PHASE IIB
ASSESSMENT OF FOUNDRY FILL

AKERMAN H.W., INC.
1005 PERKINS AVENUE
WAUKESHA, WISCONSIN 53186

Prepared for:

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Versar Job No. 1871.001

October 1992

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1.0 INTRODUCTION

Versar, Inc. (Versar), was retained by VME Americas, Inc. (VME), to perform a Phase IIB site investigation of foundry fill at the Akerman, Inc., facility located at 1005 Perkins Avenue in Waukesha, Wisconsin.

During a Phase I property assessment, fill material was identified at the ground surface in the eastern half of the property. Phase IIA sampling and analysis of the surface fill material indicated that chemical compounds are present that warranted further study. This Phase IIB study responds specifically to the need for developing additional information on the fill material.

The scope of work was designed to evaluate an area of concern identified on the property during previous the Phase II site investigation. A small segment of the site was previously identified as an area of surface fill containing construction and demolition debris. The scope of work within the Phase II B study area included the following tasks:

- Excavation of 7 of 9 planned test pits in the fill area using a grid spacing to determine the vertical and horizontal extent of fill material of unknown origin.

- Collection of samples from the base of the fill for laboratory analysis to determine chemical properties.

This report summarizes the procedures followed during sample collection, discusses the analytical results obtained from laboratory analysis of submitted samples, and provides a recommended course of action.

2.0 SITE BACKGROUND

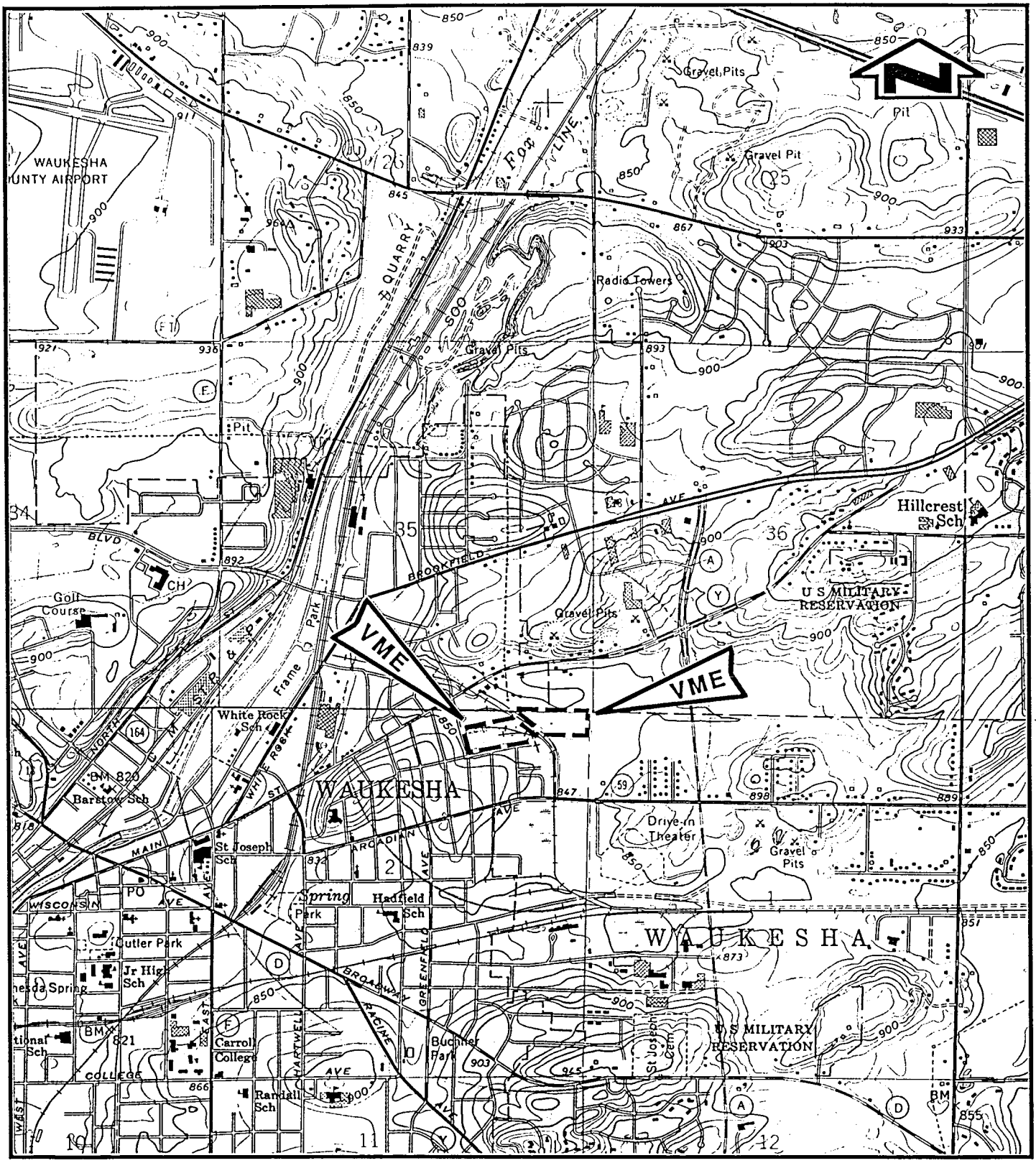
2.1 Property Description

The Akerman facility is located at 1005 Perkins Avenue in Waukesha, Wisconsin, as shown in Figure 1. The facility is located in Waukesha County, Township 6 North, Range 19 East, Section 2, Northeast quarter.

It has been reported to Versar that the property was purchased by VME in 1990 from Akerman/Hein-Werner. Hein-Werner manufactured hydraulic components and excavation equipment at the facility. VME leased approximately 60% of the facility to Akerman and 40% of the site to Hein-Werner. Akerman utilized the facility for the manufacture of excavation equipment while Hein-Werner continued to manufacture hydraulic components. At the writing of this report, excavation manufacturing operations for Akerman were being transferred to a plant located on the East Coast and the Waukesha operation is being phased out. Operations for Hein-Werner were also being discontinued at the Waukesha facility.

2.2 Area Hydrogeology

Shallow groundwater at the site is expected to flow toward the creek which bisects the property. Literature indicates site soils are composed of the glacial deposits overlying Silurian dolomite. The glacial deposits are present as the New Berlin Formation which is typically composed of an upper unit that is mostly till (clayey soil) and a lower sand and gravel unit. The upper unit is interpreted as a basal till deposited during an ice lobe retreat, and tends to retard the flow of groundwater while lower unit is interpreted as outwash sediment deposited in front of and around the margins of an advancing ice lobe which generally allows large flows of groundwater. (Schneider, 1983)



Waukesha, WI USGS 7.5 minute series topographic quadrangle map, 1959. Photorevised 1971.
Dashed line encloses site location. SCALE 1:24000 Photoinspected 1976.

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Quadrangle Location

1 1/2 0 1 Mi.

1000 0 1000 2000 3000 4000 5000 6000 7000 Ft.

1 .5 0 1 Km.

1 inch equals 2000 feet.

Figure 1.
Property Location Map
VME/Akerman Excavators, Waukesha, Wisconsin

2.3 Property Features

The property is composed of approximately 16 acres which are bisected by an unnamed creek and a railroad easement, as shown in Figure 2. The manufacturing facility is located on the western portion of the property. The eastern portion of the property was used for employee parking and demonstration of excavation equipment. A metal storage shed is also located on the eastern portion of the property. The eastern section of the property has been backfilled to allow its use as additional parking. Surface fill observed during initial investigations at the facility, appears to cover approximately 150 feet by 150 feet or approximately 10% of the total area. Debris noted on the ground surface consisted of bricks, gravel, cement blocks, scrap metal, and foundry slag. The remaining portion (90%) of the eastern half of the property is covered with asphalt or smoothly-graded gravel.

As a part of the site assessment aerial photographs taken in 1963 and 1975 were examined and were found to indicate that the eastern portion of the site was filled between 1963 and 1975. Specifically, the 1963 air photo does not appear to show any fill activity and employee parking is located on the western portion of the site to the rear of the manufacturing building. In the 1975 air photo, the manufacturing building has been expanded eastward leaving little space for employee parking at the rear of the building. It is noted from the 1975 photo that fill activity was completed on the eastern portion of the site to allow for employee parking. These two aerial photographs are included as Figures 3 and 4.

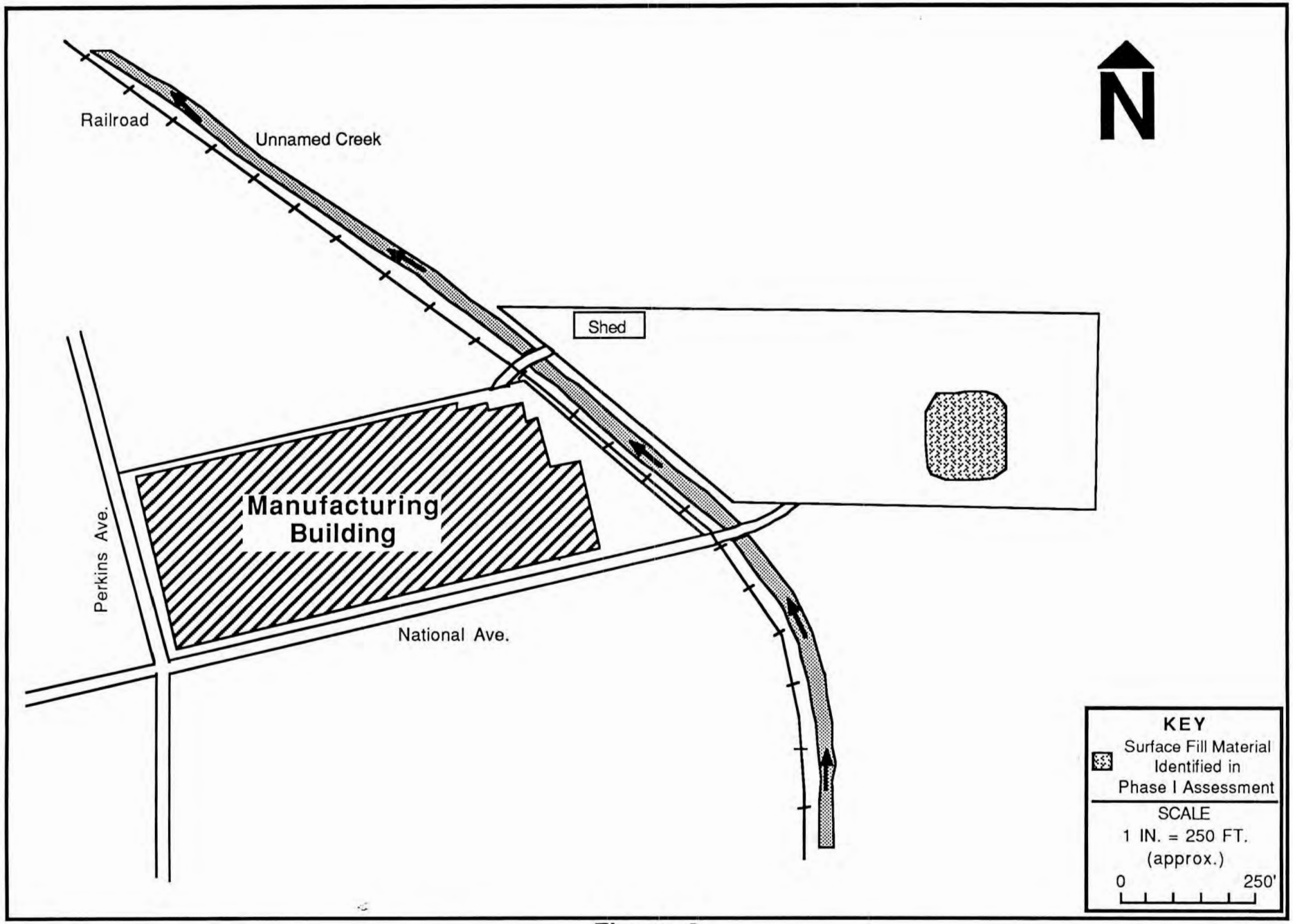

Figure 2.
Property Features Map
VME/Akerman Excavators, Waukesha, Wisconsin

Dashed line encloses property location

Figure 3.

Historical Aerial Photograph - 1963.

VME/Akerman Excavators, Waukesha, Wisconsin

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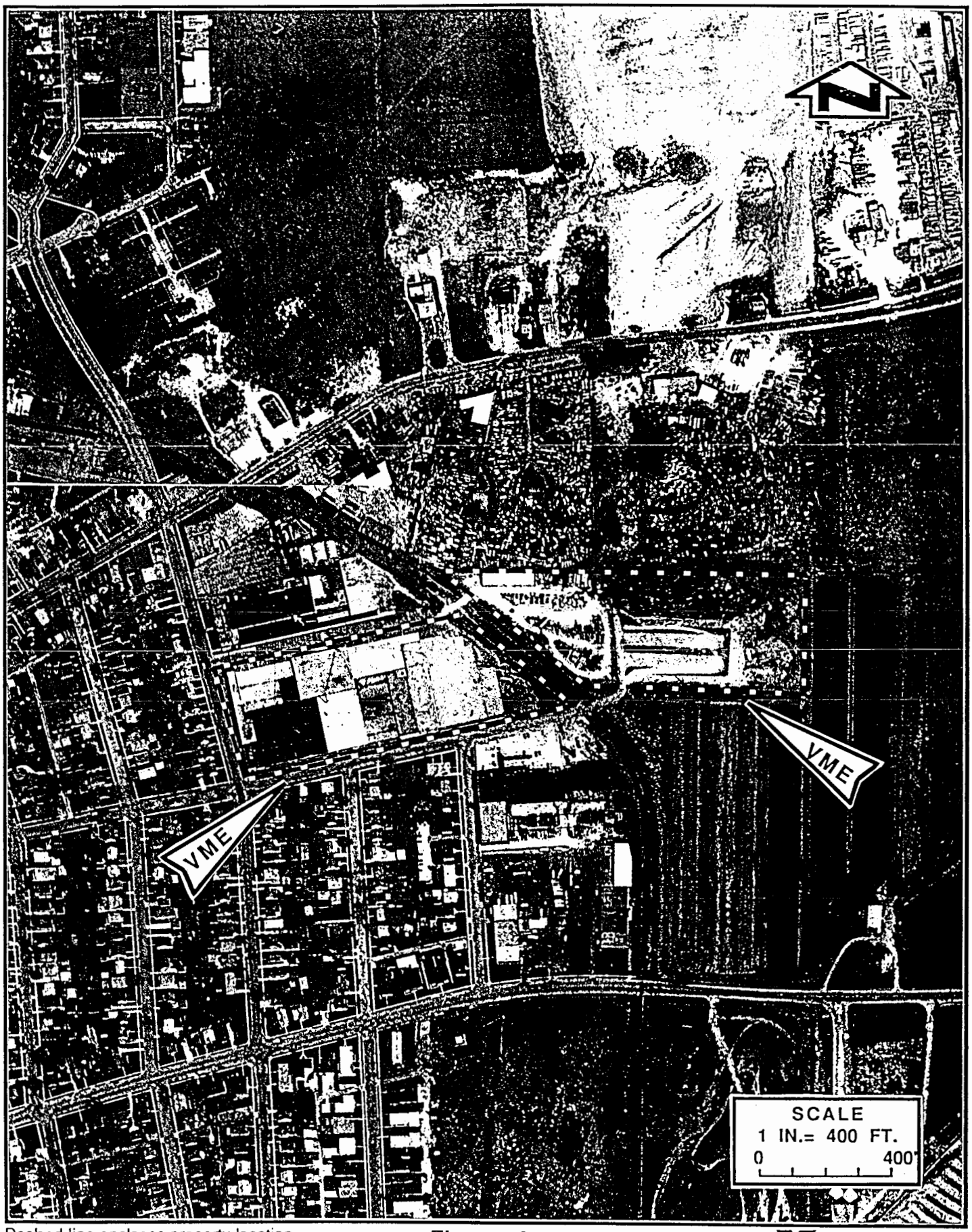

Dashed line encloses property location

Figure 4.

Historical Aerial Photograph - 1975.

VME/Akerman Excavators, Waukesha, Wisconsin

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3.0 DATA COLLECTION PROCEDURES

In order to evaluate the extent of either volatile organic compounds or foundry chemical within the fill on site it was planned that nine test pits located in a grid pattern were to be excavated. The original sampling locations are shown in Figure 5. The first and second test pits, TP-1 and TP-2, were installed in the vicinity of original surface material sampling locations. After the excavation of TP-1 and TP-2, it was evident that the fill material consisted of foundry sands and slag and that the fill extended beyond the original sampling grid. TP-3 was then excavated at the eastern most accessible location. TP-4 was excavated at the southern most accessible location in the vicinity of TP-2. Excavation of test pits was then extended to the west to delineate the western extent of foundry fill material. During the excavation of the seventh test pit, TP-7, the fill appeared to be construction fill. Having accomplished the investigation intent the excavation was halted, as the extend of foundry fill had been satisfactorily delineated. The test pit locations are shown in Figure 6.

Appropriately, the test pits were excavated with an Akerman hydraulic excavator model H14BLC. Excavation of a test pit was halted after the total fill thickness was completely exposed. Within the areas excavated the depth to the bottom of fill material ranged from approximately 5 to 9.5 feet. In order to assure the total fill thickness was found, a total trench depth ranged from approximately 6.5 to 14 feet. The bucket of the excavator was thoroughly steam cleaned prior to the start of field activities and between the excavation of each test pit. The test pits and excavated material were screened with a laboratory calibrated HNu photoionization detector (10.2 eV probe) to potentially detect the presence of volatile organic vapors. No readings above background were observed. Descriptions of the fill material and insitu soils were recorded and are included in Attachment 1.

Based on the greater probability of detecting chemicals below zones that may have been leached, material was collected from near the base of the

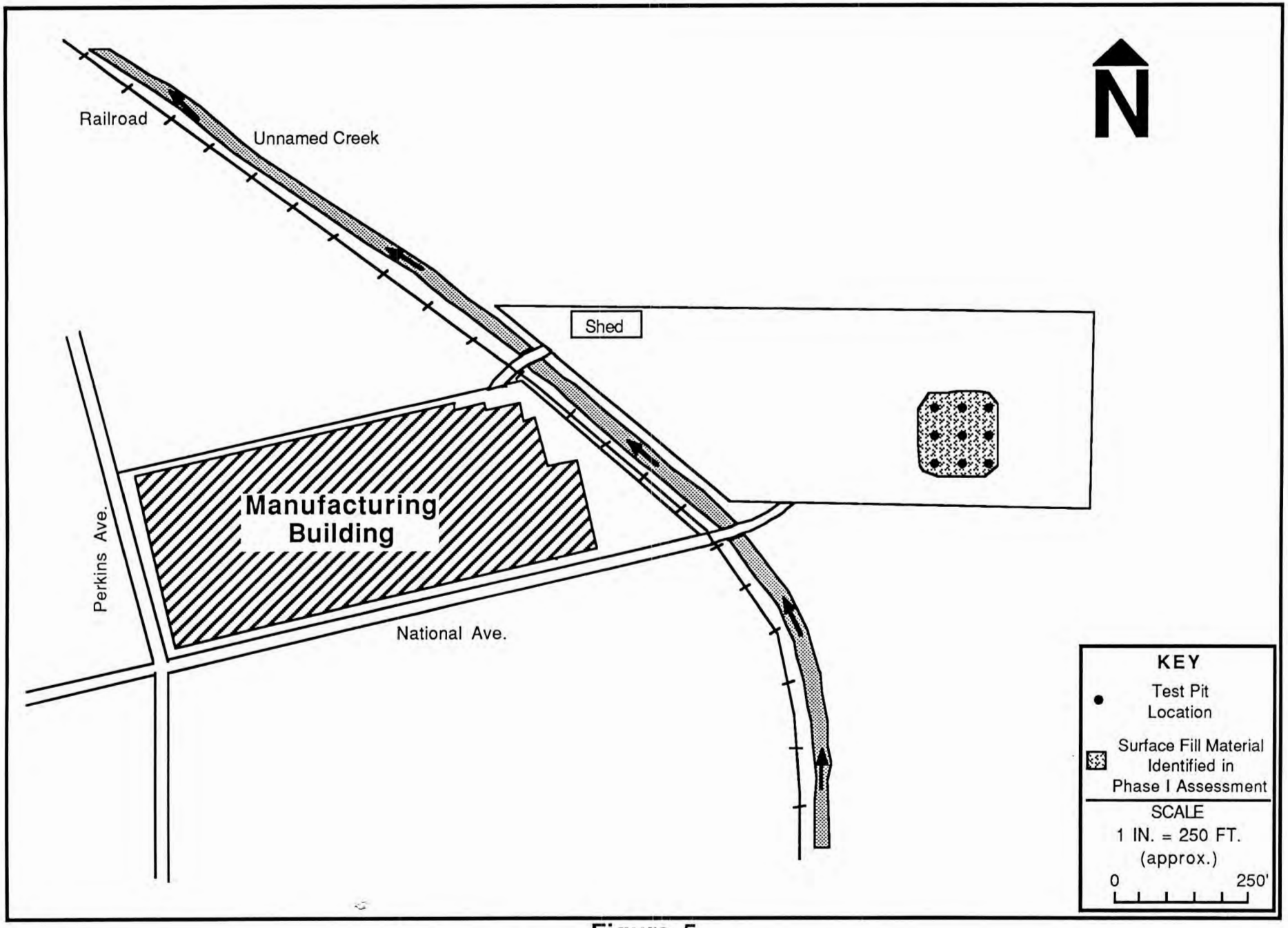

Figure 5.
Proposed Test Pit Locations
VME/Akerman Excavators, Waukesha, Wisconsin

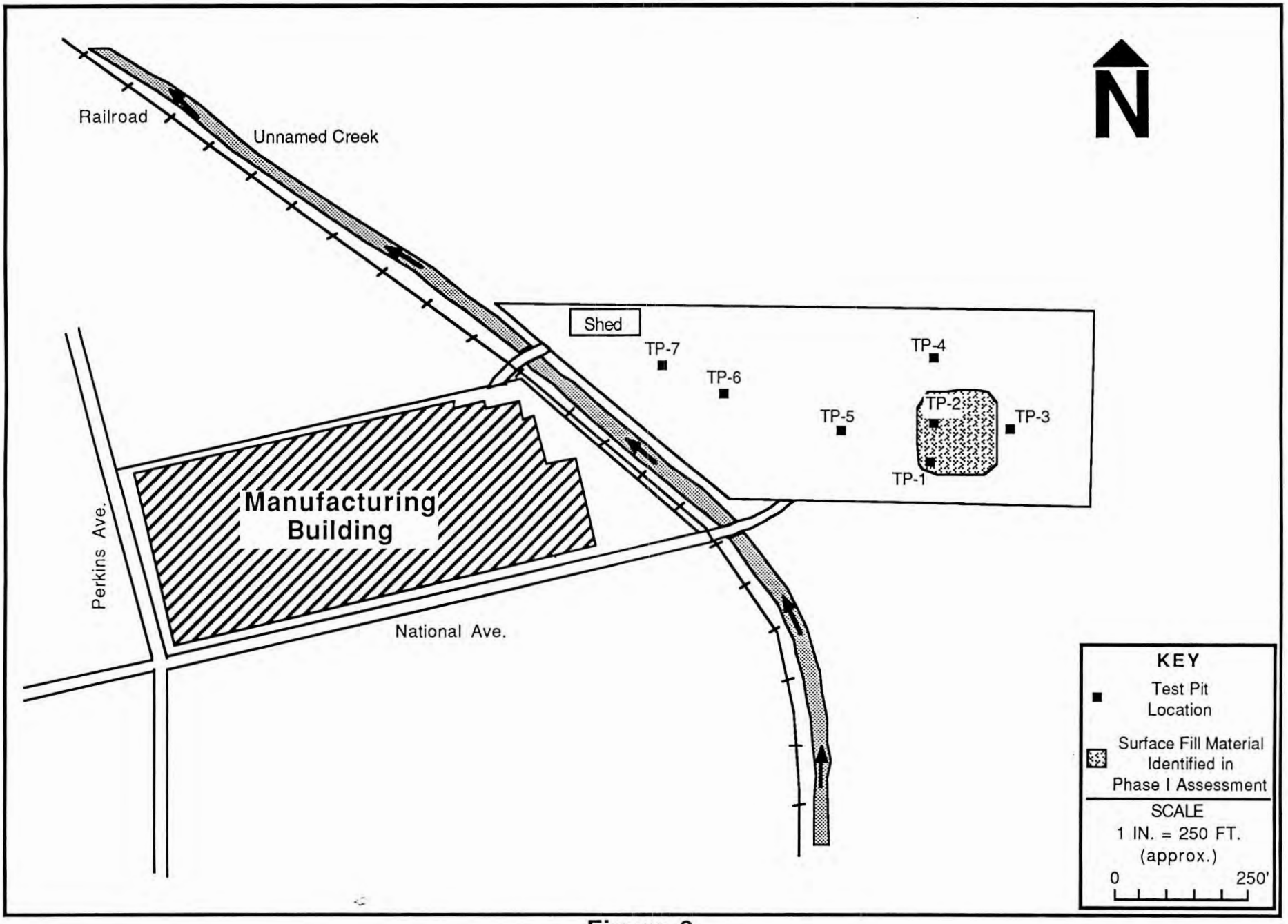

Figure 6.
Test Pit Locations
VME/Akerman Excavators, Waukesha, Wisconsin

fill for laboratory analysis and analyzed for landfill acceptance criteria. Due to the apparent low permeability of the native soils, soils beneath the fill were not collected for laboratory analyses.

During sampling procedures, field personnel wore dedicated nitrile gloves over surgical gloves. Fill material was collected with a decontaminated stainless steel scoop and packed into laboratory prepared glass containers with Teflon lids. The samples were immediately placed on ice in a cooler, transported via chain of custody procedures to a chemical analytical laboratory, and were analyzed for acceptance as a non-hazardous (special) solid waste for Waste Management of Wisconsin landfill facilities. The list of parameters and their respective acceptance limits are presented in Table 1.

Table 1 Landfill Acceptance Criteria and Acceptance Limits

PARAMETER	ACCEPTANCE LIMIT [1]
TCLP Volatiles	
Benzene	0.5
Carbon Tetrachloride	0.5
Chlorobenzene	100.0
Chloroform	6.0
1,2-Dichloroethane	0.5
1,1-Dichloroethylene	0.7
Methyl Ethyl Ketone	200.0
Tetra Chloroethylene	0.7
Trichloroethylene	0.5
Vinyl Chloride	0.2
TCLP Acid Extractables	
o-Cresol	200.0[2]
m- and p-Cresol	200.0[2]
Pentachlorophenol	100.0
2,4,5-Trichlorophenol	400.0
2,4,6-Trichlorophenol	2.0
TCLP Base/Neutrals	
1,4-Dichlorobenzene	7.5
2,4-Dinitrotoluene	0.13
Hexachloroethane	3.0
Hexachlorobutadiene	0.5
Hexachlorobenzene	0.13
Nitrobenzene	2.0
Pyridine	100.0
TCLP Metals	
Arsenic	5.0
Cadmium	1.0
Chromium	5.0
Lead	5.0
Selenium	1.0
Silver	5.0
Barium	100.0
Mercury	0.2
Copper	100.0
Nickel	35.0
Zinc	200.0
Phenol	<2000
Chlorine	<1.0%
Cyanide	<50
Reactive Sulfide	<50
Flashpoint	>140°F
pH	2.5 ≤ pH ≤ 12
PCBs	< Detection Limit

(1) Concentrations are shown in mg/l unless otherwise noted.

(2) If o-, m-, and p-Cresol concentration is used. The acceptance limit for total Cresol is 200mg/l.

4.0 DISCUSSION OF RESULTS

4.1 Fill Material and Underlying Sediments of the Test Pits

Foundry fill covers the majority of the eastern half of the site. During a previous investigation, soil borings located west of the creek that bisects the property confirms that no foundry fill is located on the western half of the property. Based on conversations with Hein-Werner personnel, the eastern half of the site was filled from the west to the east during the late 1960s through early 1970s for the primary purpose of providing additional parking for employees. That information correlates well with evidence from the aerial photography discussed earlier in this report. According to Mr. Harold Miller of Hein-Werner, the foundry fill originated from General Casting in Waukesha. Foundry sands generally contain phenolics, formaldehydes, oils, and/or bentonite as a binding material to create molds for casting metal. The material was transported to the site by Ben Kern Trucking, also of Waukesha. General Casting, now known as Waukesha Casting, was a gray iron casting facility during the period that foundry fill was delivered to the subject property.

It was observed from TP-7 that material consisting of cement block debris was used initially as fill immediately east of the creek. At an undetermined location between TP-6 and TP-7, a soil boundary exists where the fill material changes from cement block debris to foundry fill. The foundry fill extends from this point eastward to near the east property boundary. The foundry fill appears to extend from the north property boundary to the south property boundary. Confirmation of lateral extend of the foundry fill is based on observations in the areas designated as A and B on Figure 7.

The foundry fill thickness in the vicinity of test pits TP-1, TP-2, and TP-5 is documented to be approximately 5.5 feet below existing grade. The top of the foundry fill is located at up to approximately 1 foot below ground surface (BGS). The foundry fill was observed to thin toward the east and the top of the foundry fill near the east property boundary is approximately 4.5 feet BGS. The foundry fill thickens westward and

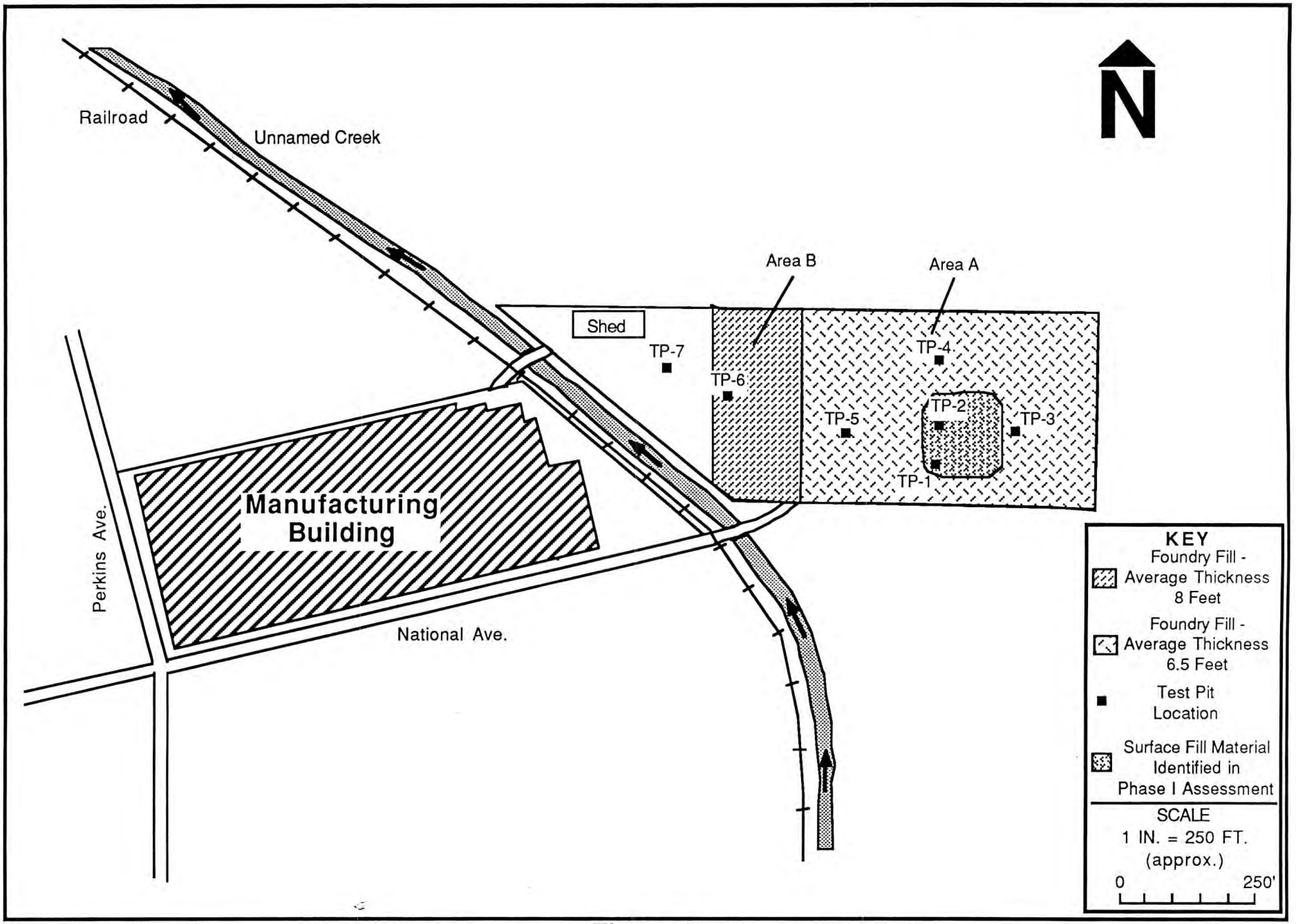

Figure 7.
Foundry Fill Areas
VME/Akerman Excavators, Waukesha, Wisconsin

northward to a thickness of approximately 8 and 7 feet, respectively. Based upon an average thickness of 6.5 feet for the area designated as A on Figure 7 and an average thickness of 8 feet for the area designated as B on Figure 7, calculations indicate that the foundry fill volume is approximately 69,000 cubic yards.

The cement block debris consists primarily of subrounded sand and gravel, with gravel up to 4 inches in diameter. The sand and gravel was likely mined from river deposits. Portions of broken cement blocks are commingled with the sand and gravel material.

The foundry fill consists primarily of black sand. There were some pockets of yellowish-brown and white sand, interpreted to be partial casting molds. There were minor amounts of slag, wire, and lumber.

The insitu soils located beneath the foundry fill consists of fine-grained materials. The native soil generally consist of brown organic silty clay overlying gray silt and silty clay.

4.2 Analytical Laboratory Results

Versar's chain of custody forms and results from laboratory analyses are included in Attachment 2. The results are summarized in Table 2.

The foundry fill samples analyzed indicate that the material is currently classified as non-hazardous. The volatiles organic compounds tetrachloroethylene (PCE) and trichloroethylene (TCE) were detected up to 0.054 and 0.017 parts per million (ppm), respectively, but remain significantly below the landfill acceptance limits of 0.7 and 0.5 ppm, respectively. The metals barium, nickel, and zinc were detected at 0.6, 0.4, and 0.5 mg/l (equivalent to ppm), respectively, but were also significantly below the landfill acceptance limits. PCBs were detected in TP-1 and TP-2 at 4.5 and 2.5 mg/kg, respectively. Test pits TP-1 and TP-2 are located in the same general area that was originally identified and sampled as surface debris. All other parameters analyzed were below the landfill limits for accepting foundry sands as non-hazardous waste.

TABLE 2
Results of Laboratory Analysis

Parameter	Parameter Concentration [1]							
	TP-1 (5'-6')[2]	TP-2 (5-6')	TP-3 (8-9')	TP-4 (6-7')	TP-5 (5-6')	TP-6 (5-6')	TP-7 (4-5')	Acceptance Limits
TCLP Volatiles								
Tetrachloroethylene	0.013	0.024	<0.005	<0.005	<0.005	<0.005	0.054	0.7
Trichloroethylene	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.017	0.5
TCLP Acid Extractables and Base/Neutrals	BDL	BDL	BDL	BDL	BDL	BDL	BDL	(3)
TCLP Metals								
Barium	0.6	0.5	0.6	0.4	0.5	0.3	0.4	100.0
Nickel	<0.1	<0.1	0.2	<0.1	0.2	0.4	<0.1	35.0
Zinc	0.5	0.3	0.4	0.2	0.4	0.2	0.1	200.0
TCLP Phenol	<0.12	0.33	0.20	<0.12	<0.12	<0.12	<0.12	2000 mg/l
Chlorine	<0.015%	<0.015%	0.016%	<0.015%	<0.015%	<0.015%	<0.015%	<1.0%
Cyanide	<5.0 mg/kg	<5.0 mg/kg	<5.0 mg/kg	<5.0 mg/kg	<5.0 mg/kg	<5.0 mg/kg	<5.0 mg/kg	50 mg/l
Reactive Sulfide	<1.3 mg/kg	49 mg/kg	<1.3 mg/kg	<1.3 mg/kg	<1.3 mg/kg	4.8 mg/kg	<1.3 mg/kg	50 mg/l
Closed Cup Flash-Point	>200°F	>200°F	>200°F	>200°F	>200°F	>200°F	>200°F	>140°F
PCBs	4.5 mg/kg	2.5 mg/kg	<0.5 mg/kg	<0.5 mg/kg	<0.5 mg/kg	<0.5 mg/kg	<0.5 mg/kg	<Detection Limits

(1) Concentrations shown as mg/l unless otherwise noted. The units mg/l and mg/kg are approximately equal to parts per million.

(2) Sample interval shown as feet below ground surface.

(3) Acceptance limits for TCLP Acid Extractables and Base/Neutrals are shown in Table 1.

5.0 CONCLUSIONS AND RECOMMENDATIONS

The purpose of this investigation was to obtain chemical and physical data and horizontal and vertical extent of fill material identified on the eastern half of the Akerman property. The eastern half of the property was filled with cement block debris and foundry fill between 1963 and 1975 to accommodate additional employee parking. The area filled was previously a low-lying area that may have been subjected to occasional flooding from the unnamed creek that bisects the property. It was observed that cement block debris was used in the western portion of the filled area. As filling continued eastward, foundry fill was utilized. The foundry fill consists primarily of sands with some partial casting molds, slag, wire, and lumber. The foundry fill is approximately 8 feet thick in the area designated as B (see Figure 7) and averages approximately 6 feet thick in the area designated as A. It is estimated that the volume of foundry fill is approximately 69,000 cubic yards.

Based on observations made during field investigations and a review of aerial photography, it appears that adjacent properties may have also been filled with material for the purpose of elevating the ground surface above flood levels. Immediately north of the eastern half of the property is an auto salvage yard that is topographically flat with an elevation approximately three feet higher than the studied property. The nature of the potential fill material at the auto salvage yard was not determined by Versar. Immediately south, the ground surface is approximately equal to the studied property, suggesting that fill may have been incorporated to elevate the ground surface. There is evidence from aerial photographs that east of the subject property filling has also occurred.

The foundry fill has been analyzed for acceptance as a non-hazardous waste and, with the exception of low concentration levels of PCBs in a limited area, passes the criteria for landfilling as a solid waste. The PCB containing area represents approximately 10% of the fill material. The concentration levels of PCBs in soil samples detecting its presence are less than 50 ppm at which point, according to Federal regulations (40 CFR

761.60 - Subpart D), disposal at a chemical (hazardous) waste landfill or destruction by incineration is required. Versar is currently obtaining Wisconsin regulations (NR 157) concerning the handling of PCB containing material and will provide additional guidance to VME as that information is interpreted.

At present, there are no plans for building on the eastern half of the property. According to Ms. Frances Koonces of the Wisconsin Department of Natural Resources (WDNR), due to extensive backfilling with foundry fill in the Waukesha area, the WDNR may allow the foundry fill to remain in place. Should any future construction be planned for that portion of the property, the WDNR will require notice and will review development plans prior to construction. Disturbed material from the foundry fill will likely be required to be disposed in a WDNR-certified landfill. The WDNR may place restriction on building activities or design prior to approving any future projects on the eastern half of the property.

According the Mr. Ken Hein of the WDNR, precedence indicates the property will likely be listed on WDNR's Registry of Abandoned Landfills. Due to foundry waste currently being classified as a solid (non-hazardous) waste, the fill is viewed as an abandoned solid waste landfill. The Registry is not a current action or enforcement list, it will be used in the future to direct WDNR to properties that may require additional investigation and, possibly, clean-up action. Current listing on the Registry will not require any additional investigations in the immediate future. However, as future environmental regulations become more strict, future investigations and/or clean-up actions and their associated standards will likely be more costly to conduct or meet.

The next step is a decision based upon present or anticipated environmental liability and commercial value of the facility and property. VME should decide to either shed the future liability of the foundry fill to the property owner at the time the fill was deposited or to address any current environmental issues that WDNR may currently have with the foundry fill.

In addition to concerns raised by having foundry fill deposited on the property, PCBs have been identified in the surface rubble and at depth. The original randomly located surface fill composite sample (July, 1992) identified PCBs at a concentration level of 42 ppm. Test pits TP-1 and TP-2 were excavated in the same area as the surface sample and have identified the presence of PCBs at concentration levels of 4.5 and 2.5 ppm, respectively, at depths of between 5 and 6 feet. Samples of fill material collected from all other test pits identified PCBs at concentration levels below the method detection limit of 0.5 ppm.

The PCBs present in the surface composite sample are identified as Aroclor 1248. A major use of PCBs was for nonflammable hydraulic systems, particularly in diecasting machines and hydraulic mechanisms used adjacent to industrial furnaces. Aroclor 1248 was recommended for complete safety with regard to spray flammability. Although the *potential sources* of PCBs in the foundry fill are understood, at present *the source* of PCBs in the fill material is not known.

There are liabilities associated with the PCBs present in the fill material. The WDNR may require additional investigation and/or corrective action to define extent and mitigate further migration of the PCBs. The concentration levels in fill samples identified as containing PCBs do not meet the current acceptance criteria of "below method detection limits" of 0.5 ppm allowing for disposal as a solid waste. It is likely that WDNR will require adherence to Federal regulations (40 CFR 761 Subpart G - PCB Spill Cleanup Policy) which outlines acceptable disposal and treatment methods. Versar will assist VME with negotiations regarding WDNR directed site activities.

There are degrees of liability associated with the identified environmental concerns at the Akerman property. At present, those liabilities cannot accurately be quantified. The liability may be quantified through a risk assessment conducted for individual or groups of compounds of concern. VME should consider the need for quantifying the liabilities for in-house use.

6.0 REFERENCES

Schneider, 1983. Wisconsinan Stratigraphy and Glacial Sequence in Southeastern Wisconsin, Geoscience Wisconsin, Volume 7, July, pp. 59-85.

ATTACHMENT 1

TEST PIT LOGS

Depth (feet)	TP-1
0 to ¾:	Top soil over gravel fill.
¾ to 6½:	Foundry fill consisting of black (N2/0) foundry sand, casting molds of founry sand, some slag, minor amounts of lumber, wire, plastic.
6½ to 7½:	Brown silty clay.
7½ to 9:	Gray (N6/0) silty clay.

TP-2

0 to ¾:	Gravel fill over sand base.
¾ to 6½:	Foundry fill consisting of black (N2/0) foundry sand, casting molds of founry sand, some slag, minor amounts of lumber, wire, plastic.
6½ to 10:	Brown silty clay.
10 to 11:	Gray (N6/0) silty clay.

TP-3

0 to 4½:	Fill consisting of subrounded gravel.
4½ to 9½:	Foundry fill consisting of black (N2/0) foundry sand, casting molds of founry sand, minor amounts of lumber and wire.
9½ to 13:	Brown silty clay.
13 to 14:	Gray (N6/0) silty clay.

TP-4

0 to 7:	Foundry fill consisting of black (N2/0) foundry sand, little wire, casting molds of foundry sand, some white silica foundry sand, some slag, moist to wet.
7 to 11:	Gray (N6/0) silty clay, trace subrounded gravel, moist.

TP-5

0 to 1:	White gravel fill.
1 to 6½:	Foundary fill consisting of black (N2/0) foundery sand, little wire and lumber scraps, trace yellow (5Y7/8) foundery sand castings, trace oil filters, moist grading downward to wet.
6½ to 8½:	Very dark gray (5Y3/1) organic clay, moist.
8½ to 9:	Light gray (N7/0) silt, moist.

Depth (feet)	TP-6
0 to 8:	Foundery fill consisting of black (N2/0) foundery sand, some pockets of yellowish brown (10YR5/6) foundary sand, trace pockets of white (10YR8/2) foundery sand, little wire and lumber scraps, moist grading downward to wet.
8 to 10:	Grayish brown (2.5Y5/2) organic clay with gastropods and plant matter, moist.

TP-7

0 to 1:	Light gray (10YR6/1) limestone gravel, angular, gravel up to 4 inches in diameter, wet.
1 to 5:	Light brownish gray (10YR6/2) sand and gravel with some clay, subrounded, gravel up to 4 inches in diameter, some broken cement blocks, wet.
5 to 6:	Black (N2/0) organic clay, moist.
6 to 6½:	Dark grayish brown (2.5Y4/2) organic clay with gastropods and plant matter, moist.

ATTACHMENT 2

CHAIN-OF-CUSTODIES
AND
LABORATORY ANALYTICAL RESULTS

QUALITY
ANALYTICAL
LABS, INC.

Project #: 920515
Date : 10/01/92
Amended

VERSAR
Suite 115
1520 Kensington
Oak Brook, IL 60521-2139

ATTN: Janice R. Smith-Bagheri

Sampling Date: 09/08,09/92
Analyses Date: 09/14-10/01/92

Identification: Seven samples taken by Janice R. Smith-Bagheri identified as:

VME
PROJECT #1871.1

Completed report.

Results follow:

Sample ID: TP-1-1

TCLP VOLATILES
Method: SW-846 8240 (modified to capillary).

Parameter	MDL (mg/L)	Analysis (mg/L)
Benzene	0.005	BDL
Carbon tetrachloride	0.005	BDL
Chlorobenzene	0.005	BDL
Chloroform	0.005	BDL
1,2-Dichloroethane	0.005	BDL
1,1-Dichloroethylene	0.005	BDL
Methyl ethyl ketone	0.25	BDL
Tetrachloroethylene	0.005	0.013
Trichloroethylene	0.005	BDL
Vinyl chloride	0.005	BDL

TCLP ACID EXTRACTABLES
Method: SW-846 8270

Parameter	MDL (mg/L)	Analysis (mg/L)
o-Cresol	0.05	BDL
m & p-Cresol	0.05	BDL
Pentachlorophenol	0.25	BDL
2,4,5-Trichlorophenol	0.05	BDL
2,4,6-Trichlorophenol	0.05	BDL

TCLP BASE/NEUTRALS
Method: SW-846 8270

Parameter	MDL (mg/L)	Analysis (mg/L)
1,4-Dichlorobenzene	0.05	BDL
2,4-Dinitrotoluene	0.05	BDL
Hexachloroethane	0.05	BDL
Hexachlorobutadiene	0.05	BDL
Hexachlorobenzene	0.05	BDL
Nitrobenzene	0.05	BDL
Pyridine	0.05	BDL

Sample ID: TP-1-1 (cont'd)

TCLP METALS
Method: Standard Method

Parameter	MDL (mg/L)	Analysis (mg/L)
Arsenic	0.2	BDL
Cadmium	0.1	BDL
Chromium	0.1	BDL
Lead	0.1	BDL
Selenium	0.2	BDL
Silver	0.1	BDL
Barium	0.1	0.6
Mercury	0.05	BDL
Copper	0.1	BDL
Nickel	0.1	BDL
Zinc	0.1	0.5
TCLP Phenol:	0.12	BDL
Chlorine:	0.015%	BDL
Cyanide:	5.0 mg/Kg	BDL
Reactive Sulfide:	1.3 mg/Kg	BDL
Closed Cup Flashpoint:		>200^{0}F
pH: (10% solution)		7.6

Method: GC/ECD

PCBs:	0.5 mg/Kg	4.5 mg/Kg

Sample ID: TP-2-1

TCLP VOLATILES
Method: SW-846 8240 (modified to capillary).

Parameter	MDL (mg/L)	Analysis (mg/L)
Benzene	0.005	BDL
Carbon tetrachloride	0.005	BDL
Chlorobenzene	0.005	BDL
Chloroform	0.005	BDL
1,2-Dichloroethane	0.005	BDL
1,1-Dichloroethylene	0.005	BDL
Methyl ethyl ketone	0.25	BDL
Tetrachloroethylene	0.005	0.024
Trichloroethylene	0.005	BDL
Vinyl chloride	0.005	BDL

TCLP ACID EXTRACTABLES
Method: SW-846 8270

Parameter	MDL (mg/L)	Analysis (mg/L)
o-Cresol	0.05	BDL
m & p-Cresol	0.05	BDL
Pentachlorophenol	0.25	BDL
2,4,5-Trichlorophenol	0.05	BDL
2,4,6-Trichlorophenol	0.05	BDL

TCLP BASE/NEUTRALS
Method: SW-846 8270

Parameter	MDL (mg/L)	Analysis (mg/L)
1,4-Dichlorobenzene	0.05	BDL
2,4-Dinitrotoluene	0.05	BDL
Hexachloroethane	0.05	BDL
Hexachlorobutadiene	0.05	BDL
Hexachlorobenzene	0.05	BDL
Nitrobenzene	0.05	BDL
Pyridine	0.05	BDL

Sample ID: TP-2-1 (cont'd)

TCLP METALS
Method: Standard Method

Parameter	MDL (mg/L)	Analysis (mg/L)
Arsenic	0.2	BDL
Cadmium	0.1	BDL
Chromium	0.1	BDL
Lead	0.1	BDL
Selenium	0.2	BDL
Silver	0.1	BDL
Barium	0.1	0.5
Mercury	0.05	BDL
Copper	0.1	BDL
Nickel	0.1	BDL
Zinc	0.1	0.3
TCLP Phenol:	0.12	0.33
Chlorine:	0.015%	BDL
Cyanide:	5.0 mg/Kg	BDL
Reactive Sulfide:	1.3 mg/Kg	49. mg/Kg
Closed Cup Flashpoint:		>200^{0}F
pH: (10% solution)		7.5

Method: GC/ECD

PCBs:	0.5 mg/Kg	2.5 mg/Kg

Sample ID: TP-3-1

TCLP VOLATILES
Method: SW-846 8240 (modified to capillary).

Parameter	MDL (mg/L)	Analysis (mg/L)
Benzene	0.005	BDL
Carbon tetrachloride	0.005	BDL
Chlorobenzene	0.005	BDL
Chloroform	0.005	BDL
1,2-Dichloroethane	0.005	BDL
1,1-Dichloroethylene	0.005	BDL
Methyl ethyl ketone	0.25	BDL
Tetrachloroethylene	0.005	BDL
Trichloroethylene	0.005	BDL
Vinyl chloride	0.005	BDL

TCLP ACID EXTRACTABLES
Method: SW-846 8270

Parameter	MDL (mg/L)	Analysis (mg/L)
o-Cresol	0.05	BDL
m & p-Cresol	0.05	BDL
Pentachlorophenol	0.25	BDL
2,4,5-Trichlorophenol	0.05	BDL
2,4,6-Trichlorophenol	0.05	BDL

TCLP BASE/NEUTRALS
Method: SW-846 8270

Parameter	MDL (mg/L)	Analysis (mg/L)
1,4-Dichlorobenzene	0.05	BDL
2,4-Dinitrotoluene	0.05	BDL
Hexachloroethane	0.05	BDL
Hexachlorobutadiene	0.05	BDL
Hexachlorobenzene	0.05	BDL
Nitrobenzene	0.05	BDL
Pyridine	0.05	BDL

Sample ID: TP-3-1 (cont'd)

TCLP METALS
Method: Standard Method

Parameter	MDL (mg/L)	Analysis (mg/L)
Arsenic	0.2	BDL
Cadmium	0.1	BDL
Chromium	0.1	BDL
Lead	0.1	BDL
Selenium	0.2	BDL
Silver	0.1	BDL
Barium	0.1	0.6
Mercury	0.05	BDL
Copper	0.1	BDL
Nickel	0.1	0.2
Zinc	0.1	0.4
TCLP Phenol:	0.12	0.20
Chlorine:	0.015%	0.016%
Cyanide:	5.0 mg/Kg	BDL
Reactive Sulfide:	1.3 mg/Kg	BDL
Closed Cup Flashpoint:		>200^{0}F
pH: (10% solution)		7.3

Method: GC/ECD

PCBs:	0.5 mg/Kg	BDL

Sample ID: TP-4-1

TCLP VOLATILES
Method: SW-846 8240 (modified to capillary).

Parameter	MDL (mg/L)	Analysis (mg/L)
Benzene	0.005	BDL
Carbon tetrachloride	0.005	BDL
Chlorobenzene	0.005	BDL
Chloroform	0.005	BDL
1,2-Dichloroethane	0.005	BDL
1,1-Dichloroethylene	0.005	BDL
Methyl ethyl ketone	0.25	BDL
Tetrachloroethylene	0.005	BDL
Trichloroethylene	0.005	BDL
Vinyl chloride	0.005	BDL

TCLP ACID EXTRACTABLES
Method: SW-846 8270

Parameter	MDL (mg/L)	Analysis (mg/L)
o-Cresol	0.05	BDL
m & p-Cresol	0.05	BDL
Pentachlorophenol	0.25	BDL
2,4,5-Trichlorophenol	0.05	BDL
2,4,6-Trichlorophenol	0.05	BDL

TCLP BASE/NEUTRALS
Method: SW-846 8270

Parameter	MDL (mg/L)	Analysis (mg/L)
1,4-Dichlorobenzene	0.05	BDL
2,4-Dinitrotoluene	0.05	BDL
Hexachloroethane	0.05	BDL
Hexachlorobutadiene	0.05	BDL
Hexachlorobenzene	0.05	BDL
Nitrobenzene	0.05	BDL
Pyridine	0.05	BDL

Sample ID: TP-4-1 (cont'd)

TCLP METALS
Method: Standard Method

Parameter	MDL (mg/L)	Analysis (mg/L)
Arsenic	0.2	BDL
Cadmium	0.1	BDL
Chromium	0.1	BDL
Lead	0.1	BDL
Selenium	0.2	BDL
Silver	0.1	BDL
Barium	0.1	0.4
Mercury	0.05	BDL
Copper	0.1	BDL
Nickel	0.1	BDL
Zinc	0.1	0.2
TCLP Phenol:	0.12	BDL
Chlorine:	0.015%	BDL
Cyanide:	5.0 mg/Kg	BDL
Reactive Sulfide:	1.3 mg/Kg	BDL
Closed Cup Flashpoint:		$>200^0$F
pH: (10% solution)		7.6

Method: GC/ECD

PCBs:	0.5 mg/Kg	BDL

Sample ID: TP-5-1

TCLP VOLATILES
Method: SW-846 8240 (modified to capillary).

Parameter	MDL (mg/L)	Analysis (mg/L)
Benzene	0.005	BDL
Carbon tetrachloride	0.005	BDL
Chlorobenzene	0.005	BDL
Chloroform	0.005	BDL
1,2-Dichloroethane	0.005	BDL
1,1-Dichloroethylene	0.005	BDL
Methyl ethyl ketone	0.25	BDL
Tetrachloroethylene	0.005	BDL
Trichloroethylene	0.005	BDL
Vinyl chloride	0.005	BDL

TCLP ACID EXTRACTABLES
Method: SW-846 8270

Parameter	MDL (mg/L)	Analysis (mg/L)
o-Cresol	0.05	BDL
m & p-Cresol	0.05	BDL
Pentachlorophenol	0.25	BDL
2,4,5-Trichlorophenol	0.05	BDL
2,4,6-Trichlorophenol	0.05	BDL

TCLP BASE/NEUTRALS
Method: SW-846 8270

Parameter	MDL (mg/L)	Analysis (mg/L)
1,4-Dichlorobenzene	0.05	BDL
2,4-Dinitrotoluene	0.05	BDL
Hexachloroethane	0.05	BDL
Hexachlorobutadiene	0.05	BDL
Hexachlorobenzene	0.05	BDL
Nitrobenzene	0.05	BDL
Pyridine	0.05	BDL

Sample ID: TP-5-1 (cont'd)

TCLP METALS
Method: Standard Method

Parameter	MDL (mg/L)	Analysis (mg/L)
Arsenic	0.2	BDL
Cadmium	0.1	BDL
Chromium	0.1	BDL
Lead	0.1	BDL
Selenium	0.2	BDL
Silver	0.1	BDL
Barium	0.1	0.5
Mercury	0.05	BDL
Copper	0.1	BDL
Nickel	0.1	0.2
Zinc	0.1	0.4
TCLP Phenol:	0.12	BDL
Chlorine:	0.015%	BDL
Cyanide:	5.0 mg/Kg	BDL
Reactive Sulfide:	1.3 mg/Kg	BDL
Closed Cup Flashpoint:		>200^{0}F
pH: (10% solution)		8.1

Method: GC/ECD

PCBs:	0.5 mg/Kg	BDL

Sample ID: TP-6-1

TCLP VOLATILES
Method: SW-846 8240 (modified to capillary).

Parameter	MDL (mg/L)	Analysis (mg/L)
Benzene	0.005	BDL
Carbon tetrachloride	0.005	BDL
Chlorobenzene	0.005	BDL
Chloroform	0.005	BDL
1,2-Dichloroethane	0.005	BDL
1,1-Dichloroethylene	0.005	BDL
Methyl ethyl ketone	0.25	BDL
Tetrachloroethylene	0.005	BDL
Trichloroethylene	0.005	BDL
Vinyl chloride	0.005	BDL

TCLP ACID EXTRACTABLES
Method: SW-846 8270

Parameter	MDL (mg/L)	Analysis (mg/L)
o-Cresol	0.05	BDL
m & p-Cresol	0.05	BDL
Pentachlorophenol	0.25	BDL
2,4,5-Trichlorophenol	0.05	BDL
2,4,6-Trichlorophenol	0.05	BDL

TCLP BASE/NEUTRALS
Method: SW-846 8270

Parameter	MDL (mg/L)	Analysis (mg/L)
1,4-Dichlorobenzene	0.05	BDL
2,4-Dinitrotoluene	0.05	BDL
Hexachloroethane	0.05	BDL
Hexachlorobutadiene	0.05	BDL
Hexachlorobenzene	0.05	BDL
Nitrobenzene	0.05	BDL
Pyridine	0.05	BDL

Sample ID: TP-6-1 (cont'd)

TCLP METALS
Method: Standard Method

Parameter	MDL (mg/L)	Analysis (mg/L)
Arsenic	0.2	BDL
Cadmium	0.1	BDL
Chromium	0.1	BDL
Lead	0.1	BDL
Selenium	0.2	BDL
Silver	0.1	BDL
Barium	0.1	0.3
Mercury	0.05	BDL
Copper	0.1	BDL
Nickel	0.1	0.4
Zinc	0.1	0.2
TCLP Phenol:	0.12	BDL
Chlorine:	0.015%	BDL
Cyanide:	5.0 mg/Kg	BDL
Reactive Sulfide:	1.3 mg/Kg	4.8 mg/Kg
Closed Cup Flashpoint:		>200^{0}F
pH: (10% solution)		7.6

Method: GC/ECD

PCBs:	0.5 mg/Kg	BDL

Sample ID: TP-7-1

TCLP VOLATILES
Method: SW-846 8240 (modified to capillary).

Parameter	MDL (mg/L)	Analysis (mg/L)
Benzene	0.005	BDL
Carbon tetrachloride	0.005	BDL
Chlorobenzene	0.005	BDL
Chloroform	0.005	BDL
1,2-Dichloroethane	0.005	BDL
1,1-Dichloroethylene	0.005	BDL
Methyl ethyl ketone	0.25	BDL
Tetrachloroethylene	0.005	0.054
Trichloroethylene	0.005	0.017
Vinyl chloride	0.005	BDL

TCLP ACID EXTRACTABLES
Method: SW-846 8270

Parameter	MDL (mg/L)	Analysis (mg/L)
o-Cresol	0.05	BDL
m & p-Cresol	0.05	BDL
Pentachlorophenol	0.25	BDL
2,4,5-Trichlorophenol	0.05	BDL
2,4,6-Trichlorophenol	0.05	BDL

TCLP BASE/NEUTRALS
Method: SW-846 8270

Parameter	MDL (mg/L)	Analysis (mg/L)
1,4-Dichlorobenzene	0.05	BDL
2,4-Dinitrotoluene	0.05	BDL
Hexachloroethane	0.05	BDL
Hexachlorobutadiene	0.05	BDL
Hexachlorobenzene	0.05	BDL
Nitrobenzene	0.05	BDL
Pyridine	0.05	BDL

Sample ID: TP-7-1 (cont'd)

TCLP METALS
Method: Standard Method

Parameter	MDL (mg/L)	Analysis (mg/L)
Arsenic	0.2	BDL
Cadmium	0.1	BDL
Chromium	0.1	BDL
Lead	0.1	BDL
Selenium	0.2	BDL
Silver	0.1	BDL
Barium	0.1	0.4
Mercury	0.05	BDL
Copper	0.1	BDL
Nickel	0.1	BDL
Zinc	0.1	0.1
TCLP Phenol:	0.12	BDL
Chlorine:	0.015%	BDL
Cyanide:	5.0 mg/Kg	BDL
Reactive Sulfide:	1.3 mg/Kg	BDL
Closed Cup Flashpoint:		>200^{0}F
pH: (10% solution)		8.5

Method: GC/ECD

PCBs:	0.5 mg/Kg	BDL

MDL = Method Detection Limit
BDL = Below Detection Limit

Respectfully submitted,

Nicholas Cuzzone
Lab Manager
Quality Analytical Labs, Inc.

Versar INC.

CHAIN OF CUSTODY RECORD

9205 15

PROJECT NO.	PROJECT NAME	INDUSTRIAL HYGIENE SAMPLE
1871.1	VME	Y / N

SAMPLERS: (Signature) _____ (Printed) JANICE R. SMITH-BAGHERI

	FIELD SAMPLE NUMBER	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	PARAMETERS: SEE ATTACHED	REMARKS: MATRIX
01	TP-1-1	9/8/92	845		X	TP-1	2	X	Soil
02	TP-2-1	9/8/92	1000		X	TP-2	2	X	Soil
03	TP-3-1	9/8/92	1150		X	TP-3	2	X	Soil
04	TP-4-1	9/8/92	1445		X	TP-4	2	X	Soil
05	TP-5-1	9/9/92	900		X	TP-5	2	X	Soil
06	TP-6-1	9/9/92	1045		X	TP-6	2	X	Soil
07	TP-7-1	9/9/92	1245		X	TP-7	2	X	Soil

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
(Printed) JANICE SMITH-BAGHERI	9/14/92	(Printed) JEFF FATA	(Printed)		(Printed)
		9/14/92 12:35			

Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks
(Printed) JEFF FATA	9/14/92 2:50 PM	(Printed)	9/14/92 2:50	IMMEDIATELY PLACED ON ICE IN COOLER.

Distribution: Original Plus One Accompanies Shipment (white and yellow); Copy to Coordinator Field Files (pink).