

**Per the Federal Facility Agreement for Iowa Army Ammunition Plant, Article X.B.1, the attached document is the final version of the submitted document.**

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**ACTION MEMORANDUM  
FOR THE PESTICIDE PIT  
AT THE  
IOWA ARMY AMMUNITION PLANT  
MIDDLETOWN, IOWA**



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CDM FEDERAL PROGRAMS CORPORATION  
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**MISCELLANEOUS MILITARY/CIVIL HTW PROJECTS  
FOR  
U. S. ARMY CORPS OF ENGINEERS  
OMAHA DISTRICT**

**ACTION MEMORANDUM  
FOR THE PESTICIDE PIT  
AT THE  
IOWA ARMY AMMUNITION PLANT  
MIDDLETOWN, IOWA**

**CONTRACT NO. DACW45-93-D-0004  
Delivery Order No. 012**

**Prepared by:**

**CDM Federal Programs Corporation  
8215 Melrose Drive, Suite 100  
Lenexa, Kansas 66214**

**March 20, 1995**



CDM FEDERAL PROGRAMS CORPORATION  
a subsidiary of Camp Dresser & McKee Inc.

March 20, 1995

Sharon Lehn - CEMRD-ED-EA  
Department of the Army  
Corps of Engineers, Omaha District  
215 N. 17th Street  
Omaha, Nebraska 68102-4978

ATTN: CEMRD-ED-EA

Project: Contract No. DACW45-93-D-0004  
Subject: Action Memorandum for the Pesticide Pit at Iowa Army Ammunition Plant,  
Middletown, Iowa

Dear Ms. Lehn:

CDM Federal Programs Corporation (CDM Federal) is pleased to provide copies of the subject document which incorporates the comments made by the U. S. EPA Region VII in reference to the draft Action Memorandum for the Pesticide Pit dated March 7, 1995. Individuals on the Distribution List in the Scope of Work dated May 23, 1994, were also provided copies. Enclosed with the copies is a facsimile of the letter Leon Baxter of the Iowa Army Ammunition Plant is sending to Scott Marquess.

If you have any questions regarding this Action Memorandum, please contact me at (913) 492-8181.

Sincerely,

CDM FEDERAL PROGRAMS CORPORATION

Stephen P. Birchmeier, P.E.  
Project Manager

Enclosures

cc: L. Baxter - IAAP  
D. Romitti - AEC  
S. Marquess - EPA Region VII  
K. Preston, PhD - COE  
J. Vedder - IDNR  
J. Kang - AMCCOM  
T. Howard - AMCCOM  
W. Koski - CDM Federal  
6102-012  
RF

EECA.320



DEPARTMENT OF THE ARMY  
IOWA ARMY AMMUNITION PLANT  
17371 STATE HIGHWAY 79  
MIDDLETOWN, IOWA 52638-5000



REPLY TO  
ATTENTION OF:

March 20, 1995

Plant Protection

U.S. Environmental Protection Agency, Region VII  
Attn: Mr. Scott Marquess  
Waste Management Division  
726 Minnesota Avenue  
Kansas City, Kansas 66101

Dear Mr. Marquess:

Reference Interagency Agreement (IAG) with the Iowa Army Ammunition Plant (IAAP), Section XIV effective December 10, 1990 and IAAP Resource Conservation and Recovery Act Part B permit, Section VIII.E.1. effective December 16, 1989.

We are submitting our Action Memorandum (AM) for the Pesticide Pit Removal at Iowa Army Ammunition Plant, Middletown, Iowa. This AM incorporates EPA's comments received March 15, 1995. With the submittal of this memorandum we are requesting permission to proceed with the removal. The Corps of Engineers have their contractor (OEM) currently on site with plans to start excavation on March 20, 1995.

If you have any questions, please contact Mr. Leon Baxter or Mr. Rodger Allison, Plant Protection, (319) 753-7130.

Sincerely,

Leon D. Baxter  
Chief Engineer

Enclosures

Copies Furnished (with enclosures):

Cdr, AMCCOM, ATTN: AMSMC-GCS, Rock Island, IL 61299-6000  
Cdr, AMCCOM, ATTN: AMSMC-EQE (Mr. Tim Howard), Rock Island, IL 61299-6000  
Cdr, USAEC, ATTN: SFIM-AEC-IRA, (Mr. Derek Romitti), Aberdeen Proving Ground, MD 21020-5401  
Mason & Hanger-Silas Mason Co., Inc., IAAP  
Director, Iowa Department of Natural Resources,  
ATTN: Mr. John Vedder, 900 E Grand, Wallace Office Building, Des Moines, IA 50319-0034

**ACTION MEMORANDUM  
FOR THE  
PESTICIDE PIT REMOVAL  
AT THE IOWA ARMY AMMUNITION PLANT**

**1.0 PURPOSE**

This Action Memorandum serves as the primary decision document supporting a non-time-critical removal action at the Pesticide Pit at the Iowa Army Ammunition Plant (IAAP) near Middletown, Iowa. This Action Memorandum identifies the proposed action and explains the rationale for the removal. The purpose of the removal action is to prevent any potential future releases from the Pesticide Pit due to high concentrations of highly toxic and highly persistent wastes contained therein.

The subject removal action will be performed in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). It will also be performed in accordance with the terms of the IAAP Federal Facility Agreement (FFA) and pursuant to Executive Order 12580.

The action will be funded by the Defense Environmental Restoration Account (DERA) through the Army's Installation Restoration Program (IRP).

**2.0 SITE CONDITIONS AND BACKGROUND**

The IAAP is in Des Moines County, Iowa near the city of Middletown. The IAAP began production in 1941 and is still in operation. The IAAP encompasses 19,127 acres. The IAAP is a Government-Owned, Contractor-Operated installation under the command of the U. S. Army Armament, Munitions, and Chemical Command, Rock Island, Illinois. The onsite contractor is Mason and Hanger-Silas Mason Company Inc.

The plant is still active in the operations to load, assemble, and pack ammunition items, including: projectiles, mortar rounds, warheads, demolition charges, anti-tank mines, and anti-personnel

mines. Components of these munitions are also handled at the facility, including: primers, detonators, fuses, and boosters. The loading, assembling, and packaging operations use lead-based initiating compounds and explosive materials (JAYCOR 1993).

Typical maintenance activities at IAAP have included the standard use of commercial pesticides and herbicides at various locations throughout the installation. This Action Memorandum addresses the removal, offsite incineration, and disposal of approximately 27 cubic yards of contaminated soils created by past disposal methods for some pesticides/herbicides used in those maintenance activities.

## **2.1 SITE DESCRIPTION**

### **2.1.1 REMOVAL SITE EVALUATION**

The Pesticide Pit was in operation between 1968 and 1974 and was used for the disposal of small quantities of insecticides and herbicides. There are no known records available to estimate the quantity of herbicides and insecticides disposed of in this pit. The site is located approximately 25 feet east of the Winnebago School House (Bldg. 500-30-6) on an upland terrace surrounded by agricultural fields. The school house is currently vacant and has historic significance. The Pesticide Pit is a small plywood structure (8' x 8' x 3') lined with limestone and polyester resin geomembrane. The pit was capped with clay, of unknown thickness, during the late 1970s to early 1980s. However, the integrity of the structure presently containing these wastes is somewhat questionable. The area is currently enclosed by a cyclone fence (45' x 60') to restrict access, and the site surface is covered with vegetation, including trees. There are no known utilities in the immediate area, however, this will need to be verified before any excavation activities begin at the site.

### **2.1.2 PHYSICAL LOCATION**

The Pesticide Pit is located in the central portion of the 19,127-acre IAAP installation. The nearest major population center is Burlington, Iowa. Attached Figures 1-1, 1-2, and 1-3 show the

relative location of the IAAP within the State of Iowa and the location of the Pesticide Pit within the IAAP installation boundaries. There are no known sensitive populations near the Pesticide Pit.

### 2.1.3 SITE CHARACTERISTICS

The site is immediately underlain by fill material consisting of silty clay. Windblown nonstratified silts and clays (loess) are located beneath the material. Underlying the loess is the Kellersville Till member of the Glasford Formation, a glacial till consisting of clay and silt. Shallow flow exists, in the drift aquifer, due to the presence of a more permeable loess over the less permeable till units. Surface water from the pesticide pit area flows in a northeast direction to an intermittent stream that, in turn, flows approximately one-half mile east to Brush Creek (JAYCOR 1993).

### 2.1.4 RELEASE OR THREATENED RELEASE INTO THE ENVIRONMENT OF A HAZARDOUS SUBSTANCE, POLLUTANT, OR CONTAMINANT

Although the integrity of the Pesticide Pit is not known, samples collected during the 1989 Preliminary Site Characterization and 1992 Remedial Investigation showed the presence of pesticide contamination. A soil sample collected at a depth of 1.5 feet, immediately adjacent to the pit (reference sample location SA-17 shown on attached Figure 1-3), showed high levels of several pesticides at levels noted below:

4,4'-DDD . . . . .	1,220 $\mu\text{g/g}$
4,4'-DDT . . . . .	78.2 $\mu\text{g/g}$
4,4'-DDE . . . . .	20,500 $\mu\text{g/g}$
Endrin . . . . .	1,390 $\mu\text{g/g}$
Alpha-chlordane . . . . .	887 $\mu\text{g/g}$
Gamma-chlordane . . . . .	648 $\mu\text{g/g}$
Heptachlor . . . . .	283 $\mu\text{g/g}$

A soil sample taken at a depth of 5.5 feet at the same location did not show the presence of any pesticide contaminant. No other soil samples collected at the Pesticide Pit showed significant amounts of pesticides.



Measurements in four temporary piezometers surrounding the Pesticide Pit showed the groundwater depth at the site to vary between 2.9 feet and 14.7 feet below ground surface (reference sample locations PZ-21, PZ-22, PZ-23, and PZ-24 shown on attached Figure 1-3). Although generalized groundwater flow at the IAAP is to the south and southeast, shallow groundwater flow at the Pesticide Pit site is north/northeast towards a tributary of Brush Creek (due to topographic controls). Table 2-1 shows groundwater sampling results from the four piezometers surrounding the Pesticide Pit.

**TABLE 2-1  
Groundwater Sampling at the Pesticide Pit**

<i>Parameter (µg/L)</i>	<i>Sample Location</i>			
	<i>PZ-21</i>	<i>PZ-22</i>	<i>PZ-23</i>	<i>PZ-24</i>
Aluminum	27,000	15,400	188,000	700,000
Antimony	48.4		78.9	61.7
Arsenic	5.65	5.54		
Barium				5,770
Beryllium			18.0	63.2
Cadmium				7.22
Calcium			906,000	1,280,000
Chromium	692		308	1,010
Cobalt			179	464
Copper	27.6	24.3	334	847
Iron	38,200	33,700	369,000	938,000
Lead	175		72.5	239
Magnesium	41,700		355,000	511,000
Manganese	582		6,980	14,000
Nickel			477	7,140
Potassium	5,070	2,950	29,900	36,400
Vanadium	74.2	45.7	503	1,660
Zinc			939	2,450
4-Methylphenol				8.8

While no pesticides were detected in groundwater sampling, metals were found in groundwater at levels exceeding MCLs. Since many metals are found in pesticide formulations and since soil samples obtained from within the pit were not analyzed for metals, the Pesticide Pit has not been dismissed as a possible source for the elevated metals levels found in groundwater near the site.

The Pesticide Pit is lined and capped; however, the below-surface condition of the pit is unknown. It appears that no migration of the pesticide residues from surficial soil has occurred. The site is surrounded by cultivated agricultural fields. There is no residential, industrial or commercial land in use in the immediate area. The potential routes of exposure are:

- Ingestion of groundwater impacted from the possible leaching of soil contaminants if the Pesticide Pit liner is breached.
- Ingestion of water from Brush Creek, which intercepts surface water or overland flow from the site, if the cap is compromised.
- Ingestion, inhalation, or dermal absorption of windblown contaminated soil if the cap is compromised.

#### **2.1.5 NPL STATUS**

The Iowa Army Ammunition Plant was included on the National Priority List on August 22, 1990. The notice of placement was published in the Federal Register dated August 30, 1990.

#### **2.1.6 MAPS, PICTURES, AND OTHER GRAPHICAL REPRESENTATION**

Figures from the EE/CA, depicting the Pesticide Pit location and sample locations, are included as Attachments to this Action Memorandum. Figures 1-1, 1-2, and 1-3 show the location of the IAAP within the State of Iowa and the location of the Pesticide Pit within the IAAP installation boundaries. Figure 1-3 also illustrates soil and groundwater sampling locations associated with previous investigations at the Pesticide Pit site.

#### **2.2 OTHER ACTION**

The only remedial action to date at the Pesticide Pit has been the capping of the pit and enclosure of the area with a security fence during the late 1970s to early 1980s. No further remedial or disposal activity is currently being done at the Pesticide Pit.

## **2.3 STATE AND LOCAL AUTHORITIES ROLE**

The role of state and local authorities at this site has been minimal. Since remediation of the Pesticide Pit is being addressed under CERCLA authority, the state and local authorities have deferred to the Environmental Protection Agency (Region VII) to provide regulatory oversight for the subject removal action. It may be noted that the purpose of the FFA is to provide a procedural framework for implementing CERCLA and RCRA Corrective Action requirements and to facilitate cooperation and communication among the FFA signatories (i.e., between the Army and EPA). The State of Iowa has declined to participate in the agreement in a formal manner. However, the IAAP is providing copies of relevant FFA primary and secondary documents to the Iowa Department of Natural Resources (IDNR) for informational purposes.

## **3.0 THREATS TO PUBLIC HEALTH OR WELFARE OR THE ENVIRONMENT, AND STATUTORY AND REGULATORY AUTHORITIES**

### **3.1 THREATS TO PUBLIC HEALTH OR WELFARE**

Current human health risks attributable to the Pesticide Pit site are limited due to the absence of current exposure routes. However, the nature of exposures at the site may change in the future based on potential land use changes. The nature of releases/exposures at the site is also subject to change based on the integrity of the containment facility.

Contaminant migration from the soil into the groundwater is possible, but it is limited by the significant clay content of the parent material, which has a permeability of only (approximately)  $10^{-8}$  cm/sec.

The potential of windblown dust being generated from the areas surrounding the Pesticide Pit is currently minimal. The Pesticide Pit is capped with soil, thereby protecting it from wind. The soil surrounding the Pesticide Pit is covered by vegetation, providing additional protection from wind erosion. Furthermore, no surficial contamination has been detected at the site. Dust generated during removal activities will be controlled as discussed in the USACE contractor's Work Plan.

### **3.2 THREATS TO THE ENVIRONMENT**

There are currently no serious threats to the environment from the contaminated soils at the Pesticide Pit, due to the absence of current exposure routes (and due to the low-permeability soils at the site). However, as stated already, the nature of exposures at the site may change in the future based on the integrity of the containment facility and due to potential land use changes. Also, unacceptable groundwater risks due to metals contamination may be attributable to the site and could pose a threat to potential future groundwater receptors.

### **4.0 ENDANGERMENT DETERMINATION**

Actual or threatened releases of hazardous substances from this site, if not addressed by implementing the response action selected in this Action Memorandum, may potentially impact public health or welfare or the environment.

### **5.0 PROPOSED ACTIONS AND ESTIMATED COSTS**

#### **5.1 PROPOSED ACTION**

The removal action at the Pesticide Pit will be accomplished by excavation of soils contaminated at levels exceeding remediation goals, hauling, offsite incineration at a permitted facility, and disposal of residual ash at a permitted offsite landfill. The selected offsite facility will be able to handle the ash so as to avoid excess transportation and disposal cost.

##### **5.1.1 CONTRIBUTION TO REMEDIAL PERFORMANCE**

The subject removal of contaminated soil from the Pesticide Pit will further reduce the pathways that potentially pose a threat to human health and the environment by eliminating a significant potential source area from any future releases to the environment. Since the soils which are contaminated at levels exceeding risk-based remediation goals are to be removed, no further actions to address soil contamination at the Pesticide Pit site are anticipated. However,

groundwater remediation, due to potential releases from the Pesticide Pit, may be required. The need for further response actions at the Pesticide Pit, beyond that which is to be accomplished in the subject removal action, will be assessed in the Feasibility Study (FS) reports for the soil and groundwater operable units.

In accordance with the technical requirements and treatment standards of 40 CFR 264 Subpart O or Part 265 Subpart O, the best demonstrated available technology (BDAT) available for the treatment of pesticides, is incineration. With the availability of offsite incinerators and the resulting elimination of mobilization and treatability costs, incineration is the most viable treatment option.

### **5.1.2 DESCRIPTION OF ALTERNATIVE TECHNOLOGIES**

Various technologies were proposed in the EE/CA for the treatment of pesticide contaminated soil. Those technologies include bioremediation, chemical treatment, soil washing, solvent extraction, thermal desorption, incineration and vitrification. Except for offsite incineration, all other treatment technologies require the expense of mobilization or treatability studies before implementation. With the low volume of contaminated soil to be treated (27 cubic yards), the most viable and cost-effective method of treating the contaminated soil is by offsite incineration, which has repeatedly been proven to be an effective technology.

### **5.1.3 ENGINEERING EVALUATION/COST ANALYSIS (EE/CA)**

An EE/CA supporting this Action Memorandum was completed in the fall of 1994. The EE/CA provides additional details regarding the subject removal action and the alternatives which have been considered. It is available for public review, as part of the official administrative record, at the Burlington Public Library, the Danville City Hall, and the Administration Building of the IAAP. A press release was published on September 19, 1994, advising the public of the availability of the EE/CA document and soliciting public comment. The public comment period ended October 30, 1994. There were no public comments received on the EE/CA for the subject removal action.

#### 5.1.4 APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARS)

Risk-based remediation goals (RGs) for soil cleanup have been established for the subject removal action. These RGs, listed in the following table, utilize the Risk-Based Concentration Levels published by EPA Region III for a commercial land-use scenario. The contaminated materials associated with this removal action are considered RCRA hazardous wastes.

EPA Region III Risk-Based Concentrations	
	<i>Commercial (mg/kg)</i>
DDD	12.0
DDT	8.4
DDE	8.4
Endrin	310.0
Chlordane	2.2
Heptachlor	0.64

Remediation goals (RGs) were calculated for an estimated excess cancer risk of greater than 1E-06 and/or the hazard index (HI) is greater than 1E+00. RGs were calculated by rearranging the equations used for the risk calculations at the site:

$$\text{Cancer Risk} = C \times \text{HIF} \times \text{SF}$$

and

$$\text{HQ} = C \times \text{HIF}/\text{RfD}$$

where:

- C = concentration of a chemical in a medium
- HIF = human intake factor
- SF = slope factor
- RfD = reference dose
- HQ = hazard quotient

To calculate the concentration of each chemical in each medium associated with a particular risk level or HQ, the following equations were used:

$$C = \text{Target Cancer Risk}/(\text{HIF} \times \text{SF})$$

and

$$C = \text{Target Hazard Quotient} \times \text{RfD}/\text{HIF}$$

A list of Federal and State ARARs that are deemed practicable for the subject removal action is provided as follows:

<b>FEDERAL</b>	
<i>Standard</i>	<i>Description</i>
40 CFR 50	Treatment technology standards for emissions to air: incinerators, surface impoundments, waste piles, and landfills.
40 CFR 261	Defines those solid wastes which are subject to regulation as hazardous waste under 40 CFR Parts 263-265 and Parts 124, 270, and 271.
40 CFR 262 and 263	Establishes standards which apply to persons transporting hazardous waste within the U. S. if the transportation requires a manifest under 40 CFR part 262.
40 CFR 264	Establishes minimum national standards which define the acceptable management of hazardous waste for owners and operators of facilities which treat, store, or dispose hazardous waste.
40 CFR 268	Establishes a timetable for restriction of land disposal of waste and other hazardous materials.
29 CFR 1910.120	Regulates worker health and safety.
36 CFR 800	Conform to the preservation of historic buildings and land.
40 CFR 300.415	Outlines criteria for implementation of Removal Actions.
40 CFR 300.440	Applies to any remedial or removal action involving the offsite transfer of any hazardous substance, pollutant, or contaminant defined under CERCLA Sections 101 (14) and 101 (33), whether it is conducted by EPA, other Federal Agencies, states, or private parties.
<b>STATE</b>	
<i>Standard</i>	<i>Description</i>
Iowa Air Pollution Control Regulation Chapter 567-23 & 24	Governs the release of fugitive dust in quantities creating nuisance during site activities.
Iowa Hazardous Waste Disposal Penalty Law	Establishes penalties for unlawful transportation and disposal of hazardous waste.
Iowa Responsible Parties Cleanup Regulations	These rules establish the procedures and criteria the IDNR will use to determine the parties responsible and cleanup actions necessary to meet the goals of the State pertaining to the protection of groundwater. These rules pertain to the cleanup of groundwater itself and soils and surface water where groundwater may be impacted.

### 5.1.5 PROJECT SCHEDULE

Pending EPA approval, and weather permitting, the subject removal action is scheduled to begin on approximately March 13, 1995. A projected (approximate) schedule of general tasks is as follows:

- Mobilization . . . . . March 13-20, 1995
- Clearing, Excavation . . . . . March 20-24, 1995

- Laboratory Analyses . . . . . March 24 - April 14, 1995
- Backfilling and Demobilization . . . . . April 15-22, 1995
- Treatment, Storage, & Disposal Facility (TSDF)  
Approval Process . . . . . April 15 - May 4, 1995
- Transportation and Disposal . . . . . May 4-11, 1995
- Post-Action Report Submittal . . . . . June 9, 1995

## 5.2 ESTIMATED COSTS

A cost estimate summary for the subject removal action, extracted from the EE/CA, is shown in Table 5-1. This cost estimate summary includes a breakdown of direct and indirect capital costs. No operation and maintenance costs are associated with the selected remedy. However, since the EE/CA was written, the U. S. Army Corps of Engineers (USACE) has awarded a cost-reimbursable contract to execute the selected remedy. That contract was awarded in the amount of approximately \$83,000. Actual cost of the removal action will not be known until the project has been completed.

**TABLE 5-1**  
**Summary of Estimated Costs for Pesticide Pit Remedial Action**

<b>Destruction at a Hazardous Waste Incinerator in Illinois</b>		
<b><u>Contaminated Soil Handling</u></b>		
Mobilization Backhoe + 6 yds. Dump	=	\$ 300.00
Soil Excavation:		
27 yd <sup>3</sup> @ \$4.20/yd <sup>3</sup>	=	113.40
SUBTOTAL	=	413.40
Add 40% for Hazardous Site Work	=	165.36
SUBTOTAL	=	\$ 992.16
<b><u>Confirmatory Sampling and Backfill of Area</u></b>		
5 Samples @ \$270/Sample	=	\$1,350.00
Backfill Area	=	466.30
SUBTOTAL	=	\$1,816.30
<b><u>Transport to TSD Facility</u></b>		
2 Loads @ \$990/Load	=	\$ 1,980.00
<b><u>Incineration and Disposal of Ash</u></b>		
75,000 lbs. @ \$0.65/lb.	=	\$ 48,750.00
SUBTOTAL	=	\$ 53,538.46
Scope Contingencies (10%)	=	\$ 5,353.84
<b>TOTAL</b>	=	<b>\$ 58,892.30</b>



## **6.0 EXPECTED CHANGE IN THE SITUATION SHOULD ACTION BE DELAYED OR NOT TAKEN**

Due to the lined and capped nature of the Pesticide Pit and the resulting (current) limited possibility of contaminant migration away from the pit, the impact to human health and the environment due to delay of action would be expected to be very low. Furthermore, the site is currently covered with vegetation and secured with fence to prevent the entry of workers or grazing animals. Therefore, the short-term impact if action is delayed or not taken, provided the integrity of the pit is maintained, is likely to be minimal. However, for the longer-term, impacts could be much more severe, especially if the integrity of the pit is compromised.

## **7.0 OUTSTANDING POLICY ISSUES**

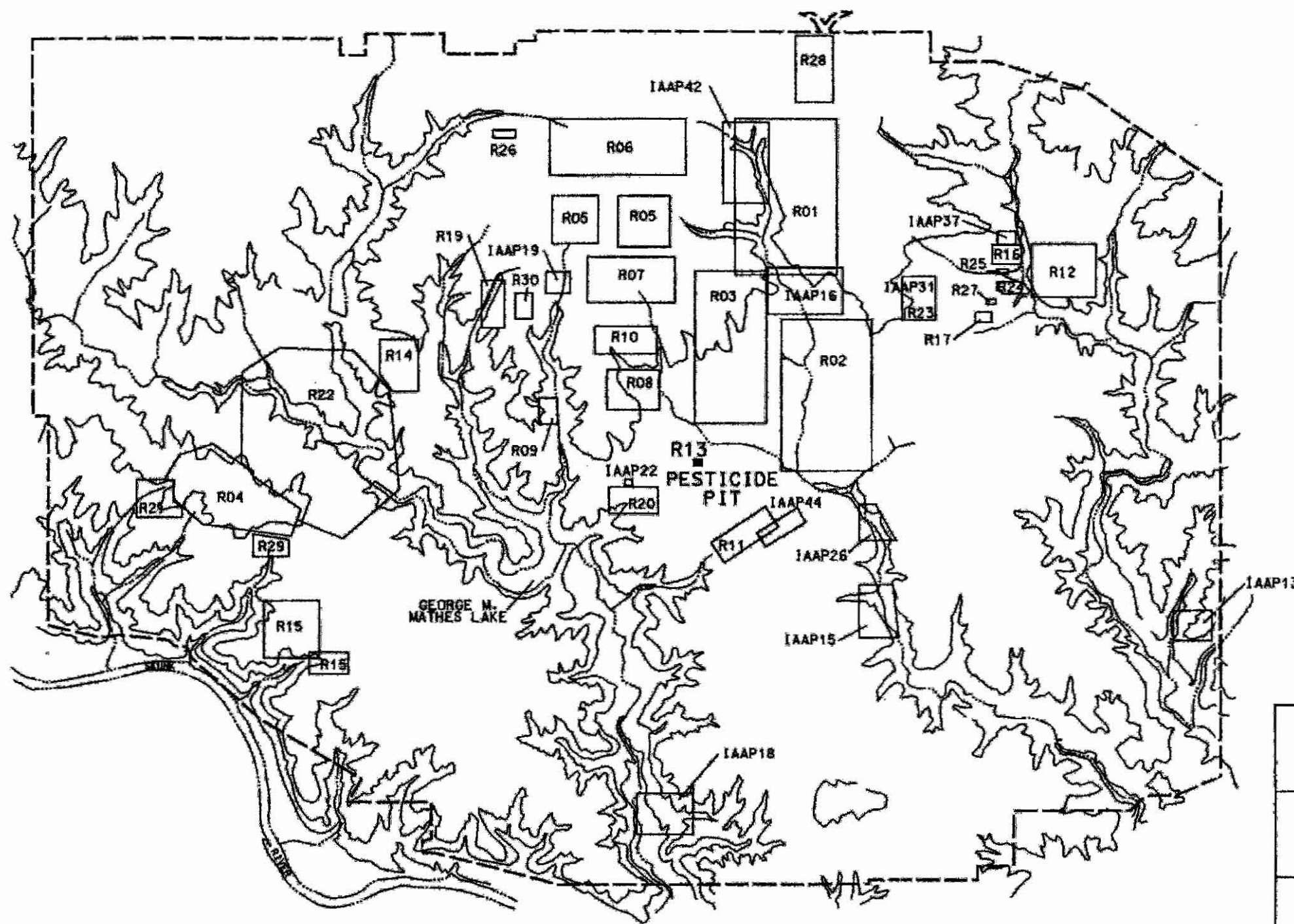
There are no outstanding policy issues related to this action.

## **8.0 RECOMMENDATIONS**

The selected removal alternative for the treatment of the contaminated soils at the Pesticide Pit is excavation of soils contaminated at levels exceeding remediation goals, confirmatory sampling to verify that RGs have been met, hauling, offsite incineration, and residual ash disposal at a permitted offsite landfill (preferably with both incineration and ash disposal at the same facility). Since this is intended to be a complete removal, no operation and maintenance will be necessary.

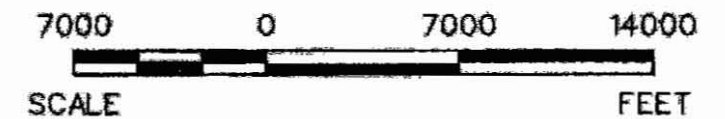
The intent of the subject removal action is to excavate all soil contamination exceeding risk-based remediation goals and to dispose of it offsite, consistent with the anticipated final remedy for the IAAP site. Any current or future risks attributable to the site following the subject non-time critical removal action will be addressed in the soil and groundwater operable unit FS reports (and RODs) and subsequent response actions, if necessary.

This removal action is effective in eliminating potential releases of hazardous substances/wastes to the environment, is readily implementable, is cost effective, and satisfies criteria of Section 300.415 of the NCP regarding removal actions. Therefore, it is recommended that this action be executed as planned, beginning in mid-March 1995.



LEGEND:

- INTERMITTENT STREAM
- TOPOGRAPHIC CONTOUR  
CONTOUR INTERVAL - 50 FEET



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**JAYCOR**  
Environmental

IOWA ARMY AMMUNITION PLANT  
MIDDLETOWN, IOWA

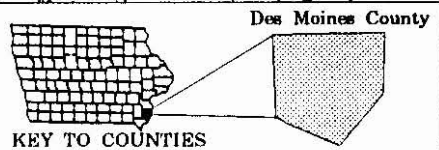
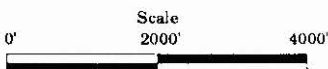
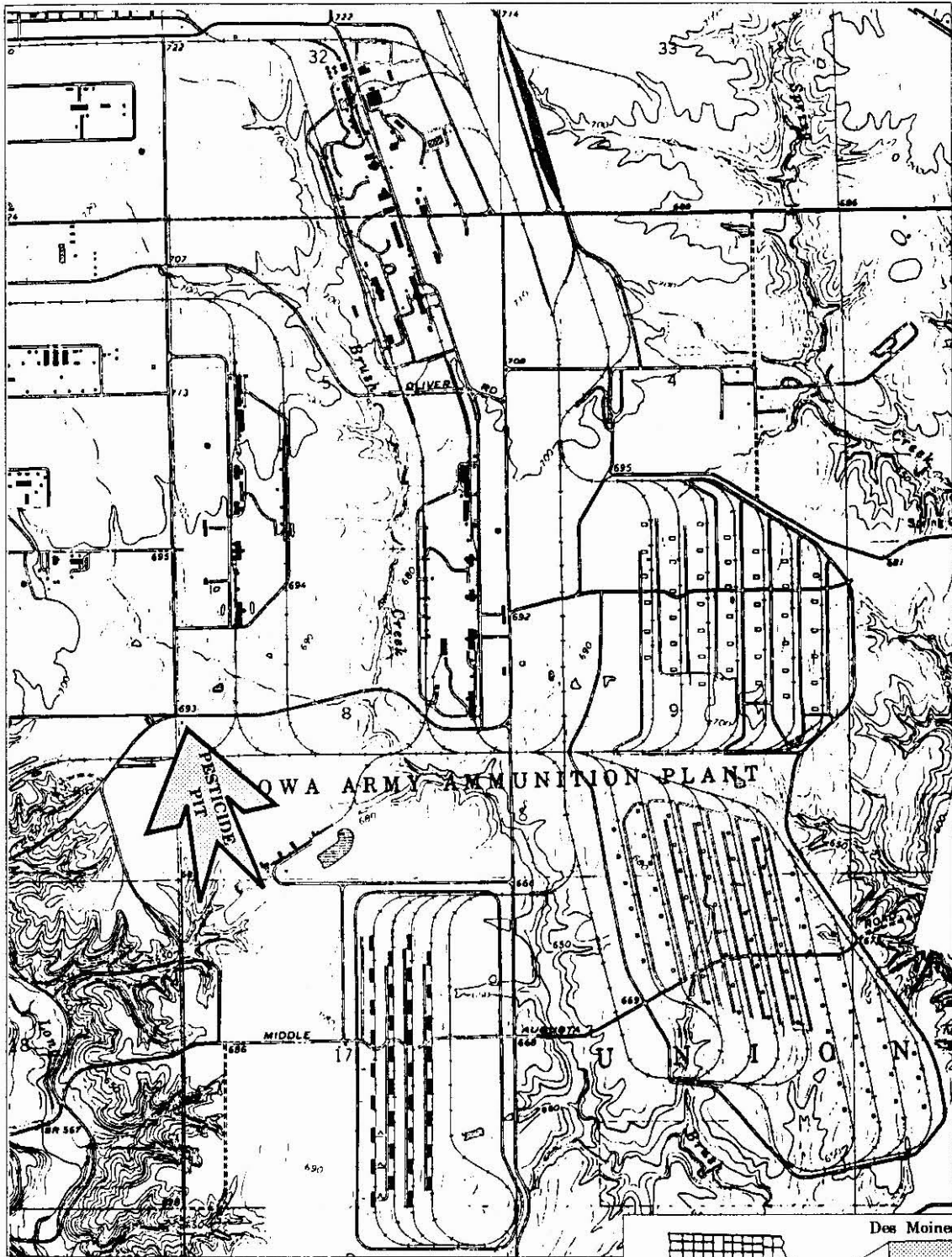
IAAP Facility Showing Basewide  
Site Locations

SOURCE: Mason & Hanger-Silas Mason Co., Inc.


FILE NO. IAAPMSTR | DRAWN BY: DDS | PROJECT #: 7150-100 | SHEET: 1 OF 1

DATE: 3/95

FIGURE: 1-1



COREL: IAAP08

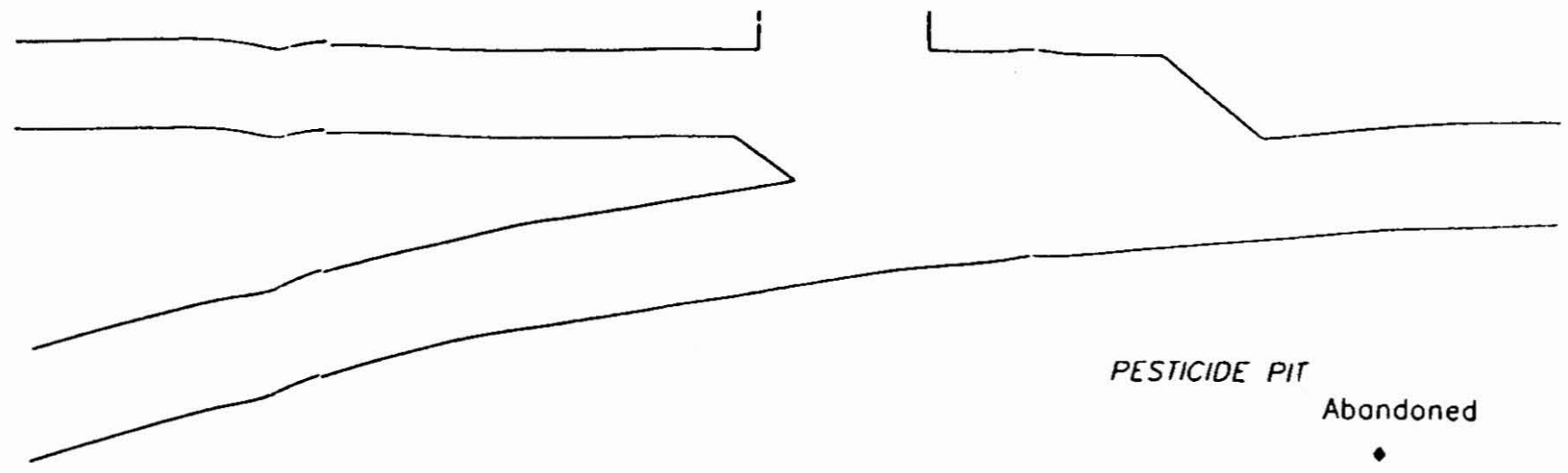
Project No. 6102-012	Iowa Army Ammunition Plant Middletown, Iowa
	 <b>CDM FEDERAL PROGRAMS CORPORATION</b> <small>a subsidiary of Camp Dresser &amp; McKee Inc.</small>

## Pesticide Pit Location Map

Figure No.:

1-2

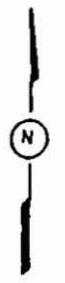
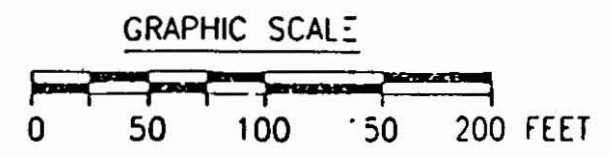
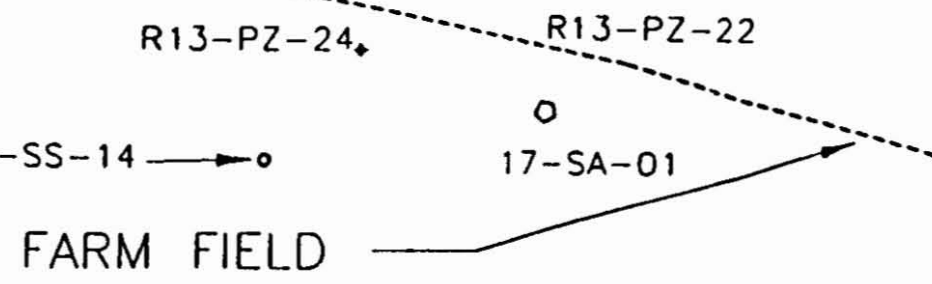
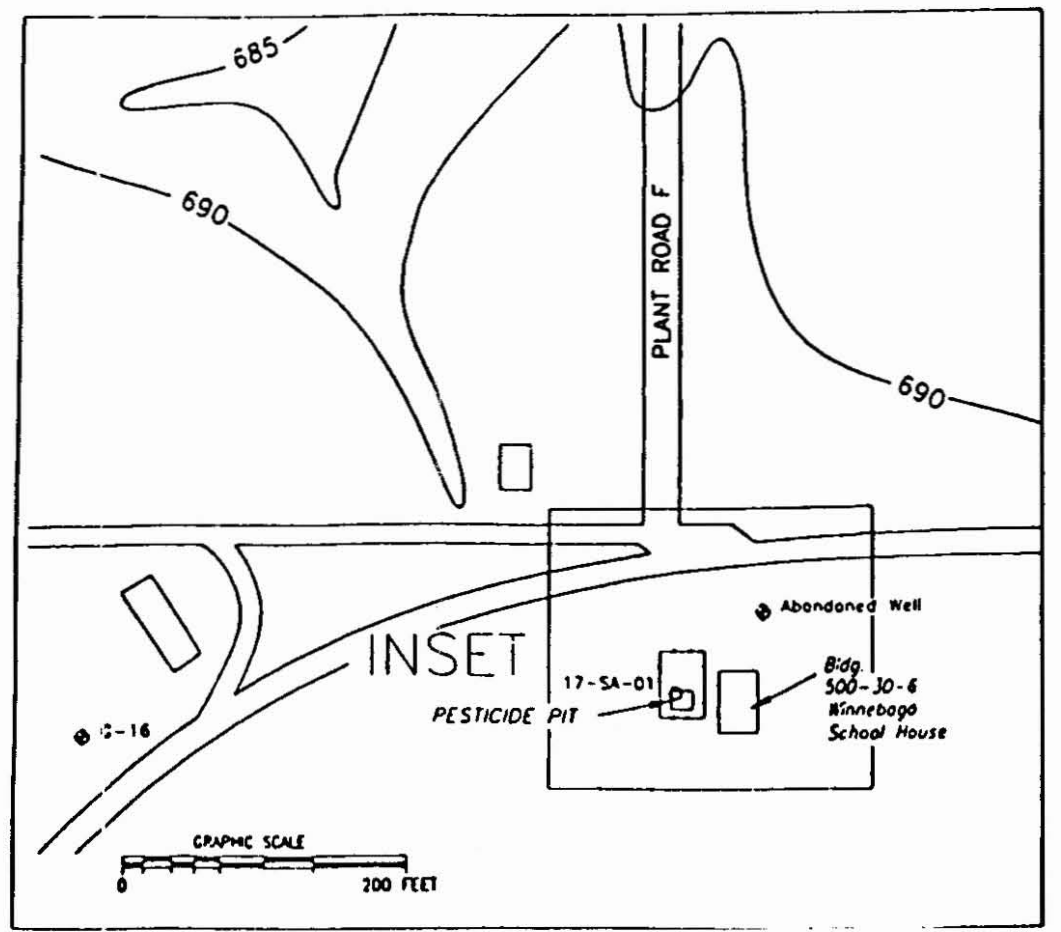
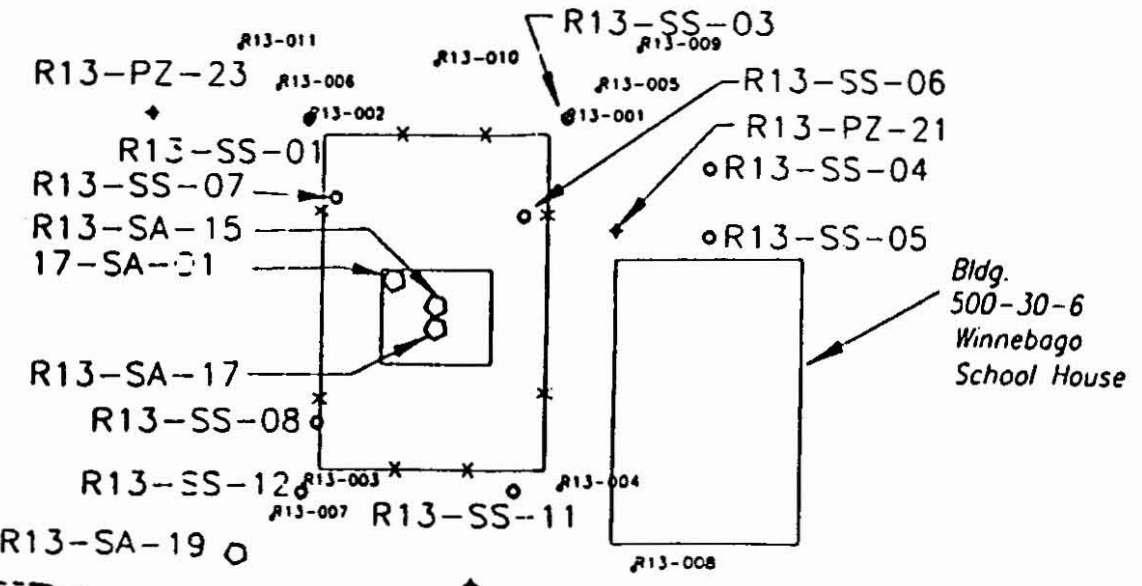
3/95



PESTICIDE PIT  
Abandoned


**LEGEND**


- 690 TOPOGRAPHIC CONTOUR  
CONTOUR INTERVAL = 5 FEET
- ROAD
- FENCE
- 500-30-6 BUILDING #



**SAMPLE KEY**

- ⊕ MONITORING WELL
- SOIL SAMPLE
- ◻ SUBSURFACE SOIL SAMPLE
- ⊗ SUBSURFACE & SURFACE SOIL SAMPLE
- △ SURFACE WATER SAMPLE
- ▽ SEDIMENT SAMPLE
- ⊛ SURFACE WATER & SEDIMENT SAMPLE
- SCREENING SAMPLE
- ⊕ GEOPROBE SAMPLE
- ⊕ PIEZOMETER SAMPLE
- ⊕ GEOPROBE & PIEZOMETER SAMPLE

  
 CDM FEDERAL PROGRAMS CORPORATION  
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**JAYCOR**  
 Environmental

**IOWA ARMY AMMUNITION PLANT**  
 MIDDLETOWN, IOWA

Site Map of IAAP R13  
 Pesticide Pit  
 (Formerly IAAP 17)

SOURCE: Mason & Hanger-Silas Mason Co., Inc.			
FILE NO. IAAPT8	DRWN BY: LR	PROJECT #: 7150-100	SHT. 1 OF 1
DATE 3/17/95			FIGURE: 1-3