....			
Result.....			
LSP ID No.....	2062	Name.....	

**TIER CLASSIFICATIONS INFORMATION**

**TIER CLASSIFICATIONS INFORMATION**

NRS Score Total.....	616	Classification.....	TIER 1A
II.....	320	Permit Number.....	
III.....	136	Tier 2 Legal Notice.....	
IV.....	40	UTM Northing.....	4662895
V.....	120	UTM Easting.....	344685
VI.....	0	Longitude.....	
Classification Received.....	10/20/97	Latitude.....	
Date of Notification.....		GPS Verified.....	
Categorical Tier 1.....		LSP Number.....	6039
Categorical Reason.....		Name.....	

RESPONSE ACTION INFORMATION

Submittal is TCLASS on 10/20/97. Notes:

<u>RESPONSE ACTION INFORMATION</u>			
Required Action No.....	5187	Response Action Type.....	
Submittal Date.....10/20/97			
Submittal Type.....	TCLASS	Status.....	
Completion Date.....		RAM Fee Date.....	
LSP Number.....	6039	Submittal No:	1
Submitted By.....	MA IN-05		
RAS NO.....	323	<u>RAM DETAIL</u>	
Code Description.....		EX-OFF Qty.....	0
		EX_ON Qty.....	0
		GW-RS.....	F
		SV-ES.....	F
		OTHER.....	

RESPONSE ACTION INFORMATION

Submittal is PHASEI with a Status of CSRCVD, on 10/20/97. Notes:

<u>RESPONSE ACTION INFORMATION</u>			
Required Action No.....	0	Response Action Type.....	PHASEI
Submittal Date.....10/20/97			
Submittal Type.....		Status.....	CSRCVD
Completion Date.....		RAM Fee Date.....	
LSP Number.....	6039	Submittal No:	2
Submitted By.....	MA IN-05		
RAS NO.....	324	<u>RAM DETAIL</u>	
Code Description.....		EX-OFF Qty.....	0
		EX_ON Qty.....	0
		GW-RS.....	F
		SV-ES.....	F
		OTHER.....	

RESPONSE ACTION INFORMATION

Submittal is LSP-FA with a Status of RECPT, on 10/20/97. Notes:

<u>RESPONSE ACTION INFORMATION</u>			
Required Action No.....	0	Response Action Type.....	LSP-FA
Submittal Date.....10/20/97			
Submittal Type.....		Status.....	RECPT
Completion Date.....		RAM Fee Date.....	
LSP Number.....	6039	Submittal No:	3
Submitted By.....	MA IN-05		
RAS NO.....	325	<u>RAM DETAIL</u>	
Code Description.....		EX-OFF Qty.....	0
		EX_ON Qty.....	0
		GW-RS.....	F
		SV-ES.....	F
		OTHER.....	

HANOVER  
4-0000090 FIREWORKS I  
FORGE POND/INDUSTRIAL PARK

a/o: 12/31/98  
08:38:32

POTENTIALLY  
RESPONSIBLE PARTY  
INFORMATION

Identification No.:	KERR-01	Entity:	CORPORATION
PRP Name:	KERR-MCGEE CHEMICAL LLC	First:	
Attention:		MI:	
Address 1:	KERR-MCGEE CENTER	Title:	
Address 2:		Town:	OKLAHOMA CITY
State:	OK Zip Code:	Phone:	
	73125-	Financial Status:	-
Relation:	P.R.P.		
LTBI NOR:		Conf NOR:	10/20/95
		PRP No:	1

POTENTIALLY  
RESPONSIBLE PARTY  
INFORMATION

Identification No.:	MA IN-05	Entity:	CORPORATION
PRP Name:	MA INSTITUTE OF TECHNOLOGY	First:	
Attention:	PRESIDENT	MI:	
Address 1:	77 MASSACHUSETTS AVE	Title:	
Address 2:		Town:	CAMBRIDGE
State:	MA Zip Code:	Phone:	
	02139-	Financial Status:	-
Relation:	P.R.P.		
LTBI NOR:		Conf NOR:	10/20/95
		PRP No:	2

POTENTIALLY  
RESPONSIBLE PARTY  
INFORMATION

Identification No.:	NATIO-06	Entity:	CORPORATION
PRP Name:	NATIONAL COATING CORPORATION	First:	
Attention:		MI:	
Address 1:	254 BEECH ST.	Title:	
Address 2:		Town:	ROCKLAND
State:	MA Zip Code:	Phone:	(617) 878-2781
	02370-	Financial Status:	-
Relation:	P.R.P.		
LTBI NOR:		Conf NOR:	10/20/95
		PRP No:	3

POTENTIALLY  
RESPONSIBLE PARTY  
INFORMATION

Identification No.:	SESQU-01	Entity:	CORPORATION
PRP Name:	SESQUEHANNA CORP	First:	
Attention:	RICHARD JOHNSTON	MI:	
Address 1:	HALE AND DORR	Title:	ESQ
Address 2:	60 STATE ST	Town:	BOSTON
State:	MA Zip Code:	Phone:	
	02109-	Financial Status:	-
Relation:	P.R.P.		
LTBI NOR:		Conf NOR:	10/20/95
		PRP No:	4

POTENTIALLY  
RESPONSIBLE PARTY  
INFORMATION

Identification No.:	THE C-11	Entity:	CORPORATION
PRP Name:	THE CORPORATE TRUST COMPANY	First:	
Attention:		MI:	
Address 1:	1209 ORANGE STREET	Title:	
Address 2:		Town:	WILMINGTON
State:	DE Zip Code:	Phone:	
	19801-	Financial Status:	-
Relation:	P.R.P.		
LTBI NOR:		Conf NOR:	10/20/95
		PRP No:	5

HANOVER  
4-0000090 FIREWORKS I  
FORGE POND/INDUSTRIAL PARK

a/o.: 12/31/98  
08:38:32

POTENTIALLY  
RESPONSIBLE PARTY  
INFORMATION

Identification No.:	UNITE-23	Entity:	FEDERAL GOVT
PRP Name:	UNITED STATES OF AMERICA	First:	
Attention:	WILLIAM PERRY	MI:	
Address 1:	THE PENTAGON	Title:	SEC OF DEFENCE
Address 2:		Town:	WASHINGTON
State:	DC	Phone:	
Zip Code:	20301-	Financial Status:	
Relation:	P.R.P.		
LTBI NOR:		Conf NOR:	10/20/95
		PRP No.:	6

HISTORICAL MODIFICATIONS TO THE SITE: 1.. On 10/05/98 at 12:14 the field LSP\_NO was modified from 2062 to ..

HISTORICAL MODIFICATIONS TO THE SITE: 2.. On 10/05/98 at 12:14 the field SITE\_STAT was modified from TIER 1A to TIER 1A.

HISTORICAL MODIFICATIONS TO THE SITE: 3.. On 10/05/98 at 12:15 the field SITE\_STAT was modified from TIER 1A to TIER 1A.

HISTORICAL MODIFICATIONS TO THE SITE: 4.. On 10/05/98 at 12:16 the field LSP\_NO was modified from to 2062.

HISTORICAL MODIFICATIONS TO THE SITE: 5.. On 10/05/98 at 12:16 the field SITE\_STAT was modified from TIER 1A to TIER 1A.

HISTORICAL MODIFICATIONS TO THE SITE: 6.. On 09/24/98 at 13:37 the field OLD\_ID was modified from to 4-0000091.

HISTORICAL MODIFICATIONS TO THE SITE: 7.. On 09/21/98 at 10:20 the field SITE\_STAT was modified from TIER 1A to TIER 1A.

HISTORICAL MODIFICATIONS TO THE SITE: 8.. On 09/21/98 at 10:21 the field SITE\_STAT was modified from TIER 1A to TIER 1A.

HISTORICAL MODIFICATIONS TO THE SITE: 9.. On 09/21/98 at 10:22 the field LSP\_NO was modified from to 2062.

HISTORICAL MODIFICATIONS TO THE SITE: 10.. On 09/21/98 at 10:22 the field SITE\_STAT was modified from TIER 1A to TIER 1A.

HISTORICAL MODIFICATIONS TO THE SITE: 11.. On 08/10/98 at 14:21 the field SITE\_STAT was modified from TIER 1A to TIER 1C.

HISTORICAL MODIFICATIONS TO THE SITE: 12.. On 08/10/98 at 14:22 the field SITE\_STAT was modified from TIER 1A to TIER 1A.

HISTORICAL MODIFICATIONS TO THE SITE: 13.. On 04/06/98 at 14:21 the field LSP\_NO was modified from 6039 to ..

HISTORICAL MODIFICATIONS TO THE SITE: 14.. On 04/08/98 at 14:21 the field SITE\_STAT was modified from TIER 1A to TIER 1A.

HISTORICAL MODIFICATIONS TO THE SITE: 15.. On 10/29/97 at 13:29 the field LSP\_NO was modified from to 6039.

HISTORICAL MODIFICATIONS TO THE SITE: 16.. On 10/29/97 at 13:30 the field PHASE was modified from to PHASEII.

HISTORICAL MODIFICATIONS TO THE SITE: 17.. On 09/03/93 at 02:08 the field SITE\_STAT was modified from UNDETERMINED to PENDING.

HISTORICAL MODIFICATIONS TO THE SITE: 18.. On 05/19/93 at 08:33 the field EXPLAIN was modified from \*MCB D01MA0004/D01MA0489? to \*MCB D01MA048900.

HISTORICAL MODIFICATIONS TO THE SITE: 19.. On 03/30/93 at 11:50 the field EXPLAIN was modified from \*GC to \*GC D01MA0004?

HISTORICAL MODIFICATIONS TO THE SITE: 20.. On 03/30/93 at 11:54 the field EXPLAIN was modified from \*GC D01MA0004? to \*GC D01MA0004/D01MA0489?

HISTORICAL MODIFICATIONS TO THE SITE: 21.. On 03/21/90 at 08:41 the field MSCA\_SITE was modified from to YES.

HISTORICAL MODIFICATIONS TO THE SITE: 22.. On 11/13/89 at 12:01 the field STAFF\_LEAD was modified from UNASSIGNED/GC to UNASSIGNED.

HISTORICAL MODIFICATIONS TO THE SITE: 23.. On 11/13/89 at 12:01 the field EXPLAIN was modified from to \*COSTELAS.

HISTORICAL MODIFICATIONS TO THE SITE: 24.. On 11/13/89 at 13:45 the field EXPLAIN was modified from \*COSTELAS to \*GC.

HISTORICAL MODIFICATIONS TO THE SITE: 25.. On 11/08/89 at 13:20 the field STAFF\_LEAD was modified from UNASSIGNED to UNASSIGNED/GC.

HISTORICAL MODIFICATIONS TO THE SITE: 26.. On 10/17/89 at 15:15 the field ADDRESS was modified from FORGE POND IND. PK. to FORGE POND/INDUSTRIAL PARK.

LETTERS INFORMATION

Letter Addressee:	KERR-MCGEE CHEMICAL CORP	Date:	11/09/98
Attention:	RUSSELL JONES	Type:	P.R.P.
Mail Address:	PO BOX 25861	Writer:	HOBILL
Town:	OKLAHOMA CITY	Dept:	SAB
State:	OK		
Zip:	73125-		
		Letter No:	1

Contents	Code	Type of Letter
Primary Purpose:	P2SOW -	Approval of Phase2 Scope of Work

HANOVER  
4-0000090 FIREWORKS I  
FORGE POND/INDUSTRIAL PARK

a/o.: 12/31/98  
08:38:32

LETTERS INFORMATION

Letter Addressee: MIT  
Attention..... THOMAS HENNENBERRY  
Mail Address.... 77 MASS AVE  
Town..... CAMBRIDGE  
State..... MA Zip... 02139-  
Date.: 06/19/98  
Type.: P.R.P.  
Writer.: JABLONSKI  
Dept.: SAB

Letter No: 2

Contents Code Type of Letter

Miscellaneous Purpose.. - PERMIT:DECISION TO GRANT

LETTERS INFORMATION

Letter Addressee: NATIONAL COATING CORP  
Attention..... ERLAND SEAVEY  
Mail Address.... 254 BEECH ST  
Town..... ROCKLAND  
State..... MA Zip... 02370-  
Date.: 06/19/98  
Type.: P.R.P.  
Writer.: JABLONSKI  
Dept.: SAB

Letter No: 3

Contents Code Type of Letter

Miscellaneous Purpose.. - PERMIT:DECISION TO GRANT

LETTERS INFORMATION

Letter Addressee: KERR-MCGEE CHEMICAL CORP  
Attention..... RUSSELL JONES  
Mail Address.... PO BOX 25861  
Town..... OKLAHOMA CITY  
State..... OK Zip... 73125-  
Date.: 06/19/98  
Type.: P.R.P.  
Writer.: JABLONSKI  
Dept.: SAB

Letter No: 4

Contents Code Type of Letter

Miscellaneous Purpose.. - PERMIT:DECISION TO GRANT

LETTERS INFORMATION

Letter Addressee: KERR-MCGEE CHEMICAL CORP  
Attention..... RUSSELL JONES  
Mail Address.... PO BOX 25861  
Town..... OKLAHOMA CITY  
State..... OK Zip... 73125-  
Date.: 03/10/98  
Type.: P.R.P.  
Writer.: JABLONSKI  
Dept.: SAB

Letter No: 5

Contents Code Type of Letter

Miscellaneous Purpose.. - PERMIT:DECISION TO GRANT

LETTERS INFORMATION

Letter Addressee:	KERR-MCGEE CHEMICAL CORP	Date.: 01/06/98
Attention.....:	RUSSELL JONES	Type.: P.R.P.
Mail Address.....:	PO BOX 25861	Writer.: JABLONSKI
Town.....:	OKLAHOMA CITY	Dept.: SAB
State.....: OK	Zip.: 73125-	
		Letter No: 6
<hr/>		
Contents	Code	Type of Letter
Miscellaneous Purpose.: - PERMIT:ADMINISTRATIVE COMPLETENESS		

LETTERS INFORMATION

Letter Addressee:	SUSQUEHANNA CORPORATION	Date.: 11/08/96
Attention.....:	THE CORPORATION TRUST COMPANY	Type.: P.R.P.
Mail Address.....:	1209 ORANGE STREET	Writer.: HOBILL
Town.....:	WILMINGTON	Dept.: SAB
State.....: DE	Zip.: 19801-	
		Letter No: 7
<hr/>		
Contents	Code	Type of Letter
Primary Purpose.....:	NON	- Notice of Noncompliance

LETTERS INFORMATION

Letter Addressee:	ENVIRONMENTAL DEFENSE SECTION	Date.: 11/08/96
Attention.....:	DANIEL DERTKE	Type.: P.R.P.
Mail Address.....:	PO BOX 23986	Writer.: HOBILL
Town.....:	WASHINGTON	Dept.: SAB
State.....: DC	Zip.: 20026-	
		Letter No: 8
<hr/>		
Contents	Code	Type of Letter
Primary Purpose.....:	NON	- Notice of Noncompliance

LETTERS INFORMATION

Letter Addressee:	JOHN WARD	Date.: 08/29/96
Attention.....:		Type.: P.R.P.
Mail Address.....:	22 NEVENS CIRCLE	Writer.: HOBILL
Town.....:	ROCKLAND	Dept.: SAB
State.....: MA	Zip.: 02370-	
		Letter No: 9
<hr/>		
Contents	Code	Type of Letter
Miscellaneous Purpose.: - RESPONSE TO LETTER 07/11/96		



HANOVER  
4-0000090 FIREWORKS I  
FORGE POND/INDUSTRIAL PARK

a/o.: 12/31/98  
08:38:32

LETTERS INFORMATION

Letter Addressee:	MA INSTITUTE OF TECHNOLOGY	Date.: 11/09/95
Attention.....:	OFFICE OF THE PRESIDENT	Type.: P.R.P.
Mail Address.....:	77 MASSACHUSETTS AVE	Writer.: HOBILL
Town.....:	CAMBRIDGE	Dept.: SAB
State.....: MA	Zip.: 02139-	
		Letter No: 10

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Contents	Code	Type of Letter
Primary Purpose.....:	NOR	- Notice of Responsibility, Confirmed

LETTERS INFORMATION

Letter Addressee:	KERR-MCGEE	Date.: 11/09/95
Attention.....:		Type.: P.R.P.
Mail Address.....:	KERR-MCGEE CENTER	Writer.: HOBILL
Town.....:	OKLAHOMA CITY	Dept.: SAB
State.....: OK	Zip.: 73125-	
		Letter No: 11

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Contents	Code	Type of Letter
Primary Purpose.....:	NOR	- Notice of Responsibility, Confirmed

LETTERS INFORMATION

Letter Addressee:	NATIONAL COATING CO	Date.: 11/09/95
Attention.....:		Type.: P.R.P.
Mail Address.....:	254 BEACH ST PO BOX 406	Writer.: HOBILL
Town.....:	ROCKLAND	Dept.: SAB
State.....: MA	Zip.: 02370-	
		Letter No: 12

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Contents	Code	Type of Letter
Primary Purpose.....:	NOR	- Notice of Responsibility, Confirmed

LETTERS INFORMATION

Letter Addressee:	SESQUEHANNA CORP	Date.: 11/09/95
Attention.....:	RICHARD JOHNSTON	Type.: P.R.P.
Mail Address.....:	60 STATE ST	Writer.: HOBILL
Town.....:	BOSTON	Dept.: SAB
State.....: MA	Zip.: 02109-	
		Letter No: 13

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Contents	Code	Type of Letter
Primary Purpose.....:	NOR	- Notice of Responsibility, Confirmed

LETTERS INFORMATION

Letter Addressee:	UNITED STATES OF AMERICA	Date.: 11/09/95
Attention.....:	SECRETARY OF DEFENCE	Type.: P.R.P.
Mail Address.....:	THE PENTAGON	Writer.: HOBILL
Town.....:	WASHINGTON	Dept.: SAB
State.....: DC	Zip.: 20301-	
		Letter No: 14

---

Contents	Code	Type of Letter
Primary Purpose.....:	NOR	- Notice of Responsibility, Confirmed

LETTERS INFORMATION

Letter Addressee:	MA INSTITUTE OF TECHNOLOGY	Date.: 10/20/95
Attention.....:	OFFICE OF THE PRESIDENT	Type.: P.R.P.
Mail Address.....:	77 MASSACHUSETTS AVE	Writer.: HOBILL
Town.....:	CAMBRIDGE	Dept.: SAB
State.....: MA	Zip.: 02139-	
		Letter No: 15

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Contents	Code	Type of Letter
Primary Purpose.....:	NOR	- Notice of Responsibility, Confirmed

LETTERS INFORMATION

Letter Addressee:	KERR-MCGEE	Date.: 10/20/95
Attention.....:		Type.: P.R.P.
Mail Address.....:	KERR-MCGEE CENTER	Writer.: HOBILL
Town.....:	OKLAHOMA CITY	Dept.: SAB
State.....: OK	Zip.: 73125-	
		Letter No: 16

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Contents	Code	Type of Letter
Primary Purpose.....:	NOR	- Notice of Responsibility, Confirmed

LETTERS INFORMATION

Letter Addressee:	NATIONAL COATING CO	Date.: 10/20/95
Attention.....:		Type.: P.R.P.
Mail Address.....:	254 BEACH ST PO BOX 406	Writer.: HOBILL
Town.....:	ROCKLAND	Dept.: SAB
State.....: MA	Zip.: 02370-	
		Letter No: 17

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Contents	Code	Type of Letter
Primary Purpose.....:	NOR	- Notice of Responsibility, Confirmed

**HANOVER**  
**4-0000090 FIREWORKS I**  
**FORGE POND/INDUSTRIAL PARK**

a/o.: 12/31/98  
08:38:32

**LETTERS INFORMATION**

Letter Addressee:	<b>SESQUEHANNA CORP</b>	Date:	<b>10/20/95</b>
Attention.....:	<b>RICHARD JOHNSTON</b>	Type..:	<b>P.R.P.</b>
Mail Address.....:	<b>60 STATE ST</b>	Writer..:	<b>HOBILL</b>
Town.....:	<b>BOSTON</b>	Dept.:	<b>SAB</b>
State.....:	<b>MA</b>	Zip..:	<b>02109-</b>
Letter No: <b>18</b>			

Contents	Code	Type of Letter
Primary Purpose.....:	<b>NOR</b>	<b>- Notice of Responsibility, Confirmed</b>

**LETTERS INFORMATION**

Letter Addressee:	<b>UNITED STATES OF AMERICA</b>	Date:	<b>10/20/95</b>
Attention.....:	<b>SECRETARY OF DEFENCE</b>	Type..:	<b>P.R.P.</b>
Mail Address.....:	<b>THE PENTAGON</b>	Writer..:	<b>HOBILL</b>
Town.....:	<b>WASHINGTON</b>	Dept.:	<b>SAB</b>
State.....:	<b>DC</b>	Zip..:	<b>20301-</b>
Letter No: <b>19</b>			

Contents	Code	Type of Letter
Primary Purpose.....:	<b>NOR</b>	<b>- Notice of Responsibility, Confirmed</b>

**LETTERS INFORMATION**

Letter Addressee:	<b>HANOVER BOARD OF SELECTMEN</b>	Date:	<b>08/30/95</b>
Attention.....:	<b>ROBERT NYMAN</b>	Type..:	<b>TOWN OFFIC</b>
Mail Address.....:	<b>TOWN HALL</b>	Writer..:	<b>HOBILL</b>
Town.....:	<b>HANOVER</b>	Dept.:	<b>SAB</b>
State.....:	<b>MA</b>	Zip..:	<b>02339</b>
Letter No: <b>20</b>			

Contents	Code	Type of Letter
Miscellaneous Purpose...:	<b>-</b>	<b>SECURITY</b>

**LETTERS INFORMATION**

Letter Addressee:	<b>FIREWORKS I</b>	Date:	<b>07/23/93</b>
Attention.....:	<b>FORGE POND/INDUSTRIAL PAR</b>	Type..:	<b>P.R.P.</b>
Mail Address.....:	<b>HANOVER</b>	Writer..:	<b>TRANSITION</b>
Town.....:	<b>HANOVER</b>	Dept.:	<b>SAB</b>
State.....:	<b>MA</b>	Zip..:	<b>02339</b>
Letter No: <b>21</b>			

Contents	Code	Type of Letter
Primary Purpose.....:	<b>TR-NP</b>	<b>- LTBI, Unclass. &amp; Non-Priority W/O Waivers</b>
Miscellaneous Purpose...:	<b>-</b>	<b>LTBI TRANSITION LETTER</b>

**HANOVER**  
**4-0000090 FIREWORKS I**  
**FORGE POND/INDUSTRIAL PARK**

a/o.: 12/31/98  
08:38:32

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**HANOVER**  
**4-0000090 FIREWORKS I**  
**FORGE POND/INDUSTRIAL PARK**

Total Waiver Applications...	0
Total Required Actions...	1
Total Permits...	3
Total Potentially Responsible Parties...	6
Total Response Actions...	3
Total Tier Classifications...	1
Total Letters sent out by the Department...	21
Total Short Term Measures...	0
Total Historical Modifications to the Site...	26

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««« END OF REPORT »»»

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Commonwealth of Massachusetts  
Executive Office of Environmental Affairs

**Department of  
Environmental Protection**  
Southeast Regional Office

RECEIVED

MAR 21 1994

William F. Weld  
Governor

Trudy Cox  
Secretary, ECEA

Thomas B. Powers  
Acting Commissioner

BUREAU OF WASTE SITE CLEANUP

FAX COVER SHEET

FAX # (508) 947-6557

TELEPHONE # (508) 946-2700

DATE: 3/18/94 FROM: Jon Hill

PLEASE DELIVER TO: Albe Simenas

COMPANY NAME: DEP - BWSC - Fed Fac

ADDRESS: 1 Winter Street  
Boston

TELECOPIER NUMBER: \_\_\_\_\_

TOTAL NUMBER OF PAGES: 6 (INCLUDING THIS COVER PAGE)

PLEASE CALL IF YOU DO NOT RECEIVE A COMPLETE FAX.

REMARKS: Re: Fireworks - Hanover

This is all I can find

JA

C-583-12-6-15

MEMO TO: DON SMITH  
DECEMBER 8, 1986-PAGE FIVE

In May 1975, two students of the South Shore Vocational Technical High School reportedly brought a rocket type projectile to school which they had dug up at the Fireworks I complex (exact location unknown) (14). The projectile was identified as a M-81 mortar shell that was subsequently determined to be inert and harmless (15). This discovery sparked concern about the potential for more, possibly live, shells being buried onsite.

Around 1983 (exact date unknown) a large portion of the Fireworks I property was purchased by P.A. Landers Inc., a private developer with the intent of developing the area into an office park. Shortly after the purchase, excavation of the area began.

The EPA became involved with the two properties in December 1983 following a letter from the Hanover Conservation Commission. The letter identified two areas of concern, Fireworks I (located east of King Street) and Fireworks II (located west of King Street) (16). As a result of this letter, the EPA requested that Preliminary Assessments be conducted at both locations by NUS Corporation in April 1984.

In July 1985, a site sketch prepared by the Atlantic Research Corporation, identifying several areas of waste disposal was discovered by a resident of Hanover. Two disposal areas identified on the site sketch were labeled "MIT Waste, Deep Pit" and "Buried Radioactive Waste, 4 Feet Cover June 1961" (17). The identification of these two disposal areas and the proposed development of a large portion of the property by P.A. Landers, Inc. aroused further concern by the Town of Hanover and the Hanover Conservation Commission. Subsequently, the EPA requested that NUS Corporation conduct a Site Inspection at the facility to determine if contamination does exist onsite and if so, to assess the potential impact to the surrounding environment. Surface water, sediment and soil samples were collected on and adjacent to the Fireworks I property. A large portion of the area identified as Fireworks II/Sevigny Candy property has undergone extensive residential development within the last year, therefore, samples were not collected at this location. Rad

#### TECHNICAL APPROACH

On Tuesday and Wednesday, July 15 and 16, NUS/FIT personnel and EPA RSPO, Susan Svirskey, conducted a site visit and sampling round at the Fireworks property in Hanover, Massachusetts. This task included a site reconnaissance and the collection of surface water, sediment and surface soil samples.

C-583-12-6-15

MEMO TO: DON SMITH  
DECEMBER 8, 1986-PAGE SEVEN

Nine sediment grab samples were also collected from the surface water bodies on and adjacent to the property. The sediment samples were collected from the upper six inches of sediment below the surface water. These samples were analyzed by an NUS/FIT chemist for inorganics and polychlorinated biphenyl (PCB) compounds.

A total of 12 surface soil grab samples were collected from both on and offsite locations. The soil samples were collected 6 to 12 inches below the ground surface. Four of these samples were collected for radiation analysis to be conducted through the EPA Contract Laboratory Program (CLP) by Accu-Labs Research of Wheat Ridge, Colorado. These samples were collected in the vicinity of the buried radioactive waste area identified on a site sketch prepared by Atlantic Research Corporation (1980) and pointed out to NUS/FIT by Steve Tucker during the site reconnaissance. The remaining eight soil samples were collected throughout the site from various disposal areas (Figure 3). These samples were analyzed in-house by an NUS/FIT chemist for inorganics and PCB compounds.

Rad

#### MIGRATION PATHWAYS

##### GROUNDWATER ROUTE

Groundwater is an important resource for Hanover and the surrounding communities. However, NUS/FIT was unable to properly assess groundwater quality in the vicinity of the Fireworks property due to the absence of sampling points (i.e., monitoring wells). However, surficial soil samples were collected to assist in determining the potential impact of the disposal areas to groundwater quality. The analytical results of the soil samples are presented later in this report.

The surficial geology of the Hanover area consists primarily of sand and gravel deposits laid down during the glaciation of southeastern Massachusetts. The major portion of the overburden consists of coarse sand and gravel. The remaining geologic deposits are composed of fine to medium sand or till. The till deposits consist of unsorted and unstratified sand, gravel, silt and cobbles. Glacial remnants such as kames, eskers and outwash plains are abundant in this region. Post glacial deposits consist of alluvium deposited adjacent to streams

C-583-12-6-15

MEMO TO: DON SMITH  
DECEMBER 8, 1986-PAGE TWELVE

The remaining four soil samples were analyzed for radiation through the EPA Contract Laboratory Program. The background sample (RS-01) was collected from the same location as SS-01 at the end of Russel Road. The other three samples (RS-02, RS-02R and RS-03) were collected from the radioactive waste disposal area. Results of this analysis will be incorporated into the final report upon completion of CLP data validation.

#### SURFACE WATER ROUTE

The surface water migration pathway is the most probable route of contaminant migration from the property. To identify possible areas of contamination and to characterize this pathway, NUS/FIT collected 14 samples from surface water bodies on and adjacent to the property.

The surface water samples were screened in-house by an NUS/FIT chemist for the presence of inorganic (metal) and volatile organic compounds (Tables IV and V respectively). Surface water samples were collected from the Drinkwater River (SW-01), Torrey Brook (SW-03), Forge Pond (SW-02) and an unnamed brook (SW-06) upstream of the Fireworks property (Figure 3). No volatile organic compounds were detected in these four upstream samples.

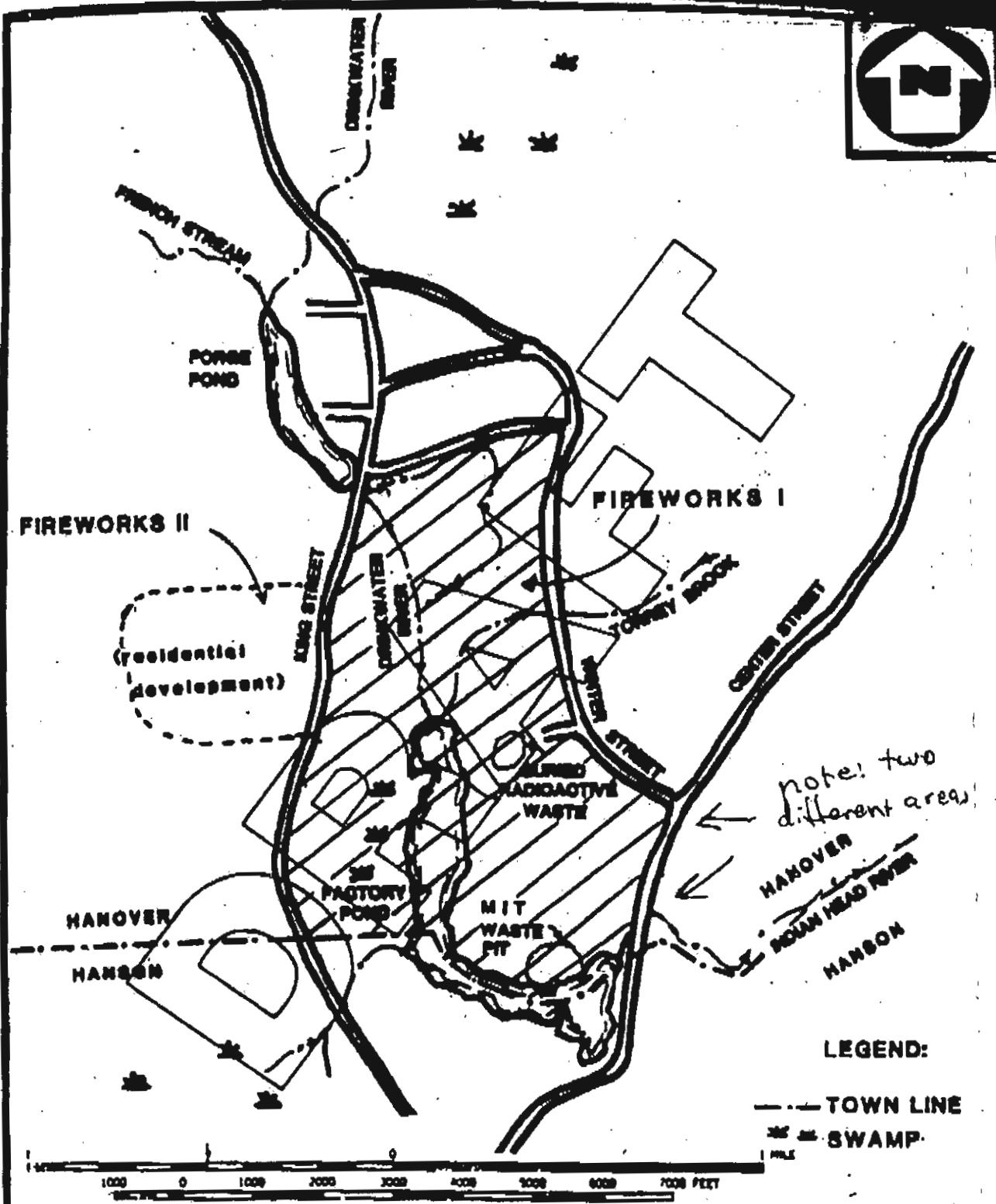
Volatile organic analysis of other surface water samples collected during the site visit indicated the presence of several compounds. The standing water in the MIT Waste Pit is the surface water body with the highest concentrations and abundance of volatile organic contamination onsite. Two surface water samples were collected from the MIT Waste Pit. Sample SW-11 was collected from the north side while sample SW-13 was collected from the south side of the waste pit. Trichloroethene, benzene, toluene, and tetrachloroethene were identified in SW-11 at concentrations below 25 ppb (Table V). The sample container for SW-13 was broken during transportation to the laboratory and therefore SW-13 was not analyzed for volatile organic compounds.

Volatile organic contamination was also detected in surface water samples collected from Factory Pond. Analysis of sample SW-07, collected from Factory Pond opposite the MIT Waste Pit, revealed the presence of toluene at 6 ppb. This is a possible indication of contaminant migration from the MIT Waste Pit into Factory Pond. Another sample collected from the northern end of

No final report is  
in the file.



- E. Correspondence December 29, 1967 to: Allan A. Carnes (Hanover Board of Selectman) from: Lawrence Slaney (Hanover Chief Engineer).
11. Correspondence August 29, 1974 to: Susquehanna Properties, Inc. Alexandria, VA from: Paul N. Litchfield (Hanover Building Inspector).
12. Correspondence September 20, 1974 to Hanover Board of Selectman from: Paul Litchfield (Hanover Building Inspector).
13. Correspondence November 19, 1974 to: Hanover Board of Selectman from: Paul Litchfield (Hanover Building Inspector).
14. Correspondence May 21, 1975 to: Hanover Conservation Commission from: David G. Zwicker (Hanover Police Chief).
15. Correspondence May 23, 1975 to: Donald Rogers (Hanover Conservation Commission) from: Lawrence E. Slaney (Hanover Fire Chief).
16. Correspondence December 8, 1983 to: John Hackler (Site Response, Waste Management Division U.S. EPA Boston, MA) from: Jerome D. Cohen (Chairman Hanover Conservation Commission).
- 17. Plot Plan Atlantic Research Corporation, Phase - Northern Division. West Hanover, Massachusetts Revised April 1, 1968.
18. Surficial geologic map of the Hanover Quadrangle Plymouth County, MA (map GQ-633) USGS 1967.
19. Surficial geologic map of the Whitman Quadrangle Plymouth County, MA (Map GQ-632) USGS 1967.
20. Water Resources of the Coastal Drainage Basins of Southeastern Massachusetts, Weir River, Hingham, to Jones River, Kingston (Hydrologic Investigations Atlas HA-504) USGS 1974.
21. Bedrock Geologic Map of Massachusetts prepared by the USGS in cooperation with the commonwealth of Massachusetts Department of Public Works and Joseph A. Sinnott, State Geologist. 1983.
22. The North River Basin 1983 Water Quality Analysis (draft) Richard S. Dorfman, Senior Sanitary Engineer. Massachusetts Division of Water Pollution Control, DEQE. Westborough, Massachusetts. June 1986.
23. Teleconference July 28, 1986 between Annette Sexton (Town Selectperson) and Robert Ross (NUS/FIT).
24. Teleconference July 28, 1986 between Richard Phillips (Hanson Assessors office) and Robert Ross (NUS/FIT).



SITE SKETCH  
FIREWORKS  
HANOVER, MA

**NUS**  
CORPORATION

A Halliburton Company

FIGURE 2

Jon Hobbs, SERO BWSC Reg Engr

1150

1/20/99

National Fireworks Site, Hanover (MA 0489)

Jon is working on a related site in Randolph:  
National Fireworks Loading Ramp Site. Site is not  
a FUDS, rather a LOGO which will be  
processed using funding obtained via a Dept  
of Justice lawsuit. (apparently site was used  
under Warpowers Act  $\Rightarrow$  federal responsibility).

The loading ramp site was used in WWII.  
elevated levels of Hg, Pb are present in North  
River sed.



DEPARTMENT OF THE ARMY

ST. LOUIS DISTRICT, CORPS OF ENGINEERS  
1222 SPRUCE STREET  
ST. LOUIS, MISSOURI 63103-2833

REPLY TO  
ATTENTION OF:

CELMS-PM-M (200-1c)

14 Mar 94

MEMORANDUM FOR Commander, U.S. Army Engineer Division,  
New England, ATTN: CENED-PD-L, 424 Trapelo Rd.,  
Waltham, MA 02154-9149

SUBJECT: Defense Environmental Restoration Program for Formerly  
Used Defense Sites (DERP-FUDS), Chemical Warfare Materials,  
Archives Search Report (ASR), National Fireworks Site, West  
Hanover, MA, #D01MA048900

1. The subject ASR is forwarded, per the request of Huntsville  
Division, (CEHND) for your information. It is subject to change  
based on their review.

2. The POC for this site is Tom Freeman, (314) 331-8785.

FOR THE COMMANDER:

Encl

WILLIAM R. SUTTON  
Chief, Project Management  
Branch

CF:  
SFIL-NSM  
AMSCB-CIL